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# Transparency in Over-the-counter Interest rate derivatives Markets

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**Abstract**

A major portion of interest rate derivatives, in particular interest rate swaps, is traded over the counter (OTC). This reports provides an overview of pre-trade and post-trade transparency in OTC interest rate derivatives markets. Focusing on the interest rate swap market, we provide an inventory of existing forms of pre-trade and post-trade transparency in this market, discuss whether there is a need for increased transparency in this market, how such an increase in transparency may be achieved and to whom the costs and benefits would incur.

# Contents

# 1 Introduction

Transparency in securities markets, defined as the degree to which information regarding quotes for securities, the prices of transactions, and the volumes of those transactions are made available to market participants. Over-the-counter derivatives markets have been criticized as being "opaque" and lacking transparency. Proposals for increasing transparency include requiring systematic reporting of trades to a central data repository, voluntary or mandatory central clearing and full-blown exchange trading of certain categories of interest rate derivatives.

The global interest rate derivatives market, with a notional volume of 448.7 trillion USD in 2009, is a major component of world financial markets. An important portion of interest rate derivatives is traded over the counter (OTC). In particular, the interest rate swap market, with a notional volume in excess of 332 trillion USD in 2009, is the most important OTC interest rate derivatives market. It is a mature market, in which banks, institutional investors and corporations have been successfully conducting bilateral transactions for more than thirty years. Other interest rate derivatives which are traded OTC include options on LIBOR rates –caps and floors– and options on swaps (swaptions).

## 1.1 Defining market transparency

Market transparency may be defined as the extent to which information on prices and quantities is disseminated among market participants. Market transparency takes various forms which may benefit different market participants in different ways. When discussing transparency in securities markets it is important to distinguish *pre-trade* and *post-trade transparency*.

It is also important to distinguish to whom the information is disclosed. Much of the discussion regarding market transparency during the crisis has been related to the lack of visibility on OTC markets for regulators. This is obviously an important issue and the current trend is towards a higher degree of disclosure to regulators of prices, quotes and exposures in OTC markets, which regulators intend to use in order to monitor and enhance market stability. Information disclosed to regulators is treated as confidential and strict rules govern the ways in which such information may be used. It is clear, however, that the same information, if disclosed publicly, may in fact act as a trigger for speculative runs on financial institutions and generate market instability. This is an extreme example of a situation where "full" transparency does not contribute to market stability and liquidity.

## 1.2 Scope

The goal of this report is to clarify some of the issues underlying the current debate on market transparency, in the context of OTC interest rate derivatives markets. Is there "enough" transparency in these markets? If not, how can

more transparency be introduced and what will its effect be on market stability and liquidity?

As in any market design problem, a meaningful analysis should specify to whom the costs are incurred and to whom the benefits accrue. Increasing transparency has a cost and any meaningful discussion of market transparency must assess the benefits of changes in market design and weigh them against their costs.

We have attempted to provide an overview of pre-trade and post-trade transparency in OTC markets for standard interest rate derivatives: interest rate swaps, cross-currency swaps, caps, floor and swaptions. Focusing on the interest rate swap market, we provide an inventory of existing forms of pre-trade and post-trade transparency in this market, discuss whether there is a need for increased transparency in this market, how such an increase in transparency may be achieved and to whom the costs and benefits would incur.

# 2 The interest rate swap market

## 2.1 A mature OTC market for institutional investors

The interest rate swap (IRS) market is a mature market whose participants are financial and non-financial institutions. Financial institutions such as banks, corporations and asset managers can use interest rate swaps to hedge their interest rate risk or manage their balance sheets.

Many corporations, in particular non-financial corporations, may enter interest rate swaps in order to hedge their bond exposures. The accounting of many of these trades is based on Financial Accounting Standards Board Statement No. 133 (FAS 133) which allows to register the interest rate swap as a hedge insofar as its characteristics match the exposure to interest rate risk initially present in the corporation's portfolio. For this reason, most interest rate swap contracts are bespoke and their characteristics, in terms of underlying rates, tenor and maturity are customized to correspond to the clients exposure.

**Example** A corporation or sovereign entity is pondering a bond issue in 6 months. Having concerns that interest rates will rise, it can enter into a "rate-lock" interest rate swap, by paying a fixed rate and receiving floating payments based on a reference market rate. This swap contract needs to match the exact cash flows of the pending bond issuance. After 6 months, at the bond issuance date the entity can unwind the interest rate swap and issue the bond, having hedged itself against rate moves during the pre-issuance period.

