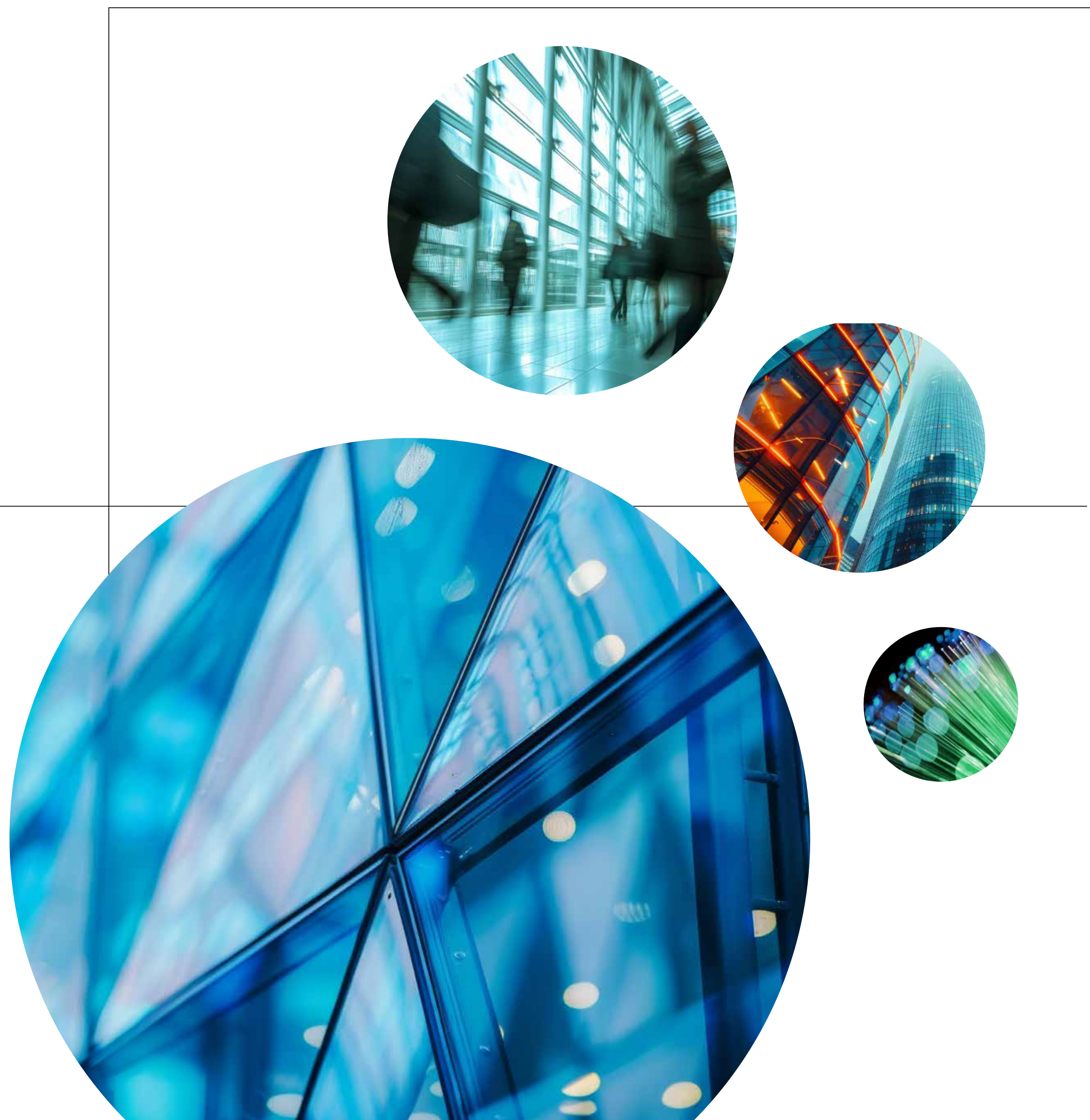


WMR FX benchmarks

The global standard for
currency valuation



**FTSE
RUSSELL**
An LSEG Business



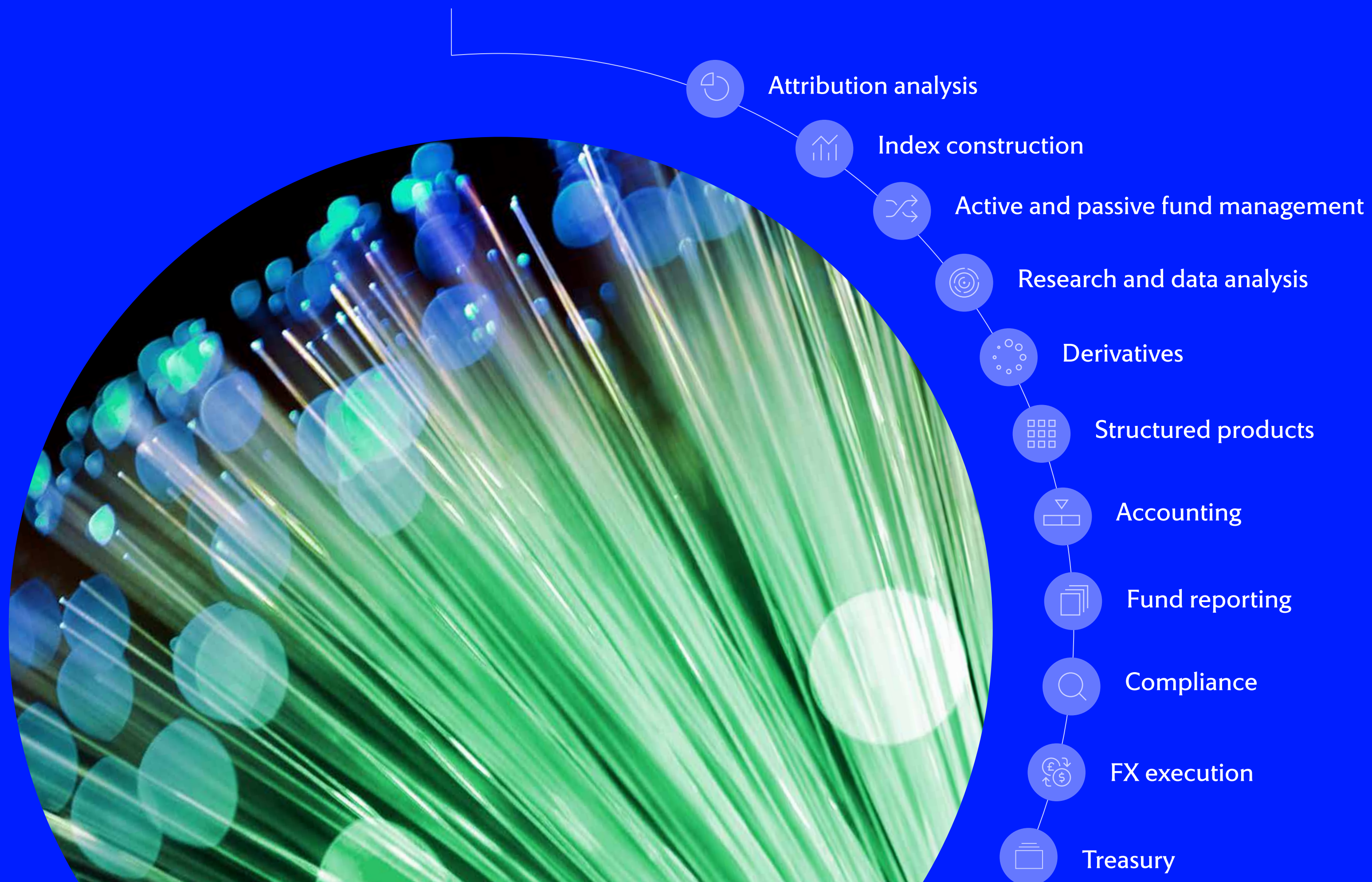
Spot on since 1994

The WMR foreign exchange (FX) benchmarks were introduced in 1994, providing a standardised way for financial market participants to value foreign assets and measure FX performance for the first time.

FTSE Russell and other major index providers quickly adopted these benchmarks to calculate global indices, which led to widespread use by institutional firms. For over 30 years the WMR FX benchmarks have been an independent, objective and unbiased source of foreign exchange data.

WMR FX rates are built with data sourced directly from market transactions. We apply multiple validation techniques to capture and calculate rates, ensuring accurate spot and forward rates at each fix throughout the day.

Today, these benchmarks are used in a variety of areas, including:



WMR's comprehensive offerings

WMR benchmark rates: An objective, unbiased source of FX data that includes intraday and closing spot rates, plus forward rates and non-deliverable forwards (NDFs).

