BITNOMIAL

October 27, 2026
BY ELECTRONIC FILING
Mr. Christopher J. Kirkpatrick
Office of the Secretariat
Commodity Futures Trading Commission
Three Lafayette Centre
1155 21st Street, N.W.
Washington, D.C. 20581

Re: BTNL 2026-126 Self-Certification Pursuant to CFTC Regulation 40.2(a) Certification - Listing of Architect Standard Silver Futures Contract

Dear Mr. Kirkpatrick,

This submission concerns the listing of Architect Standard Silver Futures ("AXAG") contracts by Bitnomial Exchange, LLC ("BTNL" or the "Exchange") under Commodity Futures Trading Commission ("CFTC" or the "Commission") regulation 40.2(a). Intended listing date: October 30, 2026.

Contract Description

The Architect Standard Silver Futures contract is a cash-settled, margined dated futures contract based on the price of 1 troy ounce of silver. Attached Exchange Rule "Architect Standard Silver Futures Contract" details the product specifications.

Silver (XAG) Market Overview

Silver is a precious metal with industrial and investment uses. Commercial users exposed to silver prices may use futures to manage the USD value of purchases, sales or inventory. The proposed AXAG contract provides cash-settled exposure to one troy ounce of silver and uses the WMR Metals Daily Closing Rate as its settlement reference. The minimum trade quantity is one contract. LBMA's Q3 2026 market report discusses industrial demand and substitution in solar manufacturing, illustrating the connection between physical use and price exposure.[1]

Liquidity: LBMA reports average daily silver trading of 429.08 million ounces, valued at USD 26.83 billion, during Q3 2026. The scope and reporting conventions are described in Volume History. These aggregate observations provide context for the underlying market; they do not measure AXAG order-book liquidity or volume within the WMR fixing window.

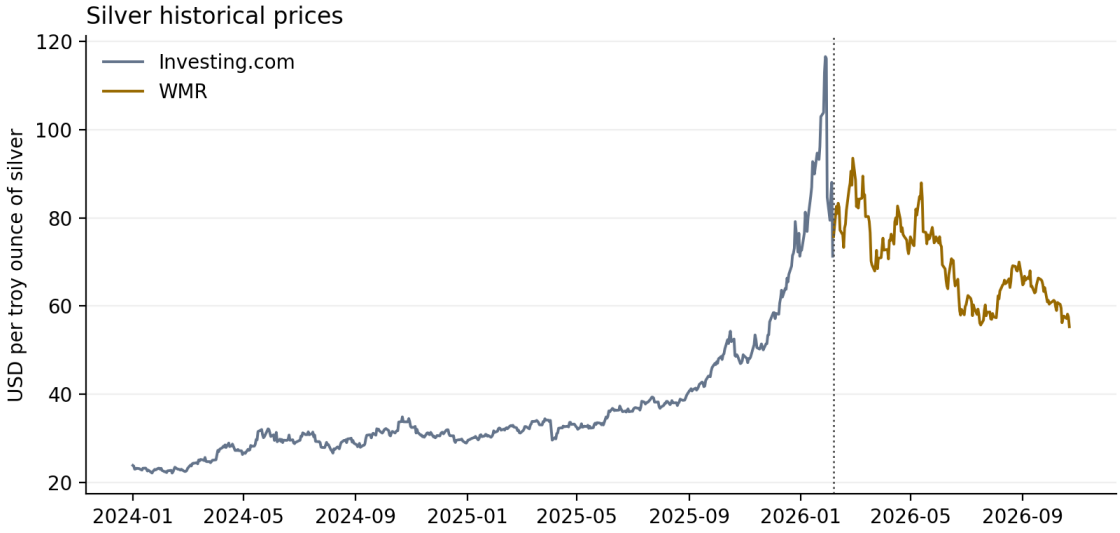
[1] LBMA Precious Metals Market Report Q3 2026, October 14, 2026.

Price History

The price history contains 729 observations from January 1, 2024 through October 22, 2026: 545 Investing.com observations through February 5, 2026, followed by 184 WMR observations from February 6, 2026. The table separates the two sources. This coverage comprises two full calendar years and part of 2026.

Measure	Investing.com	WMR
Period	2024-01-01 to 2026-02-05	2026-02-06 to 2026-10-22
Observations	545	184
First price	23.8185	75.73315
Last price	71.2921	55.27875
Lowest price	22.074 on 2024-02-13	55.27875 on 2026-10-22
Highest price	116.6095 on 2026-01-28	93.545 on 2026-02-27
Largest increase	+8.78% ending 2026-01-27	+9.07% ending 2026-02-09
Largest decrease	-27.07% ending 2026-01-30	-9.14% ending 2026-05-15

Prices are in USD per troy ounce of silver. Percentage changes compare consecutive available observations within each source segment; the source-change return is excluded. Calendar gaps, including weekends and holidays, are not filled.



Silver historical prices. Sources: Investing.com and WMR.

The dotted line marks the source change on 2026-02-06.[2]

[2] Investing.com, January 1, 2024-February 5, 2026; WMR, LSEG, February 6-October 22, 2026. Historical observations supplied in the Architect Contracts workbook.

Volume History

LBMA reports the following average daily silver trading activity. The overlapping periods are presented separately and must not be added.

Reference period	Million ounces per day	USD billions per day
Q3 2026	429.08	26.83
2026 year to date through Q3	510.34	38.59

LBMA Trade Data is based on member reporting and includes spot, swaps and forwards, options, and loans, leases and deposits. Reporting conventions distinguish trades between members from member-to-non-member trades. The published totals should therefore be retained with their stated scope, rather than treated as a count of unique physical ounces changing ownership.

The figures describe reported OTC activity across the period. They do not represent worldwide silver turnover, WMR input volume, available deliverable inventory or projected AXAG trading. The year-to-date average includes the third quarter and is not an independent observation of that quarter.

Product-level liquidity assessment must consider spreads, depth and concentration near the relevant settlement window. The aggregate figures do not by themselves justify a particular position limit or margin level.[3]

[3] LBMA Precious Metals Market Report Q3 2026, October 14, 2026, silver table; LBMA Daily Trade Reporting Data, scope and reporting conventions.

Deliverable Supply and Cash Settlement Analysis

Historical silver deliverable supply

COMEX's January 13, 2026 filing for 100-Ounce Silver Futures estimates deliverable supply as registered stocks plus 50% of eligible stocks in approved depositories. Registered silver has a warrant; eligible silver meets SI delivery specifications but has no warrant. The 50% reduction allows for long-term investment holdings. Depositories report inventory daily and undergo annual independent audits.[4]

The filing reports the following monthly averages for November 2022 through October 2025. Ounce amounts convert its rounded Silver Futures (SI) equivalents at 5,000 troy ounces per SI contract.

Supply component	SI contract equivalents	Approximate troy ounces
Registered silver	15,696	78,480,000
Eligible silver after 50% reduction	26,019	130,095,000
Total estimated deliverable supply	41,715	208,575,000

At one troy ounce per AXAG contract, the estimate corresponds to 208,575,000 AXAG contract equivalents. The 15,000,000-contract spot-month position limit represents 15,000,000 troy ounces, approximately 7.19% of this historical estimate. This scales the COMEX Silver Futures (SI) spot-month limit of 3,000 contracts at 5,000 troy ounces each. SI single-month and all-months-combined accountability levels of 6,000 contracts each scale to 30,000,000 AXAG contracts. Accountability permits information requests and directions to halt increases or reduce positions; it is not a hard cap.[5]

AXAG settles in cash to WMR and requires no silver delivery. The COMEX estimate describes historical inventory at specified depositories, not current stocks or WMR-window liquidity. Separately, LBMA reports 28,985 tonnes in London vaults at September 2026 month-end; that stock is not an estimate of freely available metal and is not added to the COMEX estimate.[6]

The reportable position level is 150 AXAG contracts for Exchange reporting, aligned with the 150-contract Silver Bullion reporting level under 17 CFR 15.03(b). Rule 407 governs Exchange large-position reports. Rules 405 and 408 govern controlled and coordinated positions and aggregation; bona fide hedge exemptions require application to the Compliance Department under Rule 405. Rule 406 permits information requests and directions to stop increasing or reduce positions above accountability levels. SI's delivery-notice spot period is not an AXAG expiration rule.[7]

AXAG's settlement formula uses WMR spot silver and contains no SI futures price or fixed SI differential. The historical three-year average is not a month-specific supply determination. No federal-limit exclusion is asserted here.

[4] Commodity Exchange, Inc., Submission No. 26-008, Exhibit F, January 13, 2026, printed pp. 9-11 (PDF pp. 10-12).
[5] CME Group, NYMEX/COMEX Position Limit, Position Accountability and Reportable Level Table, October 14, 2026 snapshot, Ch 5 Table, Silver Futures (SI), row 441, columns D, J, R, AA and AG; 17 CFR 150.1, position accountability.
[6] LBMA Precious Metals Market Report Q3 2026, October 14, 2026.
[7] 17 CFR 150.1; 17 CFR 15.03(a)-(b).

WMR Settlement Methodology

The following describes the WMR FX Benchmarks Spot, Forward, NDF and Metals Rates methodology, v30 (January 2026). FTSE International Limited is the benchmark administrator. AXAG references the XAG WMR Metals Daily Closing Rate at 16:00 UK local time, quoted in US dollars per troy ounce.[8]

Underlying market and input priority. XAG is a Trade Metal. EBS supplies arm's-length trades and bid/offer orders. Valid trades take precedence subject to sufficiency and expert judgment; orders are secondary, with metal spot quotations from RICs captured when trades and orders are unavailable.[9]

Sampling and medians. EBS trades and orders are sampled each second over five minutes centered on calculation time. Validation can exclude observations. With sufficient valid trades, separate trade bid and offer medians determine a mid rate; otherwise validated EBS order medians are used. Standard-spread controls determine published bid and offer rates. The published mid is the arithmetic mean of rounded bid and offer rates; the Exchange must consume the licensed rate side rather than reconstruct a different benchmark.[10]

Spreads, precision and validation. Standard spreads, tolerance checks and expert judgment apply. Bid and offer rates are published to four decimals and mid rates to five. AXAG's USD 0.001 per-troy-ounce tick is worth USD 0.001 per contract. WMR publication precision is distinct from Exchange settlement-price alignment: Rule 509 requires settlement prices to be rounded to the nearest contract tick.[11]

Calculation and publication times. The Closing Metals rate is calculated at 16:00 UK time, with completion and publication targeted 15 minutes later. The sampling window is 15:57:30-16:02:30. London seasonal clock changes apply; trading termination therefore precedes completion of the benchmark's window.[12]

Holidays and disruption. WMR's holiday and disruption policies can result in an earlier fixing, a carried-forward rate or no fresh rate. A received value must therefore be checked for the correct series, observation date, fixing time and status. An unavailable or unreliable benchmark is subject to the Exchange's alternative-price authority under Rule 509 and the Clearinghouse's authority under Rule 813. A carried-forward value must not be represented as a fresh fixing.[13]

Corrections, changes and cessation. WMR may correct a published rate before the following weekday's rates at the same publication time. That administrator deadline is not an automatic reopening of settled AXAG cash flows. Exchange and Clearinghouse price adjustments are governed by Rules 509 and 813; Rule 813 also addresses payment finality.[14]

[8] WMR Methodology, v30 (January 2026), sections 1.3.1 and 2.1, pp. 4 and 6.
[9] WMR Methodology, v30 (January 2026), sections 7.1, 7.3 and 7.3.1.1, pp. 25-26.
[10] WMR Methodology, v30 (January 2026), section 7.4.2, pp. 26-27.
[11] WMR Methodology, v30 (January 2026), sections 7.4.2 and 7.4.2.1, pp. 26-27.
[12] WMR Methodology, v30 (January 2026), sections 7.2 and 7.4.2, pp. 25-27.
[13] WMR Methodology, v30 (January 2026), sections 3.3-3.5, pp. 7-8.
[14] WMR Methodology, v30 (January 2026), sections 3.6 and 3.8-3.10, pp. 8-9.