Trades in interest rate swaps are often large and operated over-the-counter (OTC). Contrarily to the equity and bond markets, there is no significant "retail" component in this market.

Dealers play an important role in the interest rate swap market. SwapClear, the main interdealer clearinghouse for interest rate swaps, has around 30 mem-

bers while the WholeSale Money Brokers Association (WMBA) registers more than 50 dealers. Dealers communicate among themselves through various interdealer brokerage systems such as ICAP. These interdealer platforms play an important role in disseminating pre-trade information among dealers but are typically not accessible to non-dealers. They also act as sources of pre-trade information for the whole market by aggregating dealer quotes and disseminating indicators –swap curves, volatility surfaces– to the whole market.

Pre-trade information in the form of price quotes is communicated by dealers to their clients either directly or via service providers such as Bloomberg and Reuters.

Some electronic trading platforms have also emerged but have retained only a small fraction of market flow, less than 5% in terms of notional volume in 2009. There have been some attempts at moving products such as IRS futures to exchange trading but so far these exchange traded products have attracted little volume when compared to similar OTC products.

## 2.2 Interdealer brokerage

Given the importance of dealers in the interest rate derivatives market, a key issue is the information network connecting interest rate derivatives dealers. Like for other OTC derivatives, the most common type of transaction is done directly between two dealers over the telephone. This method may be time consuming because the dealer has to search for a matching counterparty. Interdealer brokers offer venues where dealers may exchange pre-trade information and increase the efficiency of this search. ICAP, with a 30% share of the London interest rate swap market, is one of the primary interdealer brokers in this market. Some others interdealer brokers are Tradition, BGC and Tullett Prebon.

As their name indicates, such platforms are limited to registered dealers: buy-side clients do not typically have access to the full range of their services. However, interdealer brokers also act as sources of pre-trade information for the whole market, nondealers included, by disseminating anonymized "composite" indicators of market variables –swap curves, implied volatility surfaces– based on quotes proposed by their dealer members. These indicators are accessible to all market participants and disseminated by service providers such as Bloomberg and Reuters.

## 2.3 Electronic trading platforms

According to a 2010 ISDA survey, 87% percent in notional volume of standard interest rate derivatives are eligible for electronic processing [6]. Electronically confirmed transactions in interest rates derivatives represented 47% of of electronically eligible transactions in 2009. Electronic trade confirmation eases the exchange and processing of post-trade information and its transmission to data repositories.

Eligibility for electronic processing opens the possibility of moving such trades to electronic trading platforms. These platforms are different from ex-

changes in that trades are still done OTC. But, as observed in other OTC markets, the implementation of electronic trading platforms, either interdealer or dealer-to-client, has led to more market transparency. In such electronic platforms, (anonymous) quotes can be tracked and all trades are done through the platform are electronically registered, thus providing a potential source for the reporting and dissemination of post-trade information -to regulators and trade repositories- if necessary.

Interdealer electronic trading platforms for interest rate swaps already exist: ISWAP, launched in 2003, and BlackBird are examples of such an electronic interdealer trading platform. From a technological point of view, there is no obstacle to the electronic trading and processing of interest rate swaps. Also, the existing platforms offer a wide range of products and have demonstrated their ability to support bespoke price requests. Yet, these platforms have not attracted much liquidity, most dealers having preferred the voice system. Given the current regulatory context, some market participants anticipate an increase in the use of electronic platforms in the near future. Their activity seems to have increased significantly in 2010.

## 2.4 Central clearing facilities

Central clearing facilities for OTC interest rate swap trades have existed for more than a decade. SwapClear, the primary inter-dealer clearing facility for interest rate swaps, currently clears more than 40% of the interest rate swap market, representing trades with a total notional principal of $ 229 trillion. Launched in 1999 by LCH.Clearnet, SwapClear clears swaps in 14 currencies; USD, EUR, and GBP out to 50 years, AUD, CAD, CHF, SEK and vanilla JPY out to 30 years and the remaining 6 currencies out to 10 years. It also clears OIS out to 2 years in USD, EUR, GBP and CHF.