Spot rates	16:00 UK closing, intraday and historical rates
Forwards	16:00 UK closing, intraday and historical rates in up to 11 tenors – ranging from overnight to five years
NDFs	Closing, intraday and historical rates
Historical data	Over 30 years available
Local	Specific rate publication and currencies for local markets (such as 09.55 Tokyo, 11am UK, 12 noon EST, 14.00 CET or 17.30 Israel)

Coverage and frequency

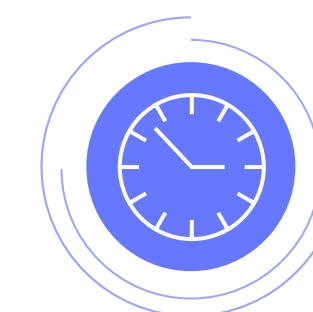
We offer a 24-hour intraday spot rate service in 157 currencies, and intraday forward rates for 80 currencies, calculated up to 22 times a day.



SPOT RATE SERVICE FOR 157 CURRENCIES

24-hour intraday spot rate service, 157 currencies. From Monday 06:00 Hong Kong time until Friday 17:00 EST:

- **Closing service** daily as of 16:00 UK time
- **Hourly service** for 157 currencies
- **30-minute updates** for 25 countries
- **Local services** (such as 09.55 Tokyo, 17.30 Israel or 14:00 CET)



79 FORWARD RATES AND 12 NDFs, UP TO 22 TIMES/DAY

Intraday forward rate service, 79 forward rates and 12 non-deliverable forward rates, up to 22 times a day:

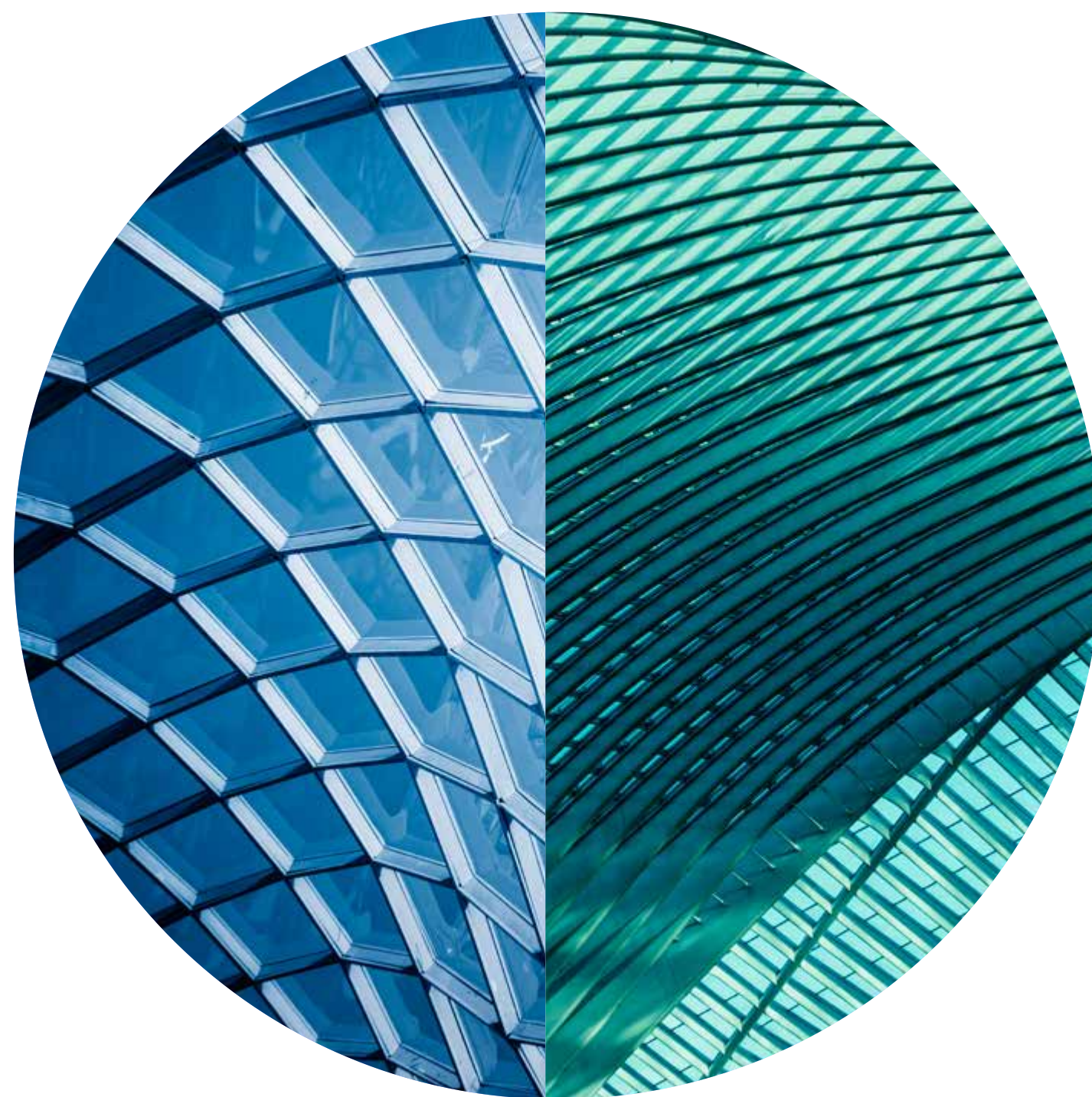
- **Closing service** daily as of 16:00 UK time
- **Hourly service** for 79 forwards and 12 NDFs
- **Up to 11 time periods** of Forwards/NDFs (ON-5Y) and in premium/discount and outright formats