Market liquidity and benchmark safeguards. The LBMA volumes above describe broader OTC activity. WMR's silver inputs come from EBS, with platform selection based primarily on liquidity and periodic review of quality and representativeness. Validated trades, fallback orders, medians and tolerance checks support the calculation; they do not establish the size of positions that can be settled without influencing the benchmark.[15]

Cash settlement removes delivery obligations but leaves incentives to influence the reference price. Surveillance must consider concentrated expiring positions, benchmark input activity, thin periods and fallback use. Source reviews, at least annual review of metal-specific validation tolerances and benchmark oversight provide additional controls; deterioration or fragmentation of input data can require methodology review.[16]

At price P in USD per troy ounce, one AXAG contract has a USD notional of P. For N contracts, a price change from P1 to P2 gives a long position N x (P2 - P1) US dollars of variation, with the opposite sign for a short position. Final settlement accounts for variation already paid; notional is not an additional principal payment. AXAG settles in US dollars with no physical delivery. Margin currency is US dollars.

The listing schedule comprises the nearest two weekly, nearest two monthly and nearest two quarterly expirations. Monthly cycles end on the last business day of the calendar month, and quarterly cycles on the last business day of March, June, September or December. Trading terminates at 16:00 UK local time (Europe/London) on that day, following London seasonal clock changes. Trading hours are 24/7 under the product-specific specification and the Exchange Market Hours schedule. The settlement reference is the dated XAG WMR Closing Metals rate, not an internal futures mark or an Exchange-calculated TWAP of WMR observations.

Daily settlement follows Rule 509: the normal daily period is 14:55-15:00 Chicago prevailing time, using the rule's Floating Market Price hierarchy. Final cash settlement uses the underlying index price. Settlement prices are aligned to AXAG's USD 0.001 tick.[17]

Core Principle Compliance

BTNL has determined that its rules related to the listing of AXAG contracts comply with the requirements of the Commodity Exchange Act and the rules and regulations promulgated by the Commission thereunder. BTNL has reviewed the DCM Core Principles and related guidance and determined that the listing of AXAG contracts impact the following Core Principles:

Core Principle 2 - Compliance with Rules:

Trading and delivery of AXAG contracts are subject to the Business Conduct and Trading Practice Rules found in Chapter 4 of the BTNL Rulebook including Rule 403 which forbids pre-arranged, pre-negotiated non-competitive trades. Trading and delivery in these products will also be subject to Market Operations and Discipline and Enforcement Rules found in Chapters 5 and 6, respectively.

Core Principle 3 - Contracts Not Readily Subject to Manipulation:

Multiple domestic and foreign markets trade the underlying silver (XAG) product, making manipulation unlikely. Additionally, Trading and delivery of AXAG contracts are not readily subject to manipulation because they are subject to position limits. Daily and Final settlement will be determined in accordance with BTNL Rule 509.

[15] WMR Methodology, v30 (January 2026), sections 7.3-7.4.2, pp. 25-27.
[16] WMR Methodology, v30 (January 2026), sections 1.3 and 3.9-3.10, pp. 4-5 and 9.
[17] BTNL Rule 509; BNCH Rule 813.

Core Principle 4 - Prevention of Market Disruption:

Trading and delivery of AXAG contracts are subject to prohibitions of market disruption under Chapters 4, 5, and 6 relating to Business Conduct and Trading Practices, Market Operations, and Discipline and Enforcement, respectively. All trading at BTNL Exchange is subject to market surveillance and a robust disciplinary framework.

Core Principle 5 - Position Limits or Accountability:

Trading and delivery of AXAG contracts are subject to position limits set forth in the product specifications. The position limits are consistent with Commission guidance. Position limits may be adjusted based on market needs.

Core Principle 7 - Availability of General Information:

Prior to the launch of trading of AXAG contracts, product terms and conditions will be available on the BTNL website. Information on delivery of AXAG contracts will be made available on the BTNL website.

Core Principle 8 - Daily Publication of Trading Information:

The Exchange will publish AXAG trading volumes, open interest levels, and price information on its website and through quote vendors.

Core Principle 9 - Execution of Transactions:

Execution of all AXAG contracts will take place on the BTNL electronic trading platform. Electronic execution provides competitive and transparent transactions. All AXAG contracts will be cleared by Bitnomial Clearinghouse, LLC ("BNCH"), a CFTC-registered derivatives clearing organisation ("DCO"), subject to Commission rules and oversight.

Core Principle 10 - Trade Information:

All requisite trade information will be recorded and stored in the audit trail and will be surveilled and monitored in accordance with BTNL Rules.

Core Principle 11 - Financial Integrity of Transactions:

All AXAG contracts will be cleared by BNCH, a CFTC-registered DCO, subject to Commission rules and oversight.

Core Principle 12 - Protection of Markets and Market Participants:

BTNL Rules have set forth numerous requirements and protections to prevent intermediaries from disadvantaging customers.

Core Principle 13 - Disciplinary Procedures:

All AXAG contracts are subject to the protections provided by Chapter 6 of the BTNL Rulebook. Chapter 6 describes the disciplinary procedures of the Exchange that authorize the Exchange to discipline, suspend, or expel Participants that violate Exchange Rules.

Core Principle 14 - Dispute Resolution:

Disputes arising from trading of AXAG contracts must be arbitrated in accordance with BTNL Rules found in Chapter 7. All disputes, controversies or claims between or among themselves that relate to or arise out of any contract or otherwise arise out of one or more transactions made or to be made on the Exchange or subject to the Rules and are based upon facts and circumstances that occurred at a time when the parties were Participants or Customers.

Certification

The Exchange has spoken with Clearing Members and market participants who support the decision to launch Architect Standard Silver Futures contracts. The Exchange is not aware of any substantive opposing views to the AXAG contracts. The Exchange certifies that the AXAG contracts and related rules certified herein comply with the Commodity Exchange Act and the rules and regulations promulgated thereunder.

The Exchange certifies that this submission has been concurrently posted on the Exchange's website at: https://bitnomial.com/exchange/regulatory

If you have any questions or require further information, please contact the undersigned at james.walsh@bitnomial.com.

Sincerely, /s/
James A. Walsh
Chief Regulatory Officer
Bitnomial Exchange, LLC

Architect Standard Silver Futures Contract - Contract Specifications

Term	Value
Product Name	Architect Standard Silver Futures Contract
Product Code	AXAG
Contract Size	1 troy ounce of silver
Price Quotation	US dollars per troy ounce
Tick Size	USD 0.001 per troy ounce
Tick Value	USD 0.001 per contract
Price Band Variation	1%
Price Limit	50%
Position Limit	15,000,000
Reportable Position Level	150
Market Hours	Rule 501 - Market Hours - 24/7
Contract Listing & Termination	Nearest two weekly, nearest two monthly and nearest two quarterly expirations. Final settlement: last business day of each cycle. Trading termination: 16:00 UK local time (Europe/London) on that day.
Settlement Method	Cash settlement in US dollars; no physical delivery
Settlement Price	XAG WMR Metals Daily Closing Rate at 16:00 UK local time on the Final Settlement Date.

Methodology

January 2026

WMR FX Benchmarks, Spot, Forward, NDF and Metal Rates

v30

FTSE RUSSELL
An LSEG Business

lseg.com/en/ftse-russell

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Section 1

Introduction

1. Introduction

1.1 History

The WMR Closing Spot Rates service was introduced in 1994 to provide a standard set of currency benchmark rates so that portfolio valuations could be compared with each other, and their performance measured against benchmarks without having any differences caused by exchange rates. These rates were adopted by index compilers, the Financial Times and other users and became the de facto standard for Closing Spot Rates on a global basis.

In 1997, the WMR Closing Forward Rates service was launched to complement the Closing Spot Rates service.

In 2001, the WMR Intraday Spot Rate service was launched to extend the Spot rates product and meet customers' growing requirements. This service has since expanded to provide hourly spot rates from Monday 06:00 in Hong Kong/Singapore until Friday 22:00 in the UK.

In 2004, the WMR Intraday Forwards were launched at 08:00, 10:00, 12:00 and 14:00 UK time. Further enhancements have since seen this extended to an hourly service from 06:00 – 21:00 UK time with additional rates provided at 17:00 New York time, 10:00 and 16:00 Sydney time, 14:00 New Zealand time, 11:00 Singapore time, 11:00 Bangkok time and 10:00 Tokyo time.

In 2009, the WMR Non Deliverable Forwards (NDF) Rates were launched covering 12 currencies. The NDF service provides both Closing and Intraday Rates.

In 2012, the WMR Intraday Spot Rates service was further enhanced by the introduction of half-hourly benchmarks for the trade currencies only.

In 2014, the WMR Spot Rates service was enhanced to include the WMR Tokyo Benchmark Service covering 24 currencies against JPY, USD, GBP and EUR. In 2018 this was extended to cover 31 currencies.

In 2024, the WMR Metals Rates service was introduced to include 4 Metals, against USD, GBP and EUR, published hourly from Monday 06:00 in Hong Kong/Singapore until Friday 22:00 in the UK.

In November 2025, the WMR Spots, Forwards and NDF rates were extended to provide JPY cross rates as at 10am Tokyo time.

1.2 Use of the Rates

It is understood that the majority of the main equity and bond index compilers use the WMR exchange rates in their calculations, and the original uses of the rates in portfolio valuations and performance measurement are still very relevant. However, other uses of the rates have developed and are becoming increasingly important. For example, many customers now use the rates as a benchmark for currencies in contracts of different kinds including the settlement of financial derivatives. Many banks will now provide a service to their customers whereby they will guarantee to trade certain currency pairs at, or by reference to, the WMR rates which is useful for investment customers if they are making changes to a portfolio bench-marked against an index that uses the WMR rates and seeks to minimize any reconciliation differences from foreign exchange. Corporate users will find that it is very useful to value currency holdings held globally at a common rate, and if necessary, swap or trade them at the same rate. Using WMR rates in this way can

avoid using expensive resources to check the market continually. Auditors accept the WMR rates as independently calculated and administered.