Such clearinghouses mitigate counterparty risk through margin requirements. For instance, SwapClear successfully managed Lehman Brothers US$9 trillion interest rate swap default in 2008, closing out over 66,000 swap trades without using up all available margin [1].

Clearinghouses also facilitate post-trade reporting to regulators and trade repositories. However, in contrast with an exchange, they do not necessarily increase transparency for market participants since the information related to cleared trades is kept confidential and not disseminated to the market. Existing swap clearing facilities do not publish trade prices - either in real-time or at the end of the day - nor do they provide facilities for arranging or facilitating new trades.

## 2.5 Exchange trading of interest rate derivatives

Exchange trading is often considered as the ultimate form of pre- and post-trade market transparency. Mandatory exchange trading of standardized derivatives has been a topic of discussion among regulators. Is mandatory exchange trading

of interest rate derivatives feasible and, most importantly, will it improve market quality and/or enhance market stability?

First, let us recall that some interest rate derivatives – bond futures and interest rate futures– are already actively traded on exchanges. They have evolved towards this situation without any mandatory requirement on behalf of regulators and such exchanges have successfully coexisted with OTC interest-rate derivatives markets for years.

However, questions arise as to the feasibility and the eventual benefit of such an approach for interest rate swaps. Why has a mature institutional market such as the interest rate swap market remained OTC for more than 30 years? Will interest rate swap markets continue to fulfill their function if they are moved to exchanges?

There have been attempts at exchange trading in the interest rate swap market. Exchange trading of interest rate swap futures, launched on the CME a few years ago, is the prime example. But trading volumes in these contracts pale with respect to similar ones on the OTC market, and represent around 0.1% of the market in notional terms.

One reason is that corporate clients primarily use interest rate swaps for hedging bond exposures, in accordance with hedge accounting rules as defined by FAS 133: these clients come to the swap market with specific interest-rate exposures related to their bond positions and offset this risk with customized interest rate swaps or derivatives whose tenor and maturity are related to their initial exposure. In particular, clients may look for contracts with very long maturities, and exercise levels far from the current level of interest rates. The range of tenors and maturities in the exchange simply has not been able to match the needs of such clients. In other words, each swap is customized in terms of tenor and maturity and the range of tenors and maturities is too large to be covered by exchange-traded contracts and still maintain liquidity across all contracts.

However this remark alone does not rule out exchange trading of interest rate swaps. One can imagine a range of interest rate swaps with standardized tenors and maturities traded on an exchange, coexisting with an OTC market where other tenors and maturities are traded at a spread with the standardized contracts. Equity options markets offer examples where exchange traded derivatives coexist with OTC derivatives, the exchange providing reference prices and volatilities which are then used as inputs for marking to market OTC trades.

This discussion suggests that, in the event where trading in a set of standardized interest rate swaps is moved to an exchange, interest rate swaps with non-standard characteristics will continue to be traded over the counter. The real question is how much of the flow will be diverted to such an exchange and how much will be done over the counter. This will depend on the range and variety of products offered by the exchange, the example of swap futures being a cautionary example here.

Another issue, when considering a move to exchange trading, is the frequency and size of trades. *Fragmented* markets in which average daily volume is much greater than average trade size are best suited for exchange trading: market

makers are then able to offload risk in a short period of time, and rarely hold risk overnight, so full transparency is appropriate and will not diminish the market makers incentives to provide liquidity. Equity markets provide examples of such fragmented markets. In contrast, markets where trading is *concentrated* among few players and where a single trade might equal the daily volume require market makers to hold risk over longer periods of time, sometimes weeks or months. Full post-trade transparency would then dissuade market makers from entering into large trades since they it would be costly to offload the resulting risk.

In the interest rate swap market, there is no retail component so the current situation is closer to the second case described above. For example, as shown in Table 1, interest rate swap trades registered with the TriOptima interest rate derivatives repository indicate around 3,011,004 transactions in interest rate swaps–all currencies included– in July 2010, representing a total notional of 339532 billion USD. This leads to an *average* notional size of more than 112 million USD for a single transaction, indicating large trade sizes. During the same month, SwapClear cleared 67826 transactions. These numbers are aggregated across contract characteristics: as shown in Table 2, when considering a given maturity range, this number may drop to tens of thousands of trades per month.

