

WM/Reuters

Spot & Forward Rates Methodology Guide

eEXCHANGE SOLUTIONS | PRODUCT PROFILE

Scope of the rates and methodology of their calculation

SECTION 1 — INTRODUCTION

1.1 History

The WM/Reuters Closing Spot Rates service was introduced in 1994 to provide a standard set of currency 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 rapidly 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 WM/Reuters Closing Forward Rates service was launched to complement the Closing Spot Rates service.

In 2001, the WM/Reuters 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 August 2004, 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 and 11:00 Bangkok time.

In September 2009, the WM/Reuters Non Deliverable Forwards (NDF) Rates were launched covering 12 currencies. The NDF service provides both closing and Intraday rates.

In September 2012, WM/Reuters Intraday Spot Rates service was further enhanced by the introduction of half-hourly fixes for the trade currencies only.

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1.2 Uses of the Rates

The majority of the main equity and bond index compilers use the WM/Reuters 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 at the WM/Reuters rates — this is useful for investment customers if they are making changes to a portfolio benchmarked against an index that uses the WM/Reuters rates, as trading at these rates will avoid any reconciliation differences. 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 WM/Reuters' rates in this way can avoid using expensive resources to check the market continually. Auditors accept the WM/Reuters rates as independently fixed.

SECTION 2 — WM/REUTERS SPOT RATES

2.1 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 fixings. The addition of currencies not meeting these criteria will be at WM's discretion, and in theory, any world currency may be included.

The coverage of the WM/Reuters rates is shown under section 2.6.

The European legacy currencies (ATS, BEF, CYP, DEM, EEK, FRF, FIM, GRD, IEP, ITL, 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 6.2. 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 fixing times from 06:00 Hong Kong/Singapore time to Friday 22:00 UK time, there is also WM/Reuters Closing Spot Rates (4 p.m. UK fix) history available since 1994 and the WM/Reuters Intraday History available since 2001.

2.2 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 2.3 for details of these 'trade currencies.'

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

- An earlier time is chosen by WM according to the policy on national holidays (see section 5.2).
- An earlier or later time is chosen by WM due to technical difficulties in receiving or failure in supply of the source financial data.
- An earlier or later time is chosen by WM for particular currencies due to special market conditions.

WM's target for completion of calculation and publication of the service is 15 minutes after the fix time.

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

2.3 Sourcing

The Reuters System is the primary source of the spot foreign exchange (FX) rates used in the calculation of the rates. Other sources may be used by exception where the appropriate rates are not available on the Reuters System. Presently, the Central Bank Spot Rate is used for a number of non-major currencies where there is no accurate alternative. A list of these currencies is available on request.

As far as possible, the underlying rates used are those deemed to be the most appropriate for foreign investment transactions.

A different type of rate may be selected by WM for reasons that include the following:

- Commercial interbank bid and offer rates are not available for a particular currency.
- An “official” fixing is created that is more appropriate for foreign investment transactions.

Wherever possible, a multi-contributor source of rates is used in preference to a single contributor unless an “official” fixing is being used.

The “base” currency for quoted rates selected from the Reuters System is the US dollar or the euro, depending on which base currency is predominant. Presently, currencies which are predominantly based against the euro are CHF, CZK, DKK, HUF, LTL, NOK, PLN, RON and SEK. All other currencies are based against the US dollar. However, this may be changed for particular currencies if WM believes that “better” quotations are available against a different base currency.

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.

The following 21 currencies (AUD, CAD, CHF, CZK, DKK, EUR, GBP, HKD, HUF, ILS, JPY, MXN, NOK, NZD, PLN, RON, RUB, SEK, SGD, TRY and ZAR) are referred to as “Trade Currencies.” Trades and rates from Currenex, Reuters Dealing 3000 and EBS are used in the validation and calculation of these currencies.

The following 17 currencies have Reuters Dealing System as their primary source: AUD, CAD, CZK, DKK, GBP, HKD, HUF, ILS, MXN, NOK, NZD, PLN, RON, SEK, SGD, TRY AND ZAR. EBS is the primary source for RUB. The following three currencies have EBS as their primary source, with Currenex as a secondary source: EUR, CHF and JPY.

The choice of rates for any particular currency lies with WM. Other market sources may be used by WM for quality control purposes.

2.4 Calculation Method

The FX market is constantly monitored by capturing rates every 15 seconds and performing continuous and interactive validation. This dynamic system identifies currency issues and outliers in advance.

2.4.1 Non-Trade Currencies

On the hour, the snapshots of the quoted rates, taken from Reuters over a two-minute fix period, are extracted. The median rates are then selected from these individual snapshots for each currency. This is done independently for bid and offer quotes. Further quality checks are applied by WM to the median bid and offer rates. While every effort is made to ensure the quality of the service, no guarantee of accuracy can be given.