1.3 Key points

1.3.1 Benchmark Administration

FTSE International Ltd “FIL” is the benchmark administrator for the WMR rates and thus, has primary responsibility for all aspects of the benchmark determination process. This includes the development, determination and dissemination, operation and governance of the Spot, Forward, Non Deliverable Forward and Metals Rate services. This methodology document provides a summary of the methodology (including the validation process and certain tolerance checks applied therein) that FIL uses to establish the benchmark rates. However, certain portions of the methodology and related intellectual property are proprietary and confidential and are therefore not publicly disclosed.

1.3.2 Expert Judgement

The term Expert Judgement is used throughout this methodology, starting from Section 4.3 and refers to when employees of FIL may exercise discretion with respect to the use of data in determining a benchmark. The calculation of the benchmark rate includes a validation process whereby, among other steps, employees of FIL review data and calculated benchmark rates pursuant to certain pre-determined tolerance checks. When applying tolerance checks, an employee has discretion (subject to internal policies and procedures) to include or reject certain data from the calculation of the benchmark rate. Based on FIL experience interpreting market data, FIL will use its own judgement when it believes it necessary with the intent of ensuring the quality and integrity of the benchmark rate. FIL may rely on its own judgement more frequently in an active albeit low liquidity market where transactions may not be consistently available. FIL has in place internal guidelines and quality control procedures that govern the application of Expert Judgement and are intended to provide consistency and oversight to this process. Employees receive initial and on-going training in how to comply with these guidelines and procedures.

1.3.3 Active market

FIL recognises that to enable the publication of a meaningful benchmark a market in each currency/metal pair represented by the benchmark must genuinely exist, and that market must be active. However, due to variable economic factors the meaning of ‘active’ may differ across currencies, as market liquidity can vary greatly from a liquid major currency to an extremely illiquid exotic currency for example, and at particular times of the day. In certain cases, FIL defines an active market as having only a ‘Single Source’. A list of these currencies can be provided upon request.

1.3.4 Data sourcing

FIL undertakes a periodic review of the appropriateness of using specific data suppliers to provide the data used in the calculation and validation of the benchmark rates. This review is intended to, among other things, assist in ensuring that the benchmark rates are (i) based on reliable and observable market data that reflect the economic realities of a given market, and (ii) that the benchmark rates themselves are reliable representations of the foreign exchange market.

There is no solicitation process to obtain underlying data, either by panel or by polling in the benchmark calculation process. FIL uses transactional data entered into on an at arm’s length basis between buyers and sellers in that market, where that data is available and reflects sufficient liquidity.

In a market where lower liquidity exists the benchmark may be based predominantly or exclusively on bid and offer rates, or from prior transactions.

1.3.5 Validation of data

All captured rates and calculated benchmark rates are subject to a number of tolerance checks with the intent of determining benchmark rates that are reflective of the underlying market at a given time. FIL performs tolerance checks at the time the data is sourced and again after the calculation of the benchmark is complete to ensure the quality of the source data and the benchmark rates. Captured rates that do not satisfy the tolerance checks and cannot be explained using Expert Judgement by wider market moves or events may be rejected and replaced. Replacement rates are subject to the same tolerance checks.

If the rates collected during a window do not satisfy the tolerance checks, or if no rates are available for a calculation based on a snapshot, benchmark rates will be determined using Expert Judgement. The use of Expert Judgement may include i) reference to earlier benchmark rates; ii) the use of alternative rates derived using data from the respective data source(s) or iii) selecting alternative sources, (that may include central bank rates where applicable).

Currency, metal and tenor specific systematic tolerances are reviewed periodically, annually as a minimum, by the Currency Review Group. This group supplements the routine monitoring and reporting of the prevailing market dynamics performed during the validation process by providing further scrutiny of the inputs and ex-post analysis of trends and outliers. The Currency Review Group is tasked with effecting and managing the change process with the intent of reflecting underlying market conditions.

If, following further scrutiny, the current source(s) of rates is considered using Expert Judgement to be of inadequate quality and a supplemental or replacement source of rates cannot be found, FIL may initiate a consultation with stakeholders on the viability of the currency, metal and tenor affected under the terms of the Cessation Policy.

1.3.6 Governance and transparency

FIL is subject to a corporate risk framework which is based on three lines of risk management:

1. Business procedures and controls are designed to promote consistency throughout the process.
2. The corporate risk framework applies independent governance, reporting and risk management.
3. The Board of directors and relevant subcommittee are responsible for oversight of the benchmark rates, including reviewing and advising on the policies and methodologies, by which FIL calculates, administers and publishes the benchmark.

A Benchmark Oversight Committee (the “Oversight Committee”) has been established to provide advice and challenge to the Benchmark administrator executive. The Oversight Committee’s Terms of Reference document provides details of the responsibilities of the Oversight Committee and its current members. The terms of reference are available via the following link. The Oversight Committee comprises members selected based on their experience and knowledge.

FIL performs periodic due diligence on third parties and data sources. FIL welcomes all enquiries with regards to the determination of the benchmark.

1.3.7 Back testing

EU BMR and Section 5 of the FIL Internal Review Policy requires WMR to undertake regular back-testing, with due consideration of market conditions as appropriate. To enable a proportionate approach to testing, and in line with demonstrating compliance across all benchmark regulations, WMR groups the benchmarks into benchmark families as follows: Spot/Metals Trade currencies, Spot/Metals Non-Trade currencies and Forward/NDF currencies. These families have consistent data inputs and methodologies. The methodology has been back-tested in line with these requirements.

Section 2

Management responsibilities

2. Management responsibilities

2.1 FTSE International Limited

2.1.1 FTSE International Limited (FTSE) is the Benchmark Administrator.[1]

2.1.2 As Administrator, FTSE is responsible for collecting input data, determining and publishing the Benchmark, and for all aspects of governance, oversight, compliance and integrity of the Benchmark.

2.2 Oversight Committee

2.2.1 The independent Oversight Committee is responsible for oversight of all aspects of the provision of the benchmark including the reviews of the Benchmark definition and Methodology at least annually, overseeing any changes to the Benchmark Methodology or cessation of the Benchmark, and overseeing the Administrator's control framework, management and operation of the Benchmark.

2.3 Benchmark Manager

2.3.1 A benchmark manager is appointed from time to time by the Administrator who will be a subject matter expert responsible for interpreting the Methodology.

[1] The term administrator is used in this document in the same sense as it is defined in Regulation (EU) 2016/1011 of the European Parliament and of the Council of 8 June 2016 on indices used as benchmarks in financial instruments and financial contracts or to measure the performance of investment funds (the European Benchmark Regulation) and The Benchmarks (Amendment and Transitional Provision) (EU Exit) Regulations 2019 (the UK Benchmark Regulation).

Section 3

FTSE Russell policies

3. FTSE Russell policies

This Methodology should be read in conjunction with the following policies and policy documents.

3.1 Policy for Benchmark Methodology Changes

3.1.1 Details of FTSE Russell's policy for making benchmark methodology changes can be accessed using the following link:

Policy_for_Benchmark_Methodology_Changes.pdf

3.2 FTSE Russell Governance Framework

3.2.1 To oversee its benchmarks, FTSE Russell employs a governance framework that encompasses product, service and technology governance. The framework incorporates the London Stock Exchange Group's three lines of defence risk management framework and is designed to meet the requirements of the IOSCO Principles for Financial Benchmarks[2], the European benchmark regulation[3] and the UK benchmark regulation[4]. The FTSE Russell Governance Framework can be accessed using the following link:

FTSE_Russell_Governance_Framework.pdf

3.3 Policy on National Holidays

The benchmark rates will be produced on all weekdays of the year, subject to the policy detailed below. For further information, there is a schedule available that covers the service alterations up to five years in advance.

Click here to view

On national holiday dates, the principle is that the rates should be calculated at the normal times up to the latest calculation time possible without compromising the quality of the rates.

In practice, national holidays in the following four financial centres will be monitored in advance: US, UK, Germany and Japan. WMR Closing Spot and Forward Rates will be produced as normal if two or more of these centres are open. WMR Intraday Spot and Forward Rates may not be produced on any day if one or more of these financial centres are closed.

If only one centre is open, the normal policy will be that no benchmark rates will be produced. When the WMR rates are not produced; benchmark rates from the **previous/last** published time would be used. However, if such a situation occurs on a month- end, then further analysis will be carried out as to other markets that are open, and a decision taken as to whether or not to produce benchmark rates.

Special circumstances may arise on the last weekdays prior to Christmas and New Year's where although markets are open, they may close early and therefore be illiquid at some normal calculation times. Under

[2] IOSCO Principles for Financial Benchmarks Final Report, FR07/13 July 2013

[3] Regulation (EU) 2016/1011 of the European Parliament and of the Council of 8 June 2016 on indices used as benchmarks in financial instruments and financial contracts or to measure the performance of investment funds

[4] The Benchmarks (Amendment and Transitional Provision) (EU Exit) Regulations 2019

these circumstances, FIL may take a decision to revert to an earlier calculation time with the intent of ensuring the integrity of the rates.

Please note the 12pm EST (CAD Noon) Intraday Spot rate service observes the statutory holidays adopted by Canada and therefore these particular benchmark rates will not be published on the market holiday dates Click here to view

On the occasions when the WMR services are being published as normal but specific market holidays result in no liquidity for particular currencies/metals; the WMR benchmarks will continue to provide the last published benchmark rate for those currencies/metals.

3.4 Disruption to Service

FIL has robust controls and resilience architecture in place and where necessary, FIL will invoke these controls to minimise any disruption to the service. FIL has procedures in place to minimise the impact of a potential failover, but in exceptional circumstances it may not be possible for FIL to produce an accurate benchmark rate. When this arises FIL will notify clients as early as possible. Following any such incident, FIL will undertake a full investigation and consider any remediation steps identified.

3.5 Disruption to FX/Metals Rates

FIL appreciates that economic realities could from time to time disrupt normal market conditions and could create unusually illiquid or fragmented markets. When this occurs FIL will use reasonable effort to provide an email notification to clients advising the nature and impact of the disruption. If you wish to receive these notifications, please contact: wmr.sales@lseg.com.

In the event that a disruption prevents reliable benchmark rates from being determined, FIL will endeavour to re-publish the most recent benchmark rates until the disruption has ended, or changes implemented. Reliability of benchmark rates following a disruption will be determined using Expert Judgement.

Where the disruption extends into the longer term, FIL will use commercially reasonable efforts to identify additional solutions to provide a benchmark rate which is representative of the market.

3.6 Cessation

FIL accepts that it may be necessary to terminate the calculation and publication of a benchmark, currency, metal or forward tenor currently provided within the WMR service. This may be due to external factors beyond FIL control, for example a market structure change or to a deterioration of data sufficiency. FIL will consult with subscribers and work to identify whether a credible alternative which continues to represent the underlying interest can be identified.