Data from TriOptima indicate that the average number of new interest rate swap trades was 3600 per day in the month of June 2010. This trade count is the aggregate across all variations of IR swaps, all maturities and all currencies, of which the biggest are USD with 1,200 trades per day and EUR with 830 trades per day. This number drops to a few hundred per day for a given maturity range. The most liquid full year IRS swap contract was the 10 year USD swap where 208 trades were made on average each day. Most of the standardized swaps in other maturities and currencies trade less than 20 contracts per day. Though exchange trading is more efficient for handling large flows of relatively small orders, such concentrated flows of large trades may be more efficiently handled in the OTC market.

More importantly, one should bear in mind that market stability, not transparency per se, should be the goal of any change in market structure. In the context of institutional markets where trades are infrequent but large in size–as opposed to liquid markets where retail flow may be important– post-trade transparency may in fact increase market impact of trades and thus lead to a greater cost of execution. The recent "flash crash" in US equity markets shows that the transparency that comes with exchange trading may also be a factor of market destabilization – revealing large orders may in fact increase their price impact and result in large market moves. The mandatory post-trade transparency which goes hand in hand with exchange trading might thus be a destabilizing factor in a market such as the interest rate swap market where trades are large and relatively infrequent. If, for other reasons, regulators eventually settle for exchange trading of interest rate swaps, it is in the interest of market stability to consider, as is common practice in other organized markets, delayed post-trade reporting requirements for trades larger than a given threshold and not require their sizes to be revealed if above a given threshold.

| Product Type | Gross Notional (BUSD Eqv.) | Gross Notional (%) | Trade Count | Trade Count (%) |
|---|---|---|---|---|
| CC - Swap | 9,436 | 2% | 119,188 | 3% |
| CC - Swap Exotic | 847 | 0% | 10,919 | 0% |
| IR - Cap/Floor | 12,419 | 3% | 82,937 | 2% |
| IR - Debt Option | 1,291 | 0% | 3,772 | 0% |
| IR - FRA | 57,015 | 12% | 153,634 | 4% |
| IR - Inflation Swap | 1,630 | 0% | 43,439 | 1% |
| IR - Option Exotic | 864 | 0% | 13,384 | 0% |
| IR - Swap | 339,532 | 73% | 3,011,004 | 81% |
| IR - Swap Basis | 12,949 | 3% | 48,617 | 1% |
| IR - Swap Exotic | 4,776 | 1% | 67,152 | 2% |
| IR - Swaption | 24,404 | 5% | 168,591 | 5% |
| Grand Total | 465,163 | | 3,722,637 | |

Table 1:
TriOptima Interest Rate Derivatives Trade Repository: trades in July 2010.

| Product Type | Gross Notional (BUSD Eqv.) | Maturity (Years) 0-2 | Maturity (Years) 2-5 | Maturity (Years) 5-10 | Maturity (Years) 10-15 | Maturity (Years) 15-20 | Maturity (Years) 20-30 | Maturity (Years) 30+ |
|---|---|---|---|---|---|---|---|---|
| CC - Swap | Notional | 3,709 | 2,943 | 1,715 | 371 | 229 | 383 | 85 |
| | Trade Count | 45,513 | 36,822 | 23,037 | 4,820 | 3,303 | 5,360 | 333 |
| CC - Swap Exotic | Notional | 337 | 242 | 153 | 38 | 38 | 37 | 1 |
| | Trade Count | 2,206 | 3,401 | 2,184 | 588 | 395 | 2,129 | 16 |
| IR - Cap/Floor | Notional | 5,612 | 3,348 | 2,278 | 560 | 474 | 141 | 6 |
| | Trade Count | 30,878 | 25,583 | 17,830 | 4,767 | 2,763 | 1,051 | 65 |
| IR - Debt Option | Notional | 615 | 365 | 122 | 40 | 28 | 117 | 4 |
| | Trade Count | 1,043 | 691 | 1,124 | 408 | 269 | 181 | 56 |
| IR - FRA | Notional | 56,434 | 479 | 94 | 7 | 1 | 0 | 0 |
| | Trade Count | 152,133 | 958 | 328 | 125 | 90 | 0 | 0 |
| IR - Inflation Swap | Notional | 282 | 346 | 417 | 137 | 108 | 254 | 86 |
| | Trade Count | 6,350 | 6,804 | 9,598 | 3,680 | 3,452 | 8,124 | 5,431 |
| IR - Option Exotic | Notional | 386 | 205 | 183 | 36 | 21 | 28 | 5 |
| | Trade Count | 3,764 | 3,657 | 3,582 | 1,034 | 510 | 566 | 271 |
| IR - Swap | Notional | 162,697 | 78,154 | 65,983 | 10,870 | 7,176 | 13,212 | 1,440 |
| | Trade Count | 798,080 | 826,415 | 845,823 | 143,613 | 119,769 | 250,841 | 26,463 |
| IR - Swap Basis | Notional | 8,032 | 2,898 | 1,236 | 285 | 173 | 253 | 73 |
| | Trade Count | 15,878 | 13,644 | 9,621 | 3,370 | 2,287 | 3,509 | 308 |
| IR - Swap Exotic | Notional | 1,906 | 978 | 801 | 290 | 205 | 365 | 232 |
| | Trade Count | 17,491 | 17,455 | 14,310 | 4,741 | 3,548 | 7,611 | 1,996 |
| IR - Swaption | Notional | 2,917 | 4,666 | 5,430 | 6,015 | 2,191 | 1,976 | 1,211 |
| | Trade Count | 9,975 | 19,806 | 35,017 | 47,828 | 16,892 | 23,415 | 15,658 |
| Grand Total | Notional | 242,927 | 94,623 | 78,412 | 18,648 | 10,645 | 16,765 | 3,144 |
| | Trade Count | 1,083,311 | 955,236 | 962,454 | 214,974 | 153,278 | 302,787 | 50,597 |