Why the FX market needs standardised reporting

FX is the lubricant of the global economy and the largest financial market in the world. WMR benchmarks were introduced in 1994 to meet the need for standardised FX pricing and reporting – a necessity that continues to grow as the FX market evolves.

Benchmarks

- Providing an objective, reliable, representative snapshot of FX rates
- Relieving market participants from the need to calculate currency movements themselves
- Serving as an input for the valuation of derivatives and other investment products
- Acting as a crucial input for multi-currency equity, bond and credit index calculations and in the funds those indices serve



In April 2022, trading in global, over-the-counter (OTC) FX markets reached \$7.5 trillion per day (Bank of International Settlements survey). By comparison, global equity markets traded \$551 billion per day during the same period (World Federation of Exchanges data).

WMR Closing Spot Rate Benchmarks (as at 16:00 UK time) have been designated as Critical Benchmarks by The UK Financial Conduct Authority (effective 13 November 2024).

- Currency is traded bilaterally and continuously across the globe between various market participants
- Unlike stock markets, there is no formal ‘closing price’ for FX trading due to its global and fragmented nature
- The challenges of obtaining reliable FX data are greater in emerging and frontier markets

Global equity or bond portfolios

May be exposed to 20+ constantly changing FX rates, and the method used to capture those rates can impact performance. Large asset owners and managers use WMR to:

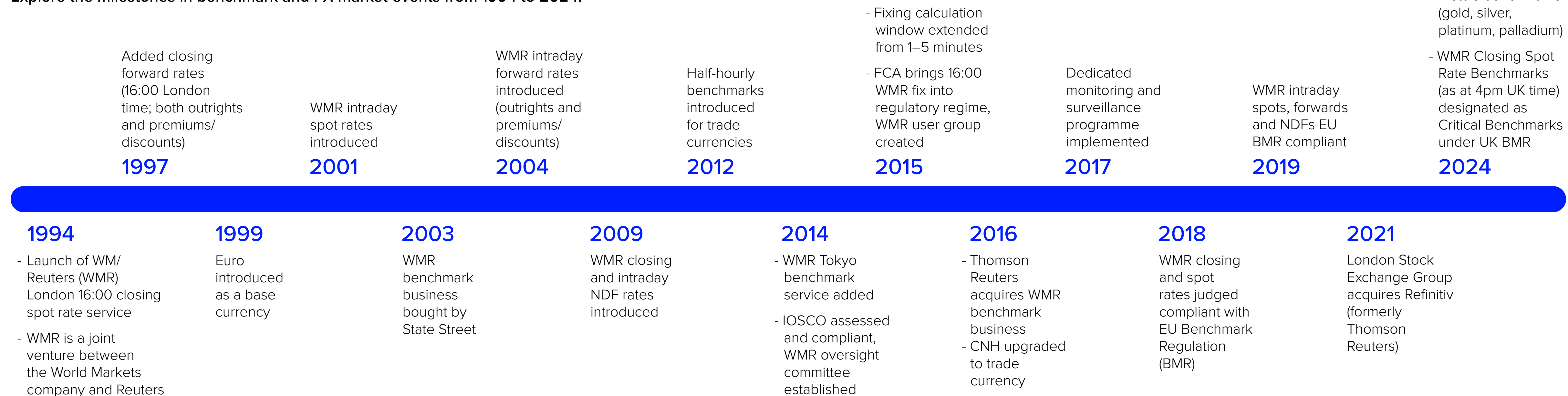
- Compare the performance of internal and external managers
- Obtain reliable risk statistics

WMR through the years

WMR FX benchmarks have recorded three eventful decades in the foreign exchange markets. Our services have expanded and deepened to meet client demand and new regulatory standards.