If a credible alternative is identified then FIL will endeavour to assess the viability of that alternative fully, again consulting with subscribers, as appropriate. If cessation is unavoidable FIL will endeavour to assist subscribers in the selection process of an alternative benchmark. Contracts and other financial instruments that reference a benchmark need robust contingency provisions in the event of material changes to, or cessation of, the referenced benchmark. Please refer to our Decommissioning Statement. Additional cessation procedures are required for Critical Benchmarks, which apply to the WMR Closing (4pm UK time) Spot Benchmark Rates which can be accessed using the following link: Critical Benchmark Methodology Change and Cessation Policy

3.7 Complaints, Operational Enquiries and Price Challenges

FTSE Russell's complaints procedure can be accessed using the following link: FTSE Russell Benchmark Determination Complaints Handling Policy

A Price Challenge is a request from a user or a stakeholder to verify and confirm the accuracy of one or more of the published Benchmark rates, inputs to those rates (if publicly available), or whether a specific benchmark determination is representative of market value.

Operational enquiries do not meet the definition of a complaint and include Benchmark Price Challenges. However, FTSE Russell may decide to treat an operational enquiry or a series of operational enquiries as a formal complaint. For further information please refer to FTSE Russell Benchmark Rates Operational Enquiries & Price Challenges Policy.

Operational enquires must be submitted to FTSE Russell by e-mail and should contain as much information as possible, including your name, your title, the institution you represent, your e-mail address and telephone number, to enable the operational enquiry to be investigated in a timely manner.

The e-mail address to raise WMR FX Spot & Forwards benchmark related price challenge and operational enquiries is: wmr.ops@lseg.com

3.8 Republication of Rates

Under exceptional circumstances, it may be necessary to amend the rates for one or more currencies/metals after publication. This will be determined by FIL, after consultation with key users, if appropriate. Under no circumstances will the WMR Spot, Forward or Metals Rates for one day be amended after the publication of the following weekday's rates at the same publication time.

All material evidence will be retained as part of our Republication of the WMR FX Benchmark Rates Policy

3.9 Changes to methodology and service

The rates are subject to a regular review and approval of the methodology. Such a review takes place on an annual basis or whenever deemed necessary due to changes in the underlying market or incidents in the calculation of the benchmark rates.

The review follows internal procedures and entails in particular an analysis of, but not limited to, the conditions in the market that forms the underlying interest of the benchmark, the quality and representativeness of the input prices or rates, the data sources as defined in Article 3(1)(24) and the effectiveness of the methodology in producing traceable and verifiable rates.

The analysis is carried out by the benchmark owner, presented to relevant Oversight Committee for review and approved by the Index Governance Board. The Terms of Reference of the Index Governance Board, including a description of the procedure for nominating and removing members, is published under ftse-russell-index-governance-board-terms-of-reference.pdf.

A review may suggest a material change to the methodology, including the validation process, or to changes to the tolerances used in the validation process. A material methodology change is defined as a change which fundamentally alters the process by which a benchmark rate is calculated. A review may also suggest a service change, defined as an amendment to coverage or to the availability of particular benchmark rates.

Changes to the methodology shall be made in accordance with the FIL Benchmark Methodology Change Procedures. A service change shall be treated as a methodology change.

3.10 Potential limitations of the Methodology

The ability of FIL to determine and publish the WMR Benchmarks in accordance with this methodology depends on (i) activity in each currency/metal on a case by case basis and for all tenors including spot and (ii) the quality and representativeness of the rates available to FIL for the calculation of the Benchmarks. If any reduction of quality in the rates or fragmentation of activity is identified or foreseen, FIL shall review the methodology and its effectiveness in determining suitable benchmarks given conditions in the underlying markets. Such reviews shall be in accordance with the procedures described in the Changes to Methodology and Service section of this methodology.

Section 4

WMR Spot Rates

4. WMR Spot Rates

4.1 Coverage

The rates are intended to cover the currencies for those countries that are included in a global or regional stock market index or where there is sufficient liquidity in the currency market to provide accurate benchmark rates. The addition of currencies not meeting these criteria will be at the discretion of FIL, and in theory, any world currency may be included.

The coverage of the WMR rates is shown under section 4.6, Closing and Intraday, and 4.7, Tokyo benchmarks.

The European legacy currencies (ATS, BEF, BGN, CYP, DEM, EEK, FRF, FIM, GRD, HRK, IEP, ITL, LTL, LUF, LVL, MTL, NLG, PTE, ESP, SIT and SKK) are included, but these are derived from the fixed conversion factor and the USD/EUR quote. An example of this calculation is included under section 9.5. The XEU (European Currency Unit — ECU) is also included, but this is equal to the euro value.

In addition to publishing rates at the hourly calculation times from Monday 06:00 Hong Kong/Singapore time to Friday 22:00 UK time, there is also WMR Closing Spot Rates (4 p.m. UK time) history available since 1994 and the WMR Intraday History available since 2001.

4.2 Timing

The normal calculation times are hourly from Monday 06:00 Hong Kong/Singapore to Friday 22:00 in the UK, with half-hourly rates provided for the ‘trade currencies’ only. See Section 4.3 for details of these ‘trade currencies.’ The Tokyo benchmarks are calculated at 9.55JST (00:55GMT), see section 4.7 for details of the currencies covered.

Different calculation times may be used for reasons that include the following:

– An earlier time is chosen by FIL according to the policy on national holidays (see section 8.1).

– An earlier or later time is chosen by FIL due to technical difficulties in receiving or failure in supply of the source financial data.

– An earlier or later time is chosen by FIL for particular currencies due to special market conditions.

FIL ‘target for completion of calculation and publication of the service is 15 minutes after the calculation time.

The rates published at 4 p.m. UK time are the Closing Spot rates.

4.3 Sourcing

The LSEG Market Data System is the primary infrastructure and technology used to source spot foreign exchange (FX) rates from multiple, market participants to be used in the calculation of the rates. FIL, using Expert Judgement, determines the appropriate data sources to be used on a per currency basis. This is subject to the oversight of the governance process. Data sources are reviewed periodically and clients will be advised prior to any material change being made.

The criteria used for selecting the source of spot FX rates are the quality and representativeness of those rates with respect to the wider market. The underlying rates used are those deemed to be the most appropriate for foreign investment transactions.

All currencies within the spot rate benchmarks are referred to as “Trade Currencies” or “Non-trade Currencies”.

For Trade Currencies, the data source (“Data Source”) to be used is determined by FIL on a per currency basis and based primarily on the liquidity available on the trading platform in said currencies. Such Data Sources are reviewed periodically with respect to their quality and the representativeness of the FX rates with respect to the wider market. Data Sources for the determination of the benchmarks are the following highly liquid order matching platforms: LSEG Matching and EBS. The benchmarks are not based on the contribution of input data. Readily available input data for determination of the benchmarks from these platforms are either traded rates or order rates, with traded rates taking precedence where available subject to the FIL’s expert judgement.

All other currencies are referred to as “Non-Trade Currencies”. The Data Source for Non-Trade Currencies is LSEG indicative quote data from multi contributor instrument codes. Wherever possible, a multi-contributor source of rates is used in preference to a single contributor unless an “official” benchmark is being used. Where data sufficiency is limited, FIL, will use its own Expert Judgement to determine representative and meaningful market rates. A different type of rate may be selected by FIL for reasons that include the following:

– Commercial interbank bid and offer rates are not available for a particular currency.

– An “official” benchmark is created that is more appropriate for foreign investment transactions.

FIL has in place internal guidelines and quality control procedures that govern the application of Expert Judgement and are intended to provide consistency and oversight to this process. Employees receive initial and on-going training in how to comply with these guidelines and procedures.

4.3.1.1 Trade Currencies

The following 25 currencies (AUD, CAD, CHF, CNH, CZK, DKK, EUR, GBP, HKD, HUF, ILS, INR, JPY, MXN, NOK, NZD, PLN, RON, RUB, SEK, SGD, THB, TOF, TRY and ZAR) are referred to as “Trade Currencies.” Bona fide arm’s length transactional Trade and Order rates are sourced from the following highly liquid platforms; LSEG Matching and EBS. The Trade and Order rates are used in the validation and calculation of these currencies.

The following 14 currencies have LSEG Matching as their source: CZK, DKK, HUF, ILS, INR, MXN, NOK, PLN, RON, SEK, THB, TOF, TRY and ZAR. 11 currencies are sourced from LSEG Matching and EBS: AUD, CAD, CHF, CNH, EUR, GBP, HKD, JPY, NZD, RUB and SGD. Please refer to Appendix A which details fully the sources used across the global day for the Trade Currencies.

The primary source of rates will be actual traded rates taken from LSEG Matching and EBS, as detailed above “Traded rates/Trades”.

The secondary source of rates will be the bid/offer rates on the order matching systems of LSEG Matching and EBS “Order rates/Orders”.

Bank quotes from RICs will be captured for instances where neither Trades nor Orders are available.

All other currencies not identified above as ‘trade’ currencies can be assumed to be ‘non trade’.

4.3.1.2 Base currency

The “base” currency is either the US dollar or the Euro, depending on which base currency is predominant. Presently, currencies which are predominantly based against the Euro are CZK, DKK, HUF, NOK, PLN, RON and SEK. All other currencies are based against the US dollar. However, this may be changed for particular currencies if FIL believes that more appropriate or representative quotations are available against a different base currency.

4.3.1.3 Market conventions

It is a convention in the FX markets that some currencies are quoted against the USD on an inverted basis. Normally, a local currency is expressed per 1USD: for example, 1USD = x.xxxx CAD. An inverted currency is expressed per local currency: for example, 1GBP = x.xxxx USD. Normally, a local currency amount would be divided by the exchange rate to get a USD amount, but for inverted currencies, the local currency amount is multiplied by the exchange rate to get a USD amount. This convention applies only to rates quoted against the USD, not rates quoted against any other currency. These inverted currencies are GBP, EUR, AUD, NZD, IEP, BWP, SBD, TOP, WST and XEU.

Certain rates are calculated from other currencies or from proportions of other currencies, for example, XDR (Special Drawing Rights).

All rates are published using standard market quotation conventions. ISO codes are used.

4.4 Calculation method

4.4.1 Non-trade currencies

The FX market is constantly monitored by capturing rates every 15 seconds and performing continuous and interactive validation.

The captured market data is subject to currency specific systematic tolerance checks which will identify outlying data. Validation is performed on the outlying data by Operations Specialists, who will seek corroboration, or rely upon their own judgement to determine the market level. The calculated benchmark is then subject to further currency specific tolerance checks prior to publication. The use of Expert Judgement may be appropriate to assess the validity of rates throughout this process, with quality control guidelines and procedures governing each application of such judgement.

Over a five minute period snapshots of the quoted rates are taken from FIL. These are extracted at 15 second intervals from 2 minutes 30 seconds before to 2 minutes 30 seconds after the calculation time.

The median bid and offer rates are independently calculated from the individual snapshots for each currency. These bid and offer rates are validated prior to publication, against currency specific thresholds and this may result in Expert Judgement being applied.

4.4.2 Traded rates

The FX market is constantly monitored by capturing rates every 15 seconds.

Over a five-minute period, actual trades executed and bid and offer order rates from the order matching systems are captured every second from 2 minutes 30 seconds before to 2 minutes 30 seconds after the time of the calculation (e.g. hour and/or ½ hour). Trading occurs in milliseconds on the trading platforms and therefore not every trade or order is captured, just a sample.