Table 2: TriOptima Interest Rate Derivatives Trade Repository:
trades in July 2010, by maturity range.

# 3 Transparency in interest rate derivatives markets

When discussing transparency in securities markets it is important to distinguish *pre-trade* and *post-trade transparency*.

Pre-trade transparency related to the dissemination of information on the size and price of prospective trading interest, such as bid and ask quotes and quantities related to such quotes.

The level or degree of pre-trade transparency in a market can range from the total transparency permitted by certain electronic markets which centralize order flow in a limit order book, to markets where each participant only knows his/her own orders and obtains information from other participants through repeated bilateral negotiations.

Post-trade transparency refers to the dissemination of trade prices and volumes of completed transactions from all markets trading that security. For exchange-traded derivatives, such transactions are recorded exhaustively. In OTC markets, post-trade transparency may be provided through electronic trading platforms, central clearing facilities or through data repositories where market participants register transactions on a voluntary or mandatory basis.

When a large trade is revealed to the market, it may be seen as conveying information and may generate other large trades, thus moving prices. Reporting of large size transactions also creates opportunities for predatory positioning or front running by other market participants, thus reducing the incentive for a participant to provide liquidity for large size trades. Thus, post-trade transparency may entail *price impact* in the case of large trades and increase the cost of trading. For this reason, in many exchanges post-trade transparency rules differ for small and large trades, reporting being delayed for large trades in order to avoid generating market volatility and price impact.

Post-trade transparency is important for market participants in order to allow to mark their derivatives positions accurately.

Post-trade transparency –the public visibility of recent trading history by market participants– is low in interest rate derivatives markets due to few reporting requirements, lack of systematic registering of trades and the lack of incentive of market participants to supply post-trade information. A new development is the creation of a trade repository in 2010 which will warehouse all G14 dealer interest rate derivatives positions on a monthly basis.

## 3.1 Pre-trade transparency in interest rate swap (IRS) markets

Pre-trade information in interest rate swap (IRS) markets consists of quotes which then lead to trades among dealers or between a dealer and their client, typically following a voice negotiation.

One should distinguish here between

- firm (or tradeable) quotes disseminated among dealers through interdealer brokerage systems, including quantities and price levels. These prices are not executable by nor directly available to non-dealer market participants.

- quotes disseminated by dealers to their clients, via "single dealer screens" provided through third party dealer-to-client platforms. TradeWeb and Bloomberg are two of the major electronic platforms for multi-dealer execution for clients. Customers may view a series of quotes including price and size for different swap contracts, usually with tight bid-offer spreads. Price bands visible on such pages may be customer-specific: different clients may view different quotes from the same dealer, depending on their previous transaction history with the dealer. The law of one price hence does not prevail in this market. Such single dealer platforms allow for price discovery and trade execution. Transactions may be either done electronically via the platform or negotiated over the phone.