2.4.2 Trade Currencies

Over a one-minute fix period, bid and offer order rates from the order matching systems and actual trades executed are captured every second from 30 seconds before to 30 seconds after the time of the fix. Trading occurs in milliseconds on the trading platforms and therefore not every trade or order is captured, just a sample. Trades are identified as a bid or offer and a spread is applied to calculate the opposite bid or offer.

Using valid rates over the fix period, the median bid and offer are calculated independently and then the mid rate is calculated from these median bid and offer rates, resulting in a mid trade rate and a mid order rate. A spread is then applied to calculate a new trade rate bid and offer and a new order rate bid and offer. Subject to a minimum number of valid trades being captured over the fix period, these new trade rates are used for the fix; if there are insufficient trade rates, the new order rates are used for the fix.

Further quality checks are then applied to ensure accurate fix rates are published.

If neither trade rates nor order rates are available, the quoted rates from Reuters are used, as they are for the non-trade currencies.

2.4.3 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 published in each subsequent fix remain unchanged. This impacts the following currencies. Please note that the “Open Time” and “Close Fix” for each currency are subject to change.

ISO	OPEN TIME	CLOSE FIX
CNY	01:15 GMT	09:00 GMT
IDR/IDT	01:15 GMT	09:00 GMT
INR	03:15 GMT	11:00 GMT
KRW	23:15 GMT	06:00 GMT
MYR	23:15 GMT	09:00 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 fixing the rates is protected by a patent awarded in 2008, US serial 09/972,193.

Once the rates have been validated, cross rates to GBP and EUR are calculated. An example of these calculations is included under section 6.1. Cross rates to further base currencies may be published, and if so, these will be calculated using the same principles. The validation process used is protected by the patent detailed above.

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.

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.

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

2.5 Spot Rate Products

- Closing Spot Rates
- Historical Spot Rates
- Intraday Spot Rates

2.6 Coverage of Closing and Intraday Spot Rates

Coverage is currently in the following 160 currencies:

Europe

Albania Lek	ALL	Austrian Schilling	ATS	Belarus Ruble	BYR
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
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
Comoros Franc	KMF	Congo Dem. Rep. Franc	CDF	Cote D'Ivoire Franc	XOF
Egyptian Pound	EGP	Ethiopia Birr	ETB	Gambian Dalasi	GMD
Ghana Cedi	GHS	Guinea Franc	GNF	Iran Rial	IRR
Israeli Shekel	ILS	Jordanian Dinar	JOD	Kenyan Shilling	KES
Kuwaiti Dinar	KWD	Lebanese Pound	LBP	Lesotho Loti	LSL
Malagasy Ariary	MGA	Malawi Kwacha	MWK	Mauritanian Ouguiya	MRO
Mauritius Rupee	MUR	Moroccan Dirham	MAD	Mozambique Metical	MZN
Namibia Dollar	NAD	Nigerian Naira	NGN	Omani Rial	OMR
Qatar Rial	QAR	Rwanda Franc	RWF	Saudi Arabian Riyal	SAR
Seychelles Rupee	SCR	Sierra Leone Leone	SLL	South African Rand	ZAR
Sudan Pound	SDG	Swaziland Lilangeni	SZL	Tanzania Shilling	TZS
Tunisian Dinar	TND	UAE Dirham	AED	Ugandan Shilling	UGX
Yemen Rial	YER	New Zambian Kwacha	ZMW	Zimbabwe Dollar	ZWL
Zim Dollar Notional	ZDN				

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	Indonesian Rupiah	IDR
Indonesian Onshore Traded	IDT	Japanese Yen	JPY	Kazakhstan Tenge	KZT
Kyrgyzstan Som	KGS	Macao Pataca	MOP	Malaysian Ringgit	MYR
Maldives Rufiyaa	MVR	Mongolia Tugrik	MNT	Nepal Rupee	NPR
New Zealand Dollar	NZD	Pacifique Franc	XPF	Pakistani Rupee	PKR
Papua NG Kina	PGK	Philippine Peso	PHP	Samoa Tala	WST
Singapore Dollar	SGD	Solomon Islands Dollar	SBD	South Korean Won	KRW
Sri Lanka Rupee	LKR	Taiwan Dollar	TWD	Thai Baht	THB
Thai Baht Offshore	TOF	Tonga Pa'anga	TOP	Uzbekistan Som	UZS
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	Netherlands Antilles Guilder	ANG
Nicaragua Gold Cordoba	NIO	Panama Balboa	PAB	Paraguay Guarano	PYG
Peru New Sol	PEN	Surinam Dollar	SRD	Trinidad & Tobago Dollar	TTD
Uruguay Peso	UYU	US Dollar	USD	Venezuelan Bolivar	VEF

SECTION 3 — WM/REUTERS FORWARD RATES

3.1 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 Reuters.