From each data source, a single traded rate will be captured each second– this will be identified as a bid or offer depending on whether the Trade is a buy or sell. A spread will be applied to the Trade rate to calculate the opposite bid or offer. The spread applied will be determined by the Order rate captured at the same time. All captured Trades will be subjected to validation checks. This may result in some captured data being excluded from the calculation.

Valid Trades from all sources captured during the time period will be “pooled” together. Subject to a minimum number of valid Trades being present within this pool of data, using a threshold determined by FIL based on Expert Judgement, the Trade rates will be used for the benchmark. A median Trade bid and Trade offer are calculated independently, using data from the single pool of trades across data sources. The mid-rate is calculated from the median Trade bid and Trade offer. A minimum “Standard Spread” is applied to the mid-rate to calculate a new bid and offer. These bid, offer and mid rates will be validated prior to publication, against currency specific tolerance thresholds, and this may result in Expert Judgement being applied.

Where the number of valid executed traded rates falls below the threshold determined by FIL Expert Judgement, then data from the order matching system(s) will be used in the calculation of the benchmark rate. From each data source, the best bid and best offer rates will be captured simultaneously to the Trade data from each data source. All captured Order rates will be subjected to validation checks. This may result in some captured data being excluded from the calculation.

Order rates from different sources will not be pooled together. Using valid Order rates, a median bid and offer are calculated independently, for each data source. The mid-rate is calculated from the median Order bid and Order offer. A minimum Standard Spread is applied to the mid-rate to calculate a new bid and offer. The bid, offer and mid rates from the data source with the highest valid Orders over the time period will be selected as the rates for publication. Consequently, the data source to be used will be driven by the market. These bid and offer rates will be validated prior to publication, against currency specific tolerance thresholds, and this may result in Expert Judgement being applied.

In the event that two or more data sources have an equal number of valid Orders, then an average of the mid-rate from these data sources will be used.

In the event that two or more data sources have a single Order only, the most up to date Order rates will be used.

Bid, offer and mid rates are derived. Mid rates are calculated as the arithmetic mean of rounded bid and offer rates. Bid and offer rates are published to a maximum of four decimal places; the mid rates are published to a maximum of five decimal places. Where a “5” is encountered, the convention is to round up.

4.4.2.1 Standard spreads

In order to publish spreads which are reflective of currency markets, FIL sets pre-defined minimum and maximum spreads for each currency, at each calculation time. These are variable across currencies to reflect different market levels and changes in liquidity at different times of day.

In order to reflect actual market conditions, if the market dictates spreads which are greater than the pre-defined minimum spread and less than the pre-defined maximum spread, then these wider spreads will be used in the benchmark calculation – up to the maximum spread as predefined in the system. In the event the market dictates spreads which are wider than the predefined maximum standard spreads, further analysis will be undertaken.

4.4.3 Local close currencies

For currencies where offshore trading is not permitted, the spot rates are published in line with local market levels. This means that when local markets are opened, the published spot rates will reflect activity in that market. When the local market closes, the spot rates in each subsequent publication (hourly/½ hourly) remain unchanged. This impacts the following currencies. Please note that the “Open Time” and “Close Time” for each currency are subject to change.

ISO	Open time	Close time
CNY	01:15 GMT	09:00 GMT
IDR	01:15 GMT	08:00 GMT
INR	03:45 GMT	10:00 GMT
KRW	23:15 GMT	07:00 GMT
MYR	23:15 GMT	10:00 GMT
PHP	00:15 GMT	08:00 GMT
THB	00:15 GMT	10:00 GMT
TWD	00:15 GMT	07:00 GMT
BRL	12:00 GMT	21:00 GMT

4.4.4 Cross calculated currencies

Section 4.3 details the currencies that are not captured against USD. All other currencies are captured and validated against USD.

Once the rates have been validated, cross rates to GBP and EUR are calculated. An example of these calculations is included under **section 9.1**.

At 10am Tokyo time, JPY cross rates are calculated and published. These cross rates have been developed to align with local market requirements and thus are provided in the format of ISO/JPY and may have a factor applied to the cross calculation.

For further details on the calculation or factors please contact wmr.ops@lseg.com.

Cross rates to further base currencies may be published.

4.4.4.1 T+1 Currencies

The following currencies follow the market convention where the spot date is T+1: CAD Canadian Dollar, RUB Russian Rouble, TRY Turkish Lira and PHP Philippine Peso

No adjustment is made and the calculation is performed as if both currencies are T+2.

4.4.5 Market Holidays

No adjustment is made in the cross calculation when market holidays are observed in either the primary, or the crossing currency.

The method of calculating the rates is protected by a patent awarded in 2008, US serial 09/972,193.

The validation process used is protected by the patent detailed above.

4.5 Spot Rate products

- Closing Spot Rates
- Historical Spot Rates
- Intraday Spot Rates
- Tokyo Spot Rates
- 11am UK Intraday Spot Rates
- 2pm CET Intraday Spot Rates
- 12pm EST Intraday Spot Rates (CAD Noon)

4.6 Coverage of closing and intraday Spot Rates

Coverage is currently in the following 157 currencies,

Europe					
Albania Lek	ALL	Austrian Schilling	ATS	Belarus Ruble	BYN
Belgian Franc	BEF	Bosnia Herzegovina Mark	BAM	Bulgarian Lev	BGN
Croatian Kuna	HRK	Cyprus Pound	CYP	Czech Koruna	CZK
Danish Krone	DKK	Estonian Kroon	EEK	ECU	XEU
Euro	EUR	Finnish Markka	FIM	French Franc	FRF
Deutsche Mark	DEM	Greek Drachma	GRD	Hungarian Forint	HUF
Iceland Krona	ISK	Irish Punt	IEP	Italian Lira	ITL
Latvian Lat	LVL	Lithuanian Litas	LTL	Luxembourg Franc	LUF
Macedonia Denar	MKD	Maltese Lira	MTL	Moldova Leu	MDL
Dutch Guilder	NLG	Norwegian Krone	NOK	Polish Zloty	PLN
Portugese Escudo	PTE	Romanian Leu	RON	Russian Ruble	RUB

Slovakian Koruna	SKK	Slovenian Tolar	SIT	Spanish Peseta	ESP

Europe					
British Pound	GBP	Swedish Krona	SEK	Swiss Franc	CHF
Turkish New Lira	TRY	Ukraine Hryvnia	UAH	Serbian Dinar	RSD
Special Drawing Rights	XDR				

Africa & Gulf					
Algerian Dinar	DZD	Angola Kwanza	AOA	Bahrain Dinar	BHD
Botswana Pula	BWP	Burundi Franc	BIF	Central African Franc	XAF
Comorian Franc	KMF	Congo Dem. Rep. Franc	CDF	Cote D'Ivorie Franc	XOF
Egyptian Pound	EGP	Ethiopia Birr	ETB	Gambian Dalasi	GMD
Ghana Cedi	GHS	Guinean Franc	GNF	Kenyan Shilling	KES
Israeli Shekel	ILS	Jordanian Dinar	JOD	Lesotho Loti	LSL
Kuwaiti Dinar	KWD	Lebanese Pound	LBP	Mauritanian Ouguiya	MRU
Malagasy Ariary	MGA	Malawi Kwacha	MWK	Mozambique Metical	MZN
Mauritius Rupee	MUR	Moroccan Dirham	MAD	Omani Rial	OMR
Namibia Dollar	NAD	Nigerian Naira	NGN	Saudi Arabian Riyal	SAR
Qatar Rial	QAR	Qatar Rial Offshore	QOF	Rwanda Franc	RWF
South African Rand	ZAR	Seychelles Rupee	SCR	Sierra Leone	SLE
Tanzania Shilling	TZS	Tunisian Dinar	TND	Swaziland Lilangeni	SZL
Ugandan Shilling	UGX	Yemen Rial	YER	UAE Dirham	AED
New Zambian Kwacha	ZMW	Zimbabwe Gold	ZWG		

Asia-Pacific					
Australian Dollar	AUD	Azerbaijan Manat	AZN	Bangladesh Taka	BDT
Bhutan Ngultrum	BTN	Brunei Dollar	BND	Chinese R. Yuan	CNY
Chinese R. Yuan HK	CNH	Fiji Islands Dollar	FJD	Georgia Lari	GEL
Hong Kong Dollar	HKD	Indian Rupee	INR	Kazakhstan Tenge	KZT
Indonesian Rupiah	IDR	Japanese Yen	JPY	Malaysian Ringgit	MYR
Kyrgyzstan Som	KGS	Macao Pataca	MOP	Nepal Rupee	NPR
Maldives Rufiyaa	MVR	Mongolia Tugrik	MNT	Pakistani Rupee	PKR
New Zealand Dollar	NZD	Pacifique Franc	XPF	Samoa Tala	WST
Papua NG Kina	PGK	Philippine Piso	PHP	South Korean Won	KRW
Singapore Dollar	SGD	Solomon Islands Dollar	SBD	Thai Baht	THB
Sri Lanka Rupee	LKR	Taiwan Dollar	TWD	Uzbekistan Som	UZS
Thai Baht Offshore	TOF	Tonga Pa'anga	TOP	Vanuatu Vatu	VUV
Vietnam Dong	VND				

Americas					
Argentine Peso	ARS	Aruba Guilder	AWG	Bahamas Dollar	BSD
Barbados Dollar	BBD	Belize Dollar	BZD	Bermudan Dollar	BMD
Bolivian Boliviano	BOB	Brazilian Real	BRL	Canadian Dollar	CAD
Cayman Islands Dollar	KYD	Chilean Peso	CLP	Colombian Peso	COP
Costa Rica Colon	CRC	Cuba Peso	CUP	Dominican Republic Peso	DOP
East Caribbean Dollar	XCD	Ecuadorian Sucre	ECS	El Salvador Colon	SVC
Guatemala Quetzal	GTQ	Haiti Gourde	HTG	Honduras Lempira	HNL
Jamaica Dollar	JMD	Mexican Peso	MXN	Nicaragua Gold Cordoba	NIO
Panama Balboa	PAB	Paraguay Guarano	PYG	Peru New Sol	PEN
Surinam Dollar	SRD	Trindad & Tobago Dollar	TTD	Uruguay Peso	UYU
US Dollar	USD	Venezuelan Soberano	VES	Caribbean Guilder	XCG

4.7 Coverage of Tokyo Spot Rates

Coverage is currently in the following 31 currencies:

Europe					
Czech Koruna	CZK	Danish Krone	DKK	Euro	EUR
Hungarian Forint	HUF	Norwegian Krone	NOK	Polish Zloty	PLN
Romanian Leu	RON	Russian Rouble	RUB	Sterling	GBP
Swedish Krone	SEK	Swiss Franc	CHF	New Turkish Lira	TRY

Africa & Gulf					
Israeli Shekel	ILS	Kuwaiti Dinar	KWD	Saudi Arabian Riyal	SAR
South African Rand	ZAR	UAE Dirham	AED		

Asia-Pacific					
Australian Dollar	AUD	Chinese R. Yuan HK	CNH	Hong Kong Dollar	HKD
Indian Rupee	INR	Indonesian Rupiah	IDR	Japanese Yen	JPY
New Zealand Dollar	NZD	Singapore Dollar	SGD	S. Korean Won	KRW
Taiwan Dollar	TWD	Thai Baht	THB		

Americas					
Canadian Dollar	CAD	Mexican Peso	MXN	US Dollar	USD

Section 5

WMR Forward Rates

5. WMR Forward Rates

5.1 Coverage

The rates are intended to cover the currencies for those countries where a significant level of forward trading exists in the country's currency and where forward quotes are reliably available on LSEG Market Data System.