- indicative (non-firm) or "composite" levels: Interdealer brokers also act as sources of pre-trade information for the whole market, nondealers included, by disseminating anonymized "composite" indicators of market variables –swap curves, implied volatility surfaces– based on quotes proposed by their dealer members. These represent averages of dealer quotes whose computation may involve interpolation procedures and contain no indication of notional/size and are not tradeable. These indicators are disseminated through services providers such as Bloomberg or Reuters and are routinely used for marking to market of positions. They are not tradeable prices.

Of all these pre-trade price levels, composite quotes are those which are the most widely disseminated. It is therefore of interest to investigate their information content: are they close to, or far from, actual transaction prices? First, it should be noted that the interest rate swap market, especially for major currency interest rate swaps, has a tight bid-offer spread. Also, as shown by a recent study of MarkitWire [9], comparing actual trade levels submitted to the MarkitWire platform and pre-trade quotes from ICAP, more than 90% of trades in EUR and GBP swaps, were apparently executed within 1bp of the interdealer quote.

## 3.2 Post-trade transparency in interest rate swaps

Post-trade transparency –the visibility of (price/volume) information on recent trades by market participants– has been low in interest rate derivatives markets due to few reporting requirements, lack of systematic registering of trades and the lack of incentive of market participants to supply post-trade information.

Electronic confirmation and processing of trades has been under way for several years and has opened the possibility of capturing post-trade information in a systematic manner. MarkitServ has emerged as the main channel for post-trade information in this market: its platform captures more than 70% of trades in interest rate swaps, swaptions, caps and floors. Currently this post-trade

information remains confidential and is not accessible to market participants other than the parties of the trade.

Another source of post-trade information is electronic trading platforms. As discussed above, these platforms have increased their activity since 2005 but the outlook for increased use of such for interest rate swaps and other OTC interest rate derivatives remains uncertain. If they do become more commonplace, they would make the efficient dissemination of post-trade information possible, at least for trades done through these platforms. Platforms such as Bloomberg, ISWAP and TradeWeb do possess the technology for collecting and processing post-trade information and aggregating them into anonymized, composite price indicators which could be possibly be disseminated to market participants at the end of each day and provide an indication of where the market has traded on that day, in a manner similar to the indicative swap curves published based on quotes.

One may consider the end-of-day dissemination of such "composite" post-trade indicators for the interest-rate swap market based on current trades going through electronic platforms. Like composite price levels based on quotes, such indicators need not contain information on volume of trades and will not reveal the identity of parties in the trades, but can provide useful. If electronic platforms gain in popularity, such indicators will become increasingly relevant. Alternatively, such an indicator could be computed based on a larger set of trades, such as the ones registered in platforms such as MarkitServ.

We believe that taking these steps to introduce post-trade transparency in the OTC interest rate swap market is more effective for improving market transparency than moving interest rate swaps to an exchange. As argued above, even after introducing an exchange, if a substantial portion of the market still remains OTC post-trade indicators based on a broad set of OTC transactions will still be more relevant than those based on exchange transactions which may or may not be representative of market prices.

The above discussion is centered on USD and major currency interest rate swaps where market liquidity is concentrated and the number of trades is high. Some large trades in less liquid swaps, especially in some currencies, may not be appropriate to report at end of day (especially if not traded till close to end of day). Post-trade transparency requirements may need to be adapted to the context of such less liquid markets.

### 3.3 Post-trade transparency for other OTC interest rate derivatives

The feasibility and the potential benefit of disseminating such post-trade information for other interest rate derivatives –caps, floors, swaptions– is much less obvious.

First, given the wide spectrum –in terms of exercise level, maturity of contracts and tenor of the underlying rate– of such products, for a given contract there may be no transaction, thus no post-trade information, during a given

day, which makes the updating of such information problematic and procedure-dependent.

Second, given that there is less flow, in markets such as the swaptions market a dealer may warehouse the risk related to a deal for a much longer period–even months– before unloading it through an offsetting trade. This is unlike the interest rate swaps market where end-of-day seems a reasonable delay for disseminating post-trade information. During this period post-trade information remains sensitive and revealing it prematurely, especially for large trades, will result in the market moving against the dealer and remove the incentive for dealers for making markets in this context.

### 3.4 Trade repositories

Regulators have recently emphasized the reporting of OTC derivatives trades to repositories as a means of increasing the availability to regulators of information on OTC derivatives. OTC derivatives trades are increasingly reported to such repositories on a voluntary or mandatory basis.