Timeline overview

Explore the milestones in benchmark and FX market events from 1994 to 2024.



Who uses WMR?

49/50

top asset managers¹

45/50

largest global banks²

And many financial professionals and institutions.

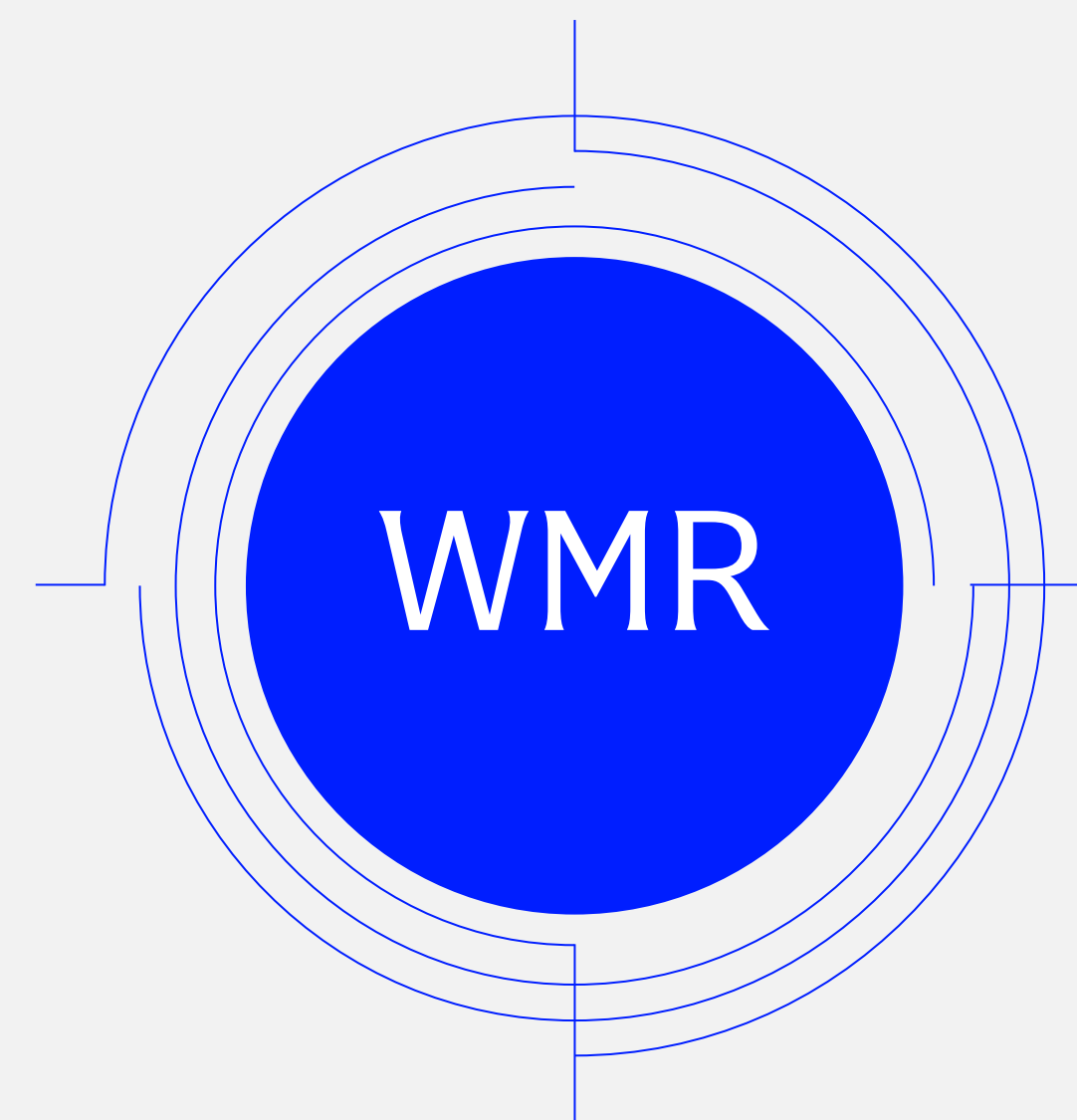
- **Active and passive fund managers:** Those with international portfolios use FX benchmark rates to value assets and assess performance.
- **Asset owners and company treasurers:** They rely on these benchmarks for internal accounting and performance reporting. They also use WMR to validate the FX rates their banks quote them and to perform Transaction Cost Analysis.
- **Index firms:** They use WMR spot and forward rates in the calculation of multi-currency equity and fixed income indices.
- **Trading platforms, fintech companies, websites and web applications:** These entities use foreign currency rates across their business activities and require a standardised way of calculating and reporting FX.