The coverage is presently 80 currencies and is periodically reviewed as more information is made available in the market.

Bid, offer and mid rates against the USD, GBP and EUR are provided at all publication times and are also available as JPY cross rates at 10am Tokyo time. A list of currencies covered is under section 5.6.

The time periods covered for the forward rates are:

- ON Overnight
- TN Tomorrow Next
- SW Spot Week (One Week)
- 1M One Month
- 2M Two Months
- 3M Three Months
- 6M Six Months
- 9M Nine Months
- 1Y One Year
- 2Y Two Years (Some Currencies Only)
- 5Y Five Years (Some Currencies Only)

5.2 Timing

The rates are intended to be "intraday and closing" rates. The normal calculation times are hourly from 06:00 to 21:00 UK time Monday to Friday. In addition, FIL publishes at 17:00 hours New York time, 10:00 hours Sydney time, 14:00 hours New Zealand time, 10:00 Tokyo time, 11:00 hours Singapore time, 11:00 Bangkok time and 16:00 hours Sydney time.

A different calculation time may be used for reasons that include the following:

- An earlier time is chosen by FIL according to the policy on national holidays (see section 8.1).
- An earlier or later time is chosen by FIL due to technical difficulties in receiving or failure in supply of the source financial data.
- An earlier or later time is chosen by FIL for particular currencies due to special market conditions.

Target time for the publication of the service is 30 minutes after the calculation time.

The rates published at 4 p.m. UK time are the Closing Forward rates.

5.3 Sourcing

The LSEG Market Data System is the sole infrastructure and technology system used to source the forward FX rates from multiple market participants to be used in the calculation of the rates. Other sources may be used by exception where the appropriate rates are not available on the LSEG architecture.

As far as possible, the underlying rates used are those deemed to be the most appropriate for foreign investment transactions. These will normally be commercial interbank bid and offer premiums or discounts.

A different type of rate may be selected by FIL if commercial interbank bid and offer rates are not available for a particular currency.

FIL, using Expert Judgement determines the appropriate data sources to be used on a per currency basis, subject to the oversight of the governance process. Data sources are reviewed periodically and clients will be advised prior to any material change being made.

The criteria used for selecting the source of forward FX rates are the quality and representativeness of those rates with respect to the wider market. The “base” currency for rates selected from the Market Data System will normally be the US dollar. However, this may be changed for particular currencies if FIL believes that more appropriate or representative quotations are available against a different base currency.

The choice of rates for any particular currency lies with FIL and other market sources are used by FIL for quality control purposes.

For some currencies, forward rates are not available, and the market uses Non-Deliverable Forward (NDF) rates instead. The premium/discount NDF currencies included in the Forwards services are ARS, BRL, CLP, COP and PEN. Also, due to there being distinct “onshore” and “offshore” forward rates for SGD, we provide offshore rates. For Thailand, we provide both onshore rates, THB, and offshore rates, TOF.

Where data sufficiency is limited, FIL will use its own judgement to determine representative and meaningful market rates.

FIL also provides outright NDF Rate services, detailed in section 6.

5.4 Calculation method

The FX Forward market is constantly monitored by capturing rates every 2 minutes and performing continuous and interactive validation. The captured market data is subject to currency specific systematic tolerance checks which identify outlying data. Validation is performed on the outlying data by Operations Specialists, who will seek corroboration, or rely upon their own judgement to determine the market level. On the hour a snapshot of quoted rates is taken for each tenor, and considered the benchmark rate, subject to further currency specific tolerance checks prior to publication.

The use of such judgement may be appropriate to assess the validity of rates throughout this process, with quality control guidelines and procedures governing each application of such judgement.

Once the rates have been validated, premiums and discounts to GBP and EUR are calculated using the outright forward rates; an example of this is under section 9.3, with further information on the calculation of the cross rates detailed in Section 4.4.4. At 10am Tokyo time, JPY cross rates are calculated and published. These cross rates have been developed to align with local market requirements and thus are provided in the format of ISO/JPY and may have a factor applied to the cross calculation. For further details on the calculation or factors please contact wmr.ops@lseg.com. Legacy currency premium/discounts are calculated using the fixed euro conversion rates; an example is shown under section 9.4. Further base currencies may be published, and if so, these will be calculated using the same principles.

All forward rates are published using premiums or discounts that can be directly added to the spot rate to provide an outright forward rate. Note that ON and TN premiums/discounts should be subtracted from the spot rate to calculate an outright forward rate. ISO codes are used.

All forward rates (bid, offer and mid) are rounded to a maximum of six decimal places after the decimal point. Where a “5” is encountered, the convention is to round up.

5.4.1 Local close currencies

For currencies where offshore trading is not permitted, the forward rates are published in line with local market levels. This means that when local markets are opened, the published forward rates will reflect activity in that market. When the local market closes, the forward rates in each subsequent publication (hourly) remain unchanged.

This impacts the following currencies. Please note that the “Open Time” and “Close Time” for each currency are subject to change.

ISO	Open time	Close time
CNY	01:15 GMT	09:00 GMT
IDR	01:15 GMT	08:00 GMT
INR	03:45 GMT	10:00 GMT
KRW	23:15 GMT	07:00 GMT
MYR	23:15 GMT	10:00 GMT
PHP	00:15 GMT	08:00 GMT
THB	00:15 GMT	10:00 GMT
TWD	00:15 GMT	07:00 GMT

The method of calculating the rates is protected by a patent awarded in 2008, US serial 2002–0042765.

5.5 Forward Rate Products

– Closing Forward Rates

– Historical Forward Rates

– Intraday Forwards Rates

5.6 Coverage of Forward Rates

Coverage is currently in the following 79 currencies:

Europe					
Austrian Schilling	ATS	Belgian Franc	BEF	Bulgarian Lev	BGN
Croatian Kuna	HRK	Cyprus Pound	CYP	Czech Koruna	CZK
Danish Krone	DKK	Estonian Kroon	EEK	Ecu	XEU
Euro	EUR	Finnish Markka	FIM	French Franc	FRF
Deutsche Mark	DEM	Greek Drachma	GRD	Hungarian Forint	HUF
Iceland Krona	ISK	Irish Punt	IEP	Italian Lira	ITL
Latvian Lat	LVL	Lithuanian Litas	LTL	Maltese Lira	MTL
Dutch Guilder	NLG	Norwegian Krone	NOK	Polish Zloty	PLN
Portuguese Escudo	PTE	Romanian Leu	RON	Russian Rouble	RUB
Serbian Dinar	RSD	Slovakian Koruna	SKK	Slovenian Tolar	SIT
Spanish Peseta	ESP	British Pound	GBP	Swedish Krone	SEK
Swiss Franc	CHF	New Turkish Lira	TRY		

Africa & Gulf					
Bahrain Dinar	BHD	Botswana Pula	BWP	Ghana Cedi	GHS
Israeli Shekel	ILS	Jordanian Dinar	JOD	Kenyan Shilling	KES
Kuwaiti Dinar	KWD	Moroccan Dirham	MAD	Omani Rial	OMR
Qatar Rial	QAR	Nigerian Naira	NGN	South African Rand	ZAR
Tunisian Dinar	TND	Saudi Arabian Riyal	SAR	Ugandan Shilling	UGX
New Zambian Kwacha	ZMW	UAE Dirham	AED		

Asia-Pacific					
Australian Dollar	AUD	Chinese R. Yuan	CNY	Chinese R. Yuan HK	CNH
Hong Kong Dollar	HKD	Indian Rupee	INR	Indonesian Rupiah	IDR
Japanese Yen	JPY	Kazakhstan Tenge	KZT	Malaysian Ringgit	MYR
New Zealand Dollar	NZD	Pakistani Rupee	PKR	Philippine Piso	PHP
Singapore Dollar	SGD	S. Korean Won	KRW	Sri Lanka Rupee	LKR
Taiwan Dollar	TWD	Thai Baht	THB	Thai Baht Offshore	TOF
Vietnam Dong	VND				

Americas					
Argentine Peso	ARS	Brazilian Real	BRL	Canadian Dollar	CAD
Chilean Peso	CLP	Colombian Peso	COP	Mexican Peso	MXN
Peru New Sol	PEN	US Dollar	USD		

Section 6

WMR NDF Rates

6. WMR NDF Rates

6.1 Coverage

The rates are intended to cover the currencies that do not allow offshore entities to trade with the local market.

The coverage is presently 11 currencies and is periodically reviewed as more information is made available. Bid, offer and mid outright rates are published against USD, GBP and EUR at all publication times and are also available as JPY cross rates at 10am Tokyo time. A list of currencies covered is under section 6.6.

The time periods covered for NDF rates are:

- SW Spot Week (One Week)
- 1M One Month
- 2M Two Months
- 3M Three Months
- 6M Six Months
- 9M Nine Months
- 1Y One Year
- 2Y Two Years (Some Currencies Only)
- 5Y Five Years (Some Currencies Only)

6.2 Timing

The rates are intended to be “intraday and closing” rates. The normal calculation times are hourly from 06:00 to 21:00 UK time Monday to Friday. In addition, FIL publish at 17:00 hours New York time, 10:00 hours Sydney time, 14:00 hours New Zealand time, 10:00 Tokyo time, 11:00 hours Singapore time, 11:00 Bangkok time and 16:00 hours Sydney time.

A different calculation time may be used for reasons that include:

- An earlier time is chosen by FIL according to the policy on national holidays (see section 8.1).
- An earlier or later time is chosen by FIL due to technical difficulties in receiving or failure in supply of the source financial data.
- An earlier or later time is chosen by FIL for particular currencies due to special market conditions.

FIL’s target for completion of calculation and publication of the service is 30 minutes after the calculation times.

The rates published as at 4 p.m. UK time are the Closing NDF rates.

6.3 Sourcing

The LSEG Market Data System is the sole infrastructure and technology system used to source the NDF FX rates from multiple, market participants to be used in the calculation of the NDF rates. Other sources may be used by exception where the appropriate rates are not available on the FIL architecture.

As far as possible, the underlying rates used are those deemed to be the most appropriate for foreign investment transactions. These will normally be commercial interbank bid and offer NDF.

FIL, using Expert Judgement determines the appropriate data sources to be used on a per currency basis, subject to the oversight of the governance process. Data sources are reviewed periodically and clients will be advised prior to any material change being made

The criteria used for selecting the source of NDF FX rates are the quality and representativeness of those rates with respect to the wider market. The “base” currency for rates selected from the Market Data System will normally be the US dollar. However, this may be changed for particular currencies if FIL believes more appropriate or representative quotations are available against a different base currency.