The coverage is presently 82 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. A list of currencies covered is under section 3.6.

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)

3.2 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, WM publishes at 17:00 hours New York time, 10:00 hours Sydney time, 14:00 hours New Zealand 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 WM according to the policy on national holidays (see section 5.2).
- An earlier or later time is chosen by WM due to technical difficulties in receiving or failure in supply of the source financial data.

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

WM's target time for the publication of the service is 30 minutes after the fix time.

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

3.3 Sourcing

The Reuters System is the sole source of the forward FX rates used in the calculation of the rates. Other sources may be used by exception where the appropriate rates are not available on the Reuters System.

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 WM if commercial interbank bid and offer rates are not available for a particular currency.

The "base" currency for rates selected from the Reuters System will normally be the US dollar. However, this may be changed for particular currencies if WM believes that "better" quotations are available against a different base currency.

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

Some currencies are NDF (Non-Deliverable Forwards). The premium/discount NDF currencies, included in the Forwards services are ARS, BRL, CLP, COP, EGP 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.

WM also provides outright NDF Rate services, detailed in section 4.

3.4 Calculation Method

A capture of the current premium/discounts is taken from multi-contributor sources on the Reuters System at or around the time of the fix.

A range of quality control checks is applied by WM (while every effort is made to ensure the quality of the service, no guarantee of accuracy can be given).

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 6.3. Legacy currency premium/discounts are calculated using the fixed euro conversion rates; an example is shown under section 6.4. 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 five decimal places after the decimal point. Where a “5” is encountered, the convention is to round up.

3.4.1 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 published in each subsequent fix remain unchanged.

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

ISO	OPEN TIME	CLOSE FIX
CNY	01:15 GMT	09:00 GMT
IDR	01:15 GMT	09:00 GMT
INR	03:15 GMT	11:00 GMT
KRW	23:15 GMT	06:00 GMT
MYR	23:15 GMT	09:00 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 fixing the rates is protected by a patent awarded in 2008, US serial 2002–0042765.

Under exceptional circumstances, it may be necessary to amend the rates for one or more currencies after publication.

This will be determined by WM, after consultation with key users if appropriate. Under no circumstances will the rates for one day be amended after the publication of the following weekday’s rates.

WM reserves the right to correct missing or incorrect rates by substituting them with previous quotes, forward premiums or discounts derived from interest rate differentials, forward premiums or discounts derived by interpolation between adjacent quoted rates, or by any other means.

3.5 Forward Rate Products

- Closing Forward Rates
- Historical Forward Rates
- Intraday Forwards Rates

3.6 Coverage of Forward Rates

Coverage is currently in the following 82 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	Ukraine Hryvnia	UAH

Africa & Gulf

Bahrain Dinar	BHD	Botswana Pula	BWP	Egyptian Pound	EGP
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 Peso	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	Venezuelan Bolivar	VEF

SECTION 4—WM/REUTERS NON-DELIVERABLE FORWARD (NDF) RATES

4.1 Coverage

The rates are intended to cover the emerging market currencies that do not allow trading out with the local market.

The coverage is presently 12 currencies and is periodically reviewed as more information is made available. Bid, offer and mid outright rates are published against USD, GBP and EUR. A list of currencies covered is under section 4.6.

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)

4.2 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, we publish at 17:00 hours New York time, 10:00 hours Sydney time, 14:00 hours New Zealand 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 WM according to the policy on national holidays (see section 5.2).
- An earlier or later time is chosen by WM due to technical difficulties in receiving or failure in supply of the source financial data.
- An earlier or later time is chosen by WM for particular currencies due to special market conditions.

WM's target for completion of calculation and publication of the service is 30 minutes after the fix times.

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

4.3 Sourcing

The Reuters System is the sole source of NDF FX rates used in the calculation of the NDF rates. Other sources may be used by exception where the appropriate rates are not available on the Reuters System.

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.

The “base” currency for rates selected from the Reuters System will normally be the US dollar. However this may be changed for particular currencies if WM believes that “better” quotations are available against a different base currency.

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

4.4 Calculation Method

A capture of current outright NDFs is taken from multi-contributor sources on the Reuters System at or around the time of the fix.

A range of quality control checks is applied by WM (while every effort is made to ensure the quality of the service, no guarantee of accuracy can be given).

Once the rates have been validated, outright rates to GBP and EUR are calculated; an example of this is under section 6.5.