Active funds: Attribution analysis

- International funds with FX exposure
- Benchmarked to indices using WMR
- Use same rates as benchmark for accuracy

Reporting

- Asset owners and treasurers use FX rates for reporting and internal accounting
- Both use WMR rates to represent performance



Passive funds: Tracking error

- Funds tracking an index using WMR
- Use WMR rates in portfolio management to minimise tracking error

Media/wealth/ fintech/redistribution

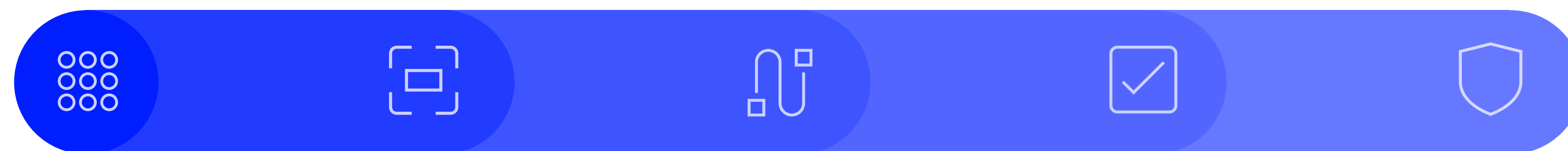
- Websites, using global market data require FX rates
- Online portals and applications require FX rates for payments, international transactions and investments for their end users

What makes a good (or bad) FX benchmark?

While it's possible to create a DIY FX benchmark, by snapping a streaming contributor quote from a data vendor at the same time every day, this would leave the data user exposed to sudden market movements around the time of the fix, as well as to data anomalies, potential delays, and regulatory burden.

Another practice is to pull in the official FX rates published by central banks. While credible, these rates are published at different times, use different holiday calendars and have diverse methodologies. Amalgamating such official feeds quickly gets tricky to manage, especially if you're dealing in emerging and frontier markets.

Here's what makes a reliable FX benchmark:



Consistent

It should be widely available, timely and delivered using a transparent methodology.

Representative

Accurately reflects FX market prices throughout the day or at a specific time, where necessary respecting the dynamics and operating rules of local FX markets.

Liquid

Represents a liquid market, with the potential to improve liquidity through the amalgamation of trades.

Attainable

Asset managers wishing to 'trade at the fix' to minimise tracking error should be able to attain that FX market price.

Robust

Immune as far as possible from potential manipulation (the benchmark's methodology should be well-designed and it should consolidate multiple data sources).

There is no perfect benchmark

It's worth stressing that there is no perfect benchmark. There are trade-offs between some of these qualities. For example, making the benchmark calculation method less transparent increases the benchmark's robustness but also makes it harder to attain. WMR aims to balance these potentially opposing objectives to provide the optimal benchmark design from the perspective of the whole user base.

And if a currency market sees disruption, we work with stakeholders to find creative and credible solutions to value their FX exposure.