As of January 2010, TriOptima serves as the OTC Derivatives Interest Rate Trade Reporting Repository (IRTRR). A key piece of industry infrastructure, the IRTRR collects transaction data on interest rate derivatives from market participants[1] and provides regulators with periodic reports summarizing outstanding trade volumes and gross notionals as well as currency breakdowns and maturity profiles by product type. Currently reporting is done on a monthly basis; however, this will move to a weekly frequency in September.

The IRTRR holds information for the full range of both cleared and non-cleared OTC derivative interest rate transactions including caps/floors, forward rate agreements, options, swaps, swaptions and cross currency swaps. Major financial institutions submit data for their OTC interest rate derivatives trade portfolios covering trades with G14 institutions, buy side organizations and other financial and non-financial institutions. Trades reported to the repository include all interest rate derivatives, from plain vanilla through structured trades, if at least one of the counterparties is a G14 dealer. This accounts currently for 77% of electronically eligible interest rate derivatives trades.

Contrarily to confirmation platforms such as MarkitServ which capture trades on a daily basis, the IRTRR gives a periodic (monthly) snapshot of *positions* in interest rate derivatives. Increased reporting of interest rate derivatives trades to the repository is a positive step which will primarily serve towards a more efficient monitoring of the market by regulators. Therefore, MarkitServ captures the information related to current/recent trading *activity* on a daily basis while the IRTRR captures information related to *positions* in interest rate derivatives. We note that the IRTRR houses all interest rate derivative positions, ranging

[1]The current list of institutions submitting trades to the repository is: Bank of America-Merrill Lynch, Barclays Capital, BNP Paribas, Citi, Credit Suisse, Deutsche Bank, Goldman Sachs, HSBC Group, J.P.Morgan, Morgan Stanley, The Royal Bank of Scotland Group, Societe Generale, UBS AG and Wells Fargo Bank.

from vanilla to complex and structured products, while MarkitServ is not as comprehensive in its coverage since it focuses on vanilla products.

# 4 Conclusion

1. The interest rate swaps market is an over the counter market involving institutional investors, based on bilateral transactions and an inter-dealer brokerage system. Most trades involve a dealer. The number of dealers is relatively small (around 50).

2. Trade sizes are large in notional terms but the number of trades tends to be much smaller than, say, in equity markets.

3. Although the interest rate swap market is a mature market, it has remained in OTC mode because most interest rate swap contracts are customized to meet the clients' hedging needs, in particular with respect to FAS 133 hedge accounting rules. As a consequence, exchange trading of swap-related products, such as standardized interest rate swap futures which started trading several years ago, has never taken off.

4. Interest rate derivatives are transacted at two levels: interdealer and dealer to customer, with different levels of market transparency.

5. Transactions between dealers are facilitated through interdealer brokerage (IDB) systems where firm interdealer quotes are visible to market participants. IDBs are the also main source of pre-trade information, in a way similar to spot foreign-exchange markets.

6. Buy–side customers have access to pre-trade information (quotes) from a limited number of dealers, via third party information providers, but observe neither the order flow of other customers nor the quotes offered by dealers to other customers.

7. Most transactions are done through voice negotiations. Electronic trading platforms exist for interdealer transactions, but their market share is still small.

8. Most OTC trades in interest rate derivatives are eligible for electronic confirmation and processed electronically. Increasing use of electronic trade confirmation has eased the exchange and processing of post-trade information and its transmission to data repositories.

9. From a technological standpoint there is no obstacle to the electronic trading of interest rate swaps and other standard interest rate derivatives. An increased use of electronic trading platforms for OTC interest rate swap transactions would enhance market transparency, especially regarding post-trade information.

10. There is room for improving post-trade transparency in OTC interest rate derivatives markets. One may consider the end-of-day dissemination of anonymized, "composite" post-trade indicators for the interest-rate swap market either based on current trades going through electronic platforms or those registered in trade repositories. We believe that taking such a step to introduce post-trade transparency in the OTC interest rate swap market is both more effective and easier to implement than moving interest rate swaps to an exchange.

11. Requiring public disclosure of post-trade information for other interest rate derivatives –swaptions, caps, floors– is more delicate since, in these markets, dealers warehouse interest rate volatility exposures and may take weeks to offload their exposures. Therefore, premature disclosure of trade information might deter market makers from providing liquidity.