The choice of rates for any particular currency lies with FIL and other market sources are used by FIL for quality control purposes. Where data sufficiency is limited, FIL, will use its own judgement to determine representative and meaningful market rates.

6.4 Calculation method

The FX Non Deliverable Forward market is constantly monitored by capturing rates every 2 minutes and performing continuous and interactive validation. The captured market data is subject to currency specific systematic tolerance checks which identify outlying data. Validation is performed on the outlying data by Operations Specialists, who will seek corroboration, or rely upon their own judgement to determine the market level. On the hour a snapshot of quoted rates is taken for each tenor, and considered the benchmark rate, subject to further currency specific tolerance checks prior to publication.

The use of FIL own judgement may be appropriate to assess the validity of rates throughout this process, with quality control guidelines and procedures governing each application of such judgement.

Once the rates have been validated, outright rates to GBP and EUR are calculated; an example of this is under section 9.5. Further information on the use and calculation of cross rates is detailed in Section 4.4.4. At 10am Tokyo time, JPY cross rates are calculated and published. These cross rates have been developed to align with local market requirements and thus are provided in the format of ISO/JPY and may have a factor applied to the cross calculation. For further details on the calculation or factors please contact wmr.ops@lseg.com

All NDF rates (bid, offer and mid) are rounded to a maximum of six decimal places after the decimal point. Where a “5” is encountered, the convention is to round up.

The method of calculating the rates is protected by a patent awarded in 2008, US serial 2002-0042765.

6.5 NDF Rate products

- Closing NDF Rates
- Historical NDF Rates
- Intraday NDF Rates

6.6 Coverage of NDF Rates

Coverage is currently in the following 12 currencies:

Europe					
Russian Rouble	RUBNDF	Ukraine Hryvnia	UAHNDF		

Africa & Gulf					
Egyptian Pound	EGPNDF	Nigerian Naira	NGNNDF		

Asia-Pacific					
Chinese R. Yuan	CNYNDF	Indian Rupee	INRNDF	Indonesian Rupiah	IDRNDF
Kazakhstan Tenge	KZTNDF	Malaysian Ringgit	MYRNDF	Philippine Piso	PHPNDF
South Korean Won	KRWNDF	Taiwanese Dollar	TWDNDF		

Section 7

WMR Metals Rates

7. WMR Metals Rates

7.1 Coverage

The rates are intended to reflect the underlying trading market for Spot Gold, Spot Silver, Spot Platinum and Spot Palladium as shown under section 7.6 below

7.2 Timing

The normal calculation times are hourly from Monday 06:00 Hong Kong/Singapore to Friday 22:00 in the UK.
Different calculation times may be used for reasons that include the following:

- An earlier time is chosen by FIL according to the policy on national holidays
- An earlier or later time is chosen by FIL due to technical difficulties in receiving or failure in supply of the source financial data.
- An earlier or later time is chosen by FIL for due to special market conditions.

FIL target for completion of calculation and publication of the service is 15 minutes after the calculation time.

The rates published as at 4 p.m. UK time are the Closing Metals rates.

7.3 Sourcing

The LSEG Market Data System is the primary infrastructure and technology used to source metal spot rates from multiple, market participants to be used in the calculation of the rates. FIL, using Expert Judgement, determines the appropriate data sources to be used on a per currency basis. This is subject to the oversight of the governance process. Data sources are reviewed periodically and clients will be advised prior to any material change being made.

The criteria used for selecting the source of metal spot rates are the quality and representativeness of those rates with respect to the wider market. The underlying rates used are those deemed to be the most appropriate for foreign investment transactions.

All metals in the WMR Metal benchmarks are referred to as “Trade Metals” or “Non-trade Metals”.

For Trade Metals, the data source (“Data Source”) to be used is determined by FIL on a per currency basis and based primarily on the liquidity available on the trading platform in said currencies. Such Data Sources are reviewed periodically with respect to their quality and the representativeness of the rates with respect to the wider market. Data Source for the determination of the benchmarks is the EBS order matching platform. The benchmarks are not based on the contribution of input data. Readily available input data for determination of the benchmarks from the platform is either traded rates or order rates, with traded rates taking precedence where available subject to the FIL’s expert judgement.
The Data Source for Non-Trade Metals is LSEG indicative quote data from multi contributor instrument codes. Where data sufficiency is limited, FIL, will use its own Expert Judgement to determine representative

and meaningful market rates. A different type of rate may be selected by FIL if the Bid and offer rates are not available for a particular metal spot rate. FIL has in place internal guidelines and quality control procedures that govern the application of Expert Judgement and are intended to provide consistency and oversight to this process. Employees receive initial and on-going training in how to comply with these guidelines and procedures.

7.3.1.1 Trade Metals

The following 2 Metals (XAG AND XAU) are referred to as “Trade Metals.” Bona fide arm’s length transactional Trade and Order rates are sourced from the EBS platform. The Trade and Order rates are used in the validation and calculation of these currencies.

The primary source of rates will be actual traded rates taken from EBS, as detailed above “Traded rates/Trades”.

The secondary source of rates will be the bid/offer rates on the order matching systems of EBS “Order rates/Orders”.

Metal spot rate quotes from RICs will be captured for instances where neither Trades nor Orders are available.

All other Metals not identified above as ‘trade’ Metals can be assumed to be ‘non trade’.

7.3.1.2 Base Currency

The “base” currency is the US dollar. However, this may be changed for particular currencies if FIL believes that more appropriate or representative quotations are available against a different base currency.

7.4 Calculation method

7.4.1 Non-Trade Metals

The Metals spot rate market is constantly monitored by capturing rates every 15 seconds and performing continuous and interactive validation.

The captured market data is subject to specific systematic tolerance checks which will identify outlying data. Validation is performed on the outlying data by Operations Specialists, who will seek corroboration, or rely upon their own judgement to determine the market level. The calculated benchmark is then subject to further specific tolerance checks prior to publication. The use of Expert Judgement may be appropriate to assess the validity of rates throughout this process, with quality control guidelines and procedures governing each application of such judgement.

Over a five minute period snapshots of the quoted rates are taken from the LSEG Market Data platform. These are extracted at 15 second intervals from 2 minutes 30 seconds before to 2 minutes 30 seconds after the calculation time.

The median bid and offer rates are independently calculated from the individual snapshots for each currency. These bid and offer rates are validated prior to publication, against currency specific thresholds and this may result in Expert Judgement being applied.

7.4.2 Traded Rates

The Metals spot rate market is constantly monitored by capturing rates every 15 seconds.

Over a five-minute period, actual trades executed and bid and offer order rates from the EBS order matching system are captured every second from 2 minutes 30 seconds before to 2 minutes 30 seconds after the time of the calculation (e.g. hour and/or ½ hour). Trading occurs in milliseconds on the trading platform and therefore not every trade or order is captured, just a sample.

From the data source, a single traded rate will be captured each second and this will be identified as a bid or offer depending on whether the Trade is a buy or sell. A spread will be applied to the Trade rate to calculate the opposite bid or offer. The spread applied will be determined by the Order rate captured at the same

time. All captured Trades will be subjected to validation checks. This may result in some captured data being excluded from the calculation.

Subject to a minimum number of valid Trades being present within this pool of data, using a threshold determined by FIL based on Expert Judgement, the Trade rates will be used for the benchmark. A median Trade bid and Trade offer are calculated independently, using data from the EBS trades. The mid-rate is calculated from the median Trade bid and Trade offer. A minimum “Standard Spread” is applied to the mid-rate to calculate a new bid and offer. These bid, offer and mid rates will be validated prior to publication, against currency specific tolerance thresholds, and this may result in Expert Judgement being applied.

Where the number of valid executed traded rates falls below the threshold determined by FIL Expert Judgement, then data from the EBS order matching system will be used in the calculation of the benchmark rate. The best bid and best offer rates will be captured simultaneously to the Trade data. All captured Order rates will be subjected to validation checks. This may result in some captured data being excluded from the calculation.

The mid-rate is calculated from the median Order bid and Order offer. A minimum Standard Spread is applied to the mid-rate to calculate a new bid and offer. These bid and offer rates will be validated prior to publication, against currency specific tolerance thresholds, and this may result in Expert Judgement being applied.

Bid, offer and mid rates are derived. Mid rates are calculated as the arithmetic mean of rounded bid and offer rates. Bid and offer rates are published to four decimal places; the mid rates are published to five decimal places. Where a “5” is encountered, the convention is to round up.

7.4.2.1 Standard Spreads

To publish spreads which are reflective of metal spot rate markets, FIL sets pre-defined minimum and maximum spreads for each metal, at each calculation time. These are variable across the metals to reflect different market levels and changes in liquidity at different times of day. In order to reflect actual market conditions, if the market dictates spreads which are greater than the pre-defined minimum spread and less than the pre-defined maximum spread, then these wider spreads will be used in the benchmark calculation – up to the maximum spread as predefined in the system. In the event the market dictates spreads which are wider than the predefined maximum standard spreads, further analysis will be undertaken.

7.5 Metals Rates products

- Closing Metals Rates
- Historical Metals Rates
- Intraday Metals Rates

7.6 Coverage of Metals Rates

Coverage is currently in the following 4 spot rates:

Metals			
Gold	XAU	Silver	XAG
Palladium	XPD	Platinum	XPT

Section 8

WMR delivery methods

8. WMR delivery methods

8.1 Delivery methods

All services are available directly from FIL on an hourly or daily basis utilising Web-based technology. These delivery methods range from e-mail to faster methods for time-critical applications. Services are also available through LSEG applications such as Eikon and Datastream.

Also, the services are available via a range of data distributors. These are subject to change but currently include (in alphabetical order):

- Bloomberg
- Enfusion
- Enverus
- FactSet Digital Solutions
- FIS
- ICE Data Services
- Markit
- Morningstar
- Nomura Research Institute
- NTT Data Financial
- Rimes Technologies
- SIX Financial Information
- SS&C Technologies Inc.
- StatPro Canada Inc.

Section 9

Cross Calculations

9. Cross Calculations

9.1 Crossed Spot Rates

For currencies where the market convention is for the spot date to be T+1, no adjustment is made and the calculation is performed as if both currencies are T+2.

T+1 Currencies

The following currencies follow the market convention where the spot date is T+1:

CAD Canadian Dollar, RUB Russian Rouble, TRY Turkish Lira and PHP Philippine Peso

No adjustment is made and the calculation is performed as if both currencies are T+2.

Likewise **no adjustment is made in the cross calculation when market holidays are observed in either or the crossing currency**. Cross rates to further base currencies may be published, and if so, these will be calculated using the same principles.