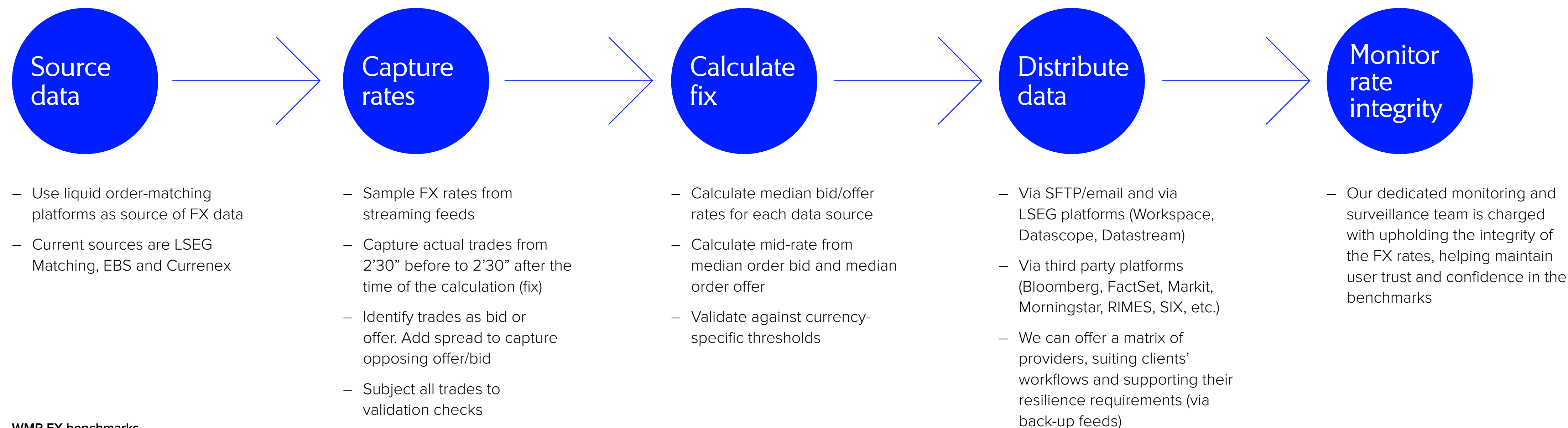
Recent regulatory reforms

Recent regulatory reforms have aimed to enhance robustness, but this has often made benchmarks less attainable. On 15 February 2015, following recommendations from the Financial Stability Board, our own responses to the recommendations and after extensive consultations with clients, we extended the 16:00 fix window from 1 minute to 5 minutes for 'trade' currencies, and from 2 minutes to 5 minutes for 'non-trade' currencies.

How we calculate a fix

We use a detailed process to calculate the fix for both trade and non-trade currencies, based on a continuous sampling of real-time market data. This ensures that our WMR benchmarks are representative, accurate and liquid.

Here are the steps involved in calculating a fix for a trade currency:



FX trading landscape is evolving rapidly

Some recent changes:

Internalisation

More FX trading is happening within large financial institutions instead of the open market.

Rise of non-banks

Non-bank entities are playing a larger role in a market traditionally dominated by banks.

Growth of passive funds

Index-tracking funds seek standardised FX rates and wish to trade at or near the fix to minimise tracking errors against their benchmarks.

Cost pressures

Increased cost pressures on the buy-side make FX trade execution costs a crucial factor.

High-frequency trading (HFT)

Capturing a larger market share by using algorithms for currency trading.

Shift to multi-participant RFQ platforms

There's continued growth away from bilateral phone and screen-based platforms to multi-participant streaming, "request-for-quote" (RFQ) and CLOBs (Central Limit Order Books), like LSEG Matching.

Post-trade structure

For example, the recent decision by securities market regulators in North America to settle equity trades on the day after trade date (T+1) has had knock-on effects in the currency market, requiring greater automation of post-trade processes and pushing FX data providers to be more reliable and efficient.

LSEG/WMR pledges to ensure that its currency benchmarks remain trusted and fundamental components of market infrastructure. They will be enhanced as market needs change.

Summary of WMR qualities



WMR benchmarks are based on three core principles:

1.

Quality data inputs and benchmark oversight

- Transparent, verifiable FX data sources
- Oversight by an independent benchmark committee (WMR methodology)
- Data from world-class primary execution platforms, chosen for their liquidity and accessibility
- Priority on trade/transaction data, and expanding our data sources and coverage as needed

2.

Data sufficiency and integrity

- 5-minute calculation with robust liquidity and market depth produces reliable and representative benchmarks
- Time-sliced capture reflects real market conditions and guards against manipulation
- Median calculation ensures accuracy and robustness
- Dedicated monitoring and surveillance team verifies and validates rates

3.

Tailored methodology

- Versatile, waterfall approach adapts to the unique characteristics of different currency markets
- Methodology is based on both global and local market practices and policies
- Calculation characteristics and validation checks align with each currency
- 24-hour view of currency markets and movements are provided