12. Whereas fragmented markets with a large retail flow are better handled by an exchange, transactions which are infrequent, large in size, bespoke in nature and concentrated on a small number of players are more efficiently done over the counter. Interest rate swap markets are somewhat in between these two extremes, while OTC interest rate derivatives such as swaptions, caps and floors definitely correspond to the second case.

13. A distinction should be made between regulatory transparency and market transparency. Regulatory transparency means that regulators should have access to trade information on a timely basis in order to monitor market risk. Regulatory transparency in the interest rate derivatives market should be increased, and trade repositories are effective tools for achieving this goal. However, transaction or position data disclosed to regulators should be treated as confidential: if made publicly available, they may have a destabilizing effect on the market.

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# References

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# A Coverage of OTC interest rate derivatives by ICAP

ICAP

ASIA DATA PRODUCTS

| Product | Currency / Instrument | Quoted Fields | Market / Data Origination | Intraday | End of Day |
|---|---|---|---|---|---|
| **INTEREST RATE DERIVATIVES - STIRs** | | | | | |
| **Forward Rate Agreements** | | | | | |
| **FRAs 3M** | | | | | |
| | HKD | BID/ASK | Hong Kong | X | X |
| | SGD | BID/ASK | Singapore | X | X |
| | TWD | BID/ASK | Singapore | X | X |
| | THB | BID/ASK | Thailand | X | X |
| | USD | BID/ASK | Singapore | X | X |
| **FRAs 6M** | | | | | |
| | SGD | BID/ASK | Singapore | X | X |
| | TWD | BID/ASK | Singapore | X | X |
| | THB | BID/ASK | Thailand | X | X |
| | USD | BID/ASK | Singapore | X | X |
| **FRAs IMM 6M** | | | | | |
| | USD | BID/ASK | Singapore | X | X |

| Product | Currency / Instrument | Quoted Fields | Market / Data Origination | Intraday | End of Day |
|---|---|---|---|---|---|
| **Interest Rate Swaps (STIRS)** | | | | | |
| **Short Swaps (v 1M)** | | | | | |
| | AUD | BID/ASK | Australia | X | X |
| | SGD | BID/ASK | Singapore | X | X |
| | USD | BID/ASK | Singapore | X | X |
| **Short Swaps (v 3M)** | | | | | |
| | AUD | BID/ASK | Australia | X | X |
| | SGD | BID/ASK | Singapore | X | X |
| | USD | BID/ASK | Singapore | X | X |
| **IMM Swaps** | | | | | |
| | USD | BID/ASK | Singapore | X | X |
| **Overnight Index Swaps** | | | | | |
| | AUD | BID/ASK | Australia | X | X |
| | INR | BID/ASK | India | X | X |
| | HKD | BID/ASK | Hong Kong | X | X |
| | SGD | BID/ASK | Singapore | X | X |
| | USD | BID/ASK | Singapore | X | X |
| | THB | BID/ASK | Thailand | X | X |
| **INTEREST RATE DERIVATIVES - IR SWAPS** | | | | | |
| **Interest Rate Swaps** | | | | | |
| | AUD | BID/ASK | Australia | X | X |
| | HKD | BID/ASK | Hong Kong | X | X |
| | INR(MIFOR) | BID/ASK | India | X | X |
| | MYR | BID/ASK | Malaysia | X | X |
| | SGD | BID/ASK | Singapore | X | X |
| | KRW | BID/ASK | Korea | X | X |
| | TWD | BID/ASK | Singapore | X | X |
| | PHP | BID/ASK | Philippines | X | X |
| | THB | BID/ASK | Thailand | X | X |
| **Cross Currency Swaps** | | | | | |
| | THB/USD | BID/ASK | Thailand | X | X |
| | TWD/USD | BID/ASK | Singapore | X | X |
| | KRW/USD | BID/ASK | Korea | X | X |
| **Basis Swaps** | | | | | |
| | AUD BB/Libor | BID/ASK | Australia | X | X |
| | HKD Hibor/Libor | BID/ASK | Hong Kong | X | X |
| | SGD Sibor/Libor | BID/ASK | Singapore | X | X |
| | MYR Klibor/Libor | BID/ASK | Malaysia | X | X |
| | THB Thibor/Libor | BID/