9.2 For Currencies Quoted in Units to USD (For Example, CAD)

Sterling Cross Calculation

GBP/CAD bid	=	(USD/CAD bid)	*	(GBP/USD bid)
GBP/CAD offer	=	(USD/CAD offer)	*	(GBP/USD offer)

Euro Cross Calculation

EUR/CAD bid	=	(USD/CAD bid)	*	(EUR/USD bid)
EUR/CAD offer	=	(USD/CAD offer)	*	(EUR/USD offer)

9.3 For Currencies Quoted in USD per Unit (For Example, AUD)

Sterling Cross Calculation

GBP/AUD bid	=	(GBP/USD bid)	/	(AUD/USD offer)
GBP/AUD offer	=	(GBP/USD offer)	/	(AUD/USD bid)

Euro Cross Calculation

EUR/AUD bid	=	(EUR/USD bid)	/	(AUD/USD offer)
EUR/AUD offer	=	(EUR/USD offer)	/	(AUD/USD bid)

9.4 For Currencies Quoted in Units to EUR (For Example, SEK)

USD Cross Calculation

USD/SEK bid	=	(EUR/SEK bid)	/	(EUR/USD offer)
USD/SEK offer	=	(EUR/SEK offer)	/	(EUR/USD bid)

Sterling Cross Calculation

GBP/SEK bid = (USD/SEK bid) * (GBP/USD bid)

GBP/SEK offer = (USD/SEK offer) * (GBP/USD offer)

9.5 EMU Legacy Spot Rates

The same principle applies for all legacy currencies. DEM is used in the formulas below:

USD/DEM Bid Rate Calculation

Invert the EUR/USD offer rate; this now becomes the USD/EUR bid.

Then:

USD/DEM bid = USD/EUR bid * EUR fixed conversion rate

USD/DEM Offer Rate Calculation

Invert the EUR/USD bid rate; this now becomes the USD/EUR offer rate.

Then:

USD/DEM offer = USD/EUR offer * EUR fixed conversion rate

9.6 Crossed Forward Rates

For currencies where the market convention is for the spot date to be T+1, no adjustment is made and the calculation is performed as if both currencies are T+2.

T+1 Currencies

The following currencies follow the market convention where the spot date is T+1: CAD Canadian Dollar, RUB Russian Rouble, TRY Turkish Lira and PHP Philippine Peso

No adjustment is made and the calculation is performed as if both currencies are T+2.

Likewise **no adjustment is made in the cross calculation when market holidays are observed in either or the crossing currency**. Cross rates to further base currencies may be published, and if so, these will be calculated using the same principles.

Example of How to Calculate the GBP/CAD 1M (One Month) Bid Premium/Discount

Use the bid rate for all of the following calculations:

- Add the USD/CAD 1M premium/discount to the USD/CAD spot rate = the USD/CAD 1M outright forward rate
- Add the GBP/USD 1M premium/discount to the GBP/USD spot rate. = the GBP/USD 1M outright forward rate
- Multiply these two outright forward rates together = the GBP/CAD 1M outright rate
- GBP/CAD 1M outright forward rate – GBP/CAD spot rate = GBP/CAD 1M premium/discount Therefore:
- USD/CAD 1M premium/discount bid + USD/CAD spot bid = USD/CAD 1M outright rate bid
- GBP/USD 1M premium/discount bid + GBP/USD spot bid = GBP/USD 1M outright rate bid
- USD/CAD 1M outright rate bid * GBP/USD 1M outright rate bid = GBP/CAD 1M outright rate bid
- GBP/CAD 1M outright rate bid – GBP/CAD spot bid = GBP/CAD 1M premium/discount bid

9.7 EMU Legacy Forward Rates

Example of How to Calculate the USD/DEM 1M Bid Premium/Discount

- Add the EUR/USD 1M ask premium/discount to the EUR/USD ask spot rate = the EUR/USD 1M outright ask forward rate

- Invert EUR/USD; this ask figure now becomes the bid = USD/EUR 1M outright bid forward rate
- Multiply the newly created USD/EUR bid rate and the EUR/DEM fixed conversion rate = the USD/DEM 1M outright bid rate
- USD/DEM 1M outright bid rate – USD/DEM spot bid rate = USD/DEM 1M bid premium/discount rate Therefore:
  - EUR/USD 1M premium/discount ask + EUR/USD spot ask = EUR/USD 1M outright rate ask
  - USD/EUR * EUR/DEM conversion rate = USD/DEM 1M outright bid
  - USD/DEM 1M outright rate bid – USD/DEM spot bid rate = USD/DEM 1M bid premium/discount forward rate

9.8 Crossed NDF Rates

Example of How to Calculate the GBP/CNYNDF 1M Bid Outright Use the bid rate for all of the following calculations:

- Add the GBP/USD 1M premium/discount to the GBP/USD spot rate = the GBP/USD 1M outright forward rate
- Multiply USD/CNYNDF 1M outright bid * GBP/USD 1M outright bid = GBP/CNYNDF 1M outright rate Therefore:
  - GBP/USD 1M premium/discount bid + GBP/USD spot bid = GBP/USD 1M outright bid
  - USD/CNYNDF 1M outright rate bid * GBP/USD 1M outright bid = GBP/CNYNDF 1M outright rate bid

9.9 JPY Cross Rates

For further details on the calculation and factors please contact wmr.ops@lseg.com.

Appendix A

Source of WMR Spot benchmark rates – Traded Currencies		
ISO	**LSEG Matching**	**EBS**
AUD	Included in all benchmark rate calculations	Included in all benchmark rate calculations, **except from 9pm to 12am UK Inclusive**
CAD	Included in all benchmark rate calculations	Included in all benchmark rate calculations, **except from 9pm to 12am UK Inclusive**
CHF	Included in all benchmark rate calculations	Included in all benchmark rate calculations
CNH	Included in all benchmark rate calculations	Included in all benchmark rate calculations
CZK	Included in all benchmark rate calculations	
DKK	Included in all benchmark rate calculations	
EUR	Included in all benchmark rate calculations	Included in all benchmark rate calculations
GBP	Included in all benchmark rate calculations	Included in all benchmark rate calculations, **except from 9pm to 12am UK Inclusive**
HKD	Included in all benchmark rate calculations	Included in all benchmark rate calculations, **except from 9pm to 12am UK Inclusive**
HUF	Included in all benchmark rate calculations	
ILS	Included in all benchmark rate calculations	
INR	Included in all benchmark rate calculations when the local markets are open	
JPY	Included in all benchmark rate calculations	Included in all benchmark rate calculations
MXN	Included in all benchmark rate calculations	
NOK	Included in all benchmark rate calculations	
NZD	Included in all benchmark rate calculations	Included in all benchmark rate calculations, **except from 9pm to 12am UK Inclusive**
PLN	Included in all benchmark rate calculations	
RON	Included in all benchmark rate calculations	
RUB	Included in all benchmark rate calculations	Included in all benchmark rate calculations
SEK	Included in all benchmark rate calculations	
SGD	Included in all benchmark rate calculations	Included in all benchmark rate calculations, **except from 9pm to 12am UK Inclusive**
THB	Included in all benchmark rate calculations when the local markets are open	
TOF	Included in all benchmark rate calculations	
TRY	Included in all benchmark rate calculations	
ZAR	Included in all benchmark rate calculations	

Appendix B

Definition of key terms

Key Term	Definition
Administration	Includes all stages and processes involved in the production and dissemination of a Benchmark, including: Collecting, analysing and/or processing information or expressions of opinion for the purposes of the determination of a Benchmark; Determining a Benchmark through the application of a formula or another method of calculating the information or expressions of opinions provided for that purpose; and Dissemination to users, including any review, adjustment and modification to this process.
Administrator	An organisation or legal person that controls the creation and operation of the Benchmark Administration process, whether or not it owns the intellectual property relating to the Benchmark. In particular, it has responsibility for all stages of the Benchmark Administration process, including: The calculation of the Benchmark; Determining and applying the Benchmark Methodology; and Disseminating the Benchmark.
Arm's Length Transaction	As defined by the IOSCO Principles, this refers to a transaction between two parties that is concluded on terms that are not influenced by a conflict of interest.
Authorised Benchmark Administrator	An Administrator that is authorised pursuant to Article 34 of the Benchmarks Regulation.
Benchmark	A standard against which foreign exchange rates may be measured.
Benchmark Oversight Committee	Established to perform oversight of the WMR spot, forward and non-deliverable forward rate Benchmarks and FTSE International Ltd "FIL" role as administrator of the Benchmark Rates. It will also be responsible for reviewing and advising on the policies and methodologies by which FIL calculates, administers and publishes the Benchmark Rates, including for the avoidance of doubt, any cessation of Benchmark Rates.

Benchmarks Regulation	Regulation (EU) 2016/1011 (https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R1011&from=EN) and the Benchmarks (Amendment and Transitional Provision) (EU Exit) Regulations 2019 (the UK Benchmark Regulation) (https://www.legislation.gov.uk/uksi/2019/657/made)
Bona Fide	as defined by the IOSCO Principles, this refers to data where the parties submitting the data have executed, or are prepared to execute, transactions generating such data and the concluded transactions were executed at arm's length from each other.
Business Day	any day on which the TARGET2 real-time gross settlement system is open.
Closing Rate	FIL defines 4pm London as the Closing Rate benchmark rates.
Economic Realities	the appreciation that the availability, depth and quality of market data will vary from one market to another depending on the evolution and liquidity available within that market.
Interbank	conducted between or involving two or more banks
Intraday Rate	FIL produces benchmark rates throughout the day; all rates except the Closing Rates are referred to as Intraday.
Inverted	when a currency's market quotation is shown as the number of US dollars required to buy one unit of foreign currency, also known as 'American terms' or 'Direct'
Methodology	the written rules and procedures according to which information is collected and the Benchmark is determined.
Non-Inverted	when a currency's market quotation is shown as the number of foreign currency required to buy one USD. Also known as 'European terms' or 'Indirect'
IOSCO Principles	'The Principles for Financial Benchmarks' as at July 2013, published by The Board of the International Organization of Securities Commissions.
Local Close Currencies	currencies identified by FIL where offshore trading is not permitted. Rates are only published during local market opening hours, with no further updates permitted to the benchmark rate once that market closes.
Metal/Metals	a precious metal spot rate
Multi Contributor Rate	a composite feed from LSEG Market Data System which is typically updated by more than one contributor
Official Benchmarks	a daily exchange rate for a local currency based on market conditions, usually with involvement from the Central Bank.
Offshore	a market where non domestic banks can participate.

Onshore	a market which is accessible to domestic banks only.
Single Source	where currency markets are restricted or illiquid, the data inputs maybe limited to a primary provider.
WMR Currency Review Group	the group within FIL responsible for the periodic review of currency, metals and tenor specific systematic tolerances which enables the effective monitoring and scrutiny of pre-publication monitoring, as well as ex post analysis of trends and outliers.

Appendix C

Further information

If you would like to learn more about the WMR Rates Service, please visit our website or contact us by telephone or e-mail. A service representative will be available 24 hours a day from Monday 06:00 Hong Kong/Singapore until Friday 22:00 UK time.

Client Subscriptions:

UK Toll Free: 0800 023 4130

International: + 44 (0) 0131 376 0007

Email: wmr.sales@lseg.com

Operations:

UK Toll Free: 0800 028 2551

International: + 44 (0) 131 376 0004

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