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

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

Under exceptional circumstances, it may be necessary to amend the rates for one or more currencies after publication. This will be determined by WM, after consultation with key users, if appropriate. Under no circumstances will the rates for one day be amended after the publication of the following weekday's rates.

WM reserves the right to correct missing or incorrect rates by substituting them with previous quotes or by any other means.

4.5 NDF Rate Products

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

4.6 Coverage of NDF Rates

Coverage is currently in the following 12 currencies:

Asia-Pacific

Chinese R. Yuan	CNYNDF	Indian Rupee	INRNDF
Indonesian Rupiah	IDRNDF	Kazakhstan Tenge	KZTNDF
Malaysian Ringgit	MYRNDF	Philippine Peso	PHPNDF
South Korean Won	KRWNDF	Taiwanese Dollar	TWDNDF
Vietnamese Dong	VNDNDF		

Africa & Gulf

Nigerian Naira	NGNNDF
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Europe

Russian Rouble	RUBNDF	Ukraine Hryvnia	UAHNDF
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SECTION 5 — THE SPOT & FORWARD RATES

5.1 Policy on National Holidays

The fixings 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. Please visit our website for more information.

On national holiday dates, the principle is that the rates should be fixed at the normal times up to the latest fix 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. WM/Reuters Closing Spot and Forward Rates will be produced as normal if two or more of these centres are open. WM/Reuters Intraday Spot and Forward Rates may not be produced for all fixings in 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 fixings will be produced and the rates from the previous fixing 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 fixings.

Special circumstances may arise on the last weekdays prior to Christmas and New Years where although markets are open, they may close early and therefore be illiquid at some normal fixing times. Under these circumstances, WM may take a decision to revert to an earlier fixing to ensure the integrity of the rates.

5.2 Delivery Methods

All services are available directly from the WM Company on an hourly or daily basis utilising Web-based technology. These delivery methods range from e-mail to faster methods for time-critical applications.

Also, the services are available via a range of data distributors including (in alphabetical order):

- Bloomberg
- Fininfo
- Interactive Data Pricing and Reference Data
- Linedata
- Markit
- Morningstar
- Nomura Research Institute
- NTT Data Financial
- Proquote
- Rimes Technologies
- Six Financial Information
- SunGard GL Trade
- Thomson Reuters (Including Datastream)
- SunGard Asset Arena Pricing Services (Valuelink)

SECTION 6—CROSS CALCULATIONS

6.1 Crossed Spot Rates

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

Sterling Cross Calculation

$$\begin{aligned}\text{GBP/CAD bid} &= (\text{USD/CAD bid}) * (\text{GBP/USD bid}) \\ \text{GBP/CAD offer} &= (\text{USD/CAD offer}) * (\text{GBP/USD offer})\end{aligned}$$

Euro Cross Calculation

$$\begin{aligned}\text{EUR/CAD bid} &= (\text{USD/CAD bid}) * (\text{EUR/USD bid}) \\ \text{EUR/CAD offer} &= (\text{USD/CAD offer}) * (\text{EUR/USD offer})\end{aligned}$$

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

Sterling Cross Calculation

$$\begin{aligned}\text{GBP/AUD bid} &= (\text{GBP/USD bid}) / (\text{AUD/USD offer}) \\ \text{GBP/AUD offer} &= (\text{GBP/USD offer}) / (\text{AUD/USD bid})\end{aligned}$$

Euro Cross Calculation

$$\begin{aligned}\text{EUR/AUD bid} &= (\text{EUR/USD bid}) / (\text{AUD/USD offer}) \\ \text{EUR/AUD offer} &= (\text{EUR/USD offer}) / (\text{AUD/USD bid})\end{aligned}$$

6.1.3 For Currencies Quoted in Units to EUR (For Example, CHF)

USD Cross Calculation

$$\begin{aligned}\text{USD/CHF bid} &= (\text{EUR/CHF bid}) / (\text{EUR/USD offer}) \\ \text{USD/CHF offer} &= (\text{EUR/CHF offer}) / (\text{EUR/USD bid})\end{aligned}$$

Sterling Cross Calculation

$$\begin{aligned}\text{GBP/CHF bid} &= (\text{USD/CHF bid}) * (\text{GBP/USD bid}) \\ \text{GBP/CHF offer} &= (\text{USD/CHF offer}) * (\text{GBP/USD offer})\end{aligned}$$

6.2 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:

$$\text{USD/DEM bid} = \text{USD/EUR bid} * \text{EUR fixed conversion rate}$$

USD/DEM Offer Rate Calculation

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

Then:

$$\text{USD/DEM offer} = \text{USD/EUR offer} * \text{EUR fixed conversion rate}$$

6.3 Crossed Forward Rates

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

6.4 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

6.5 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

For more information

If you would like to learn more about the WM/Reuters 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.

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