How we're growing

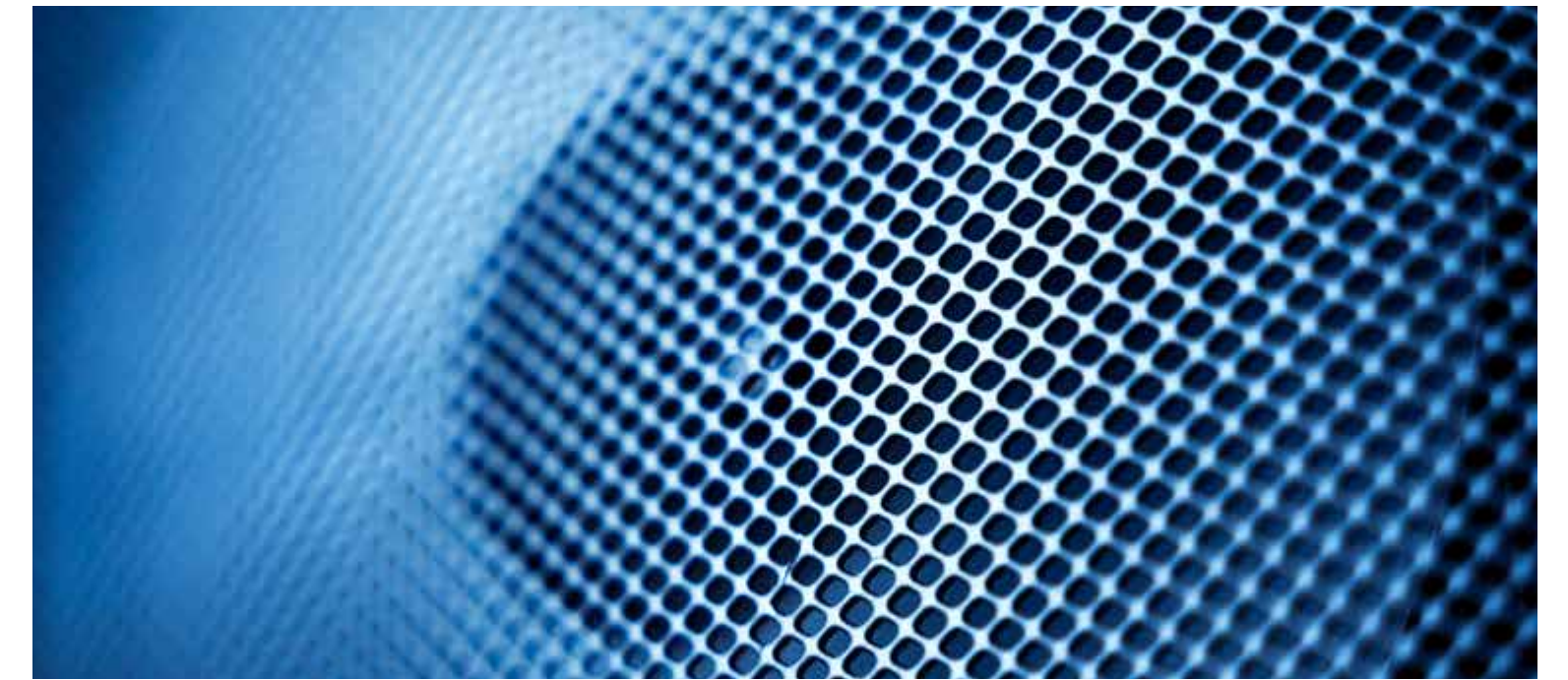
As global financial markets evolve, we're expanding beyond traditional foreign exchange to meet new demands in areas like metals and the development of digital assets.

We apply our experience in WMR's best-in-class benchmark data collection methodologies and well-understood governance structures to other traded instruments. Recent benchmarking initiatives include:



WMR metals

- WMR metals cover gold, silver, palladium and platinum
- Benchmarks are created using multiple data sources, including trade data from the EBS platform and LSEG data
- Available hourly throughout the global trading week



New asset classes

- Markets are evolving, and WMR is looking to bring its data and regulatory expertise wherever our clients need it. We see continued expansion in our future. In the meantime we work to maintain our place as the standard for rates benchmark calculation and administration

Speak to us

WMR FX benchmarks are the global standard for tracking currency movements, whether your need is valuation, comparison, reconciliation, hedging or transactions.

Our difference

- Ensure consistency with global indices for accurate performance attribution
- Fairly represent FX movements in accounting statements and performance reports
- Streamline operations across investment, treasury, risk and accounting

Discover more today

Learn how WMR FX benchmarks can meet your currency reporting needs. Please contact your LSEG D&A or FTSE Russell representative, or wmr.sales@lseg.com for more information about our robust, regulated benchmarks.



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.

Certain FTSE Russell products are served by our shared LSEG Data & Analytics teams. To learn more, email wmr.sales@lseg.com, or call your regional Client Service Team office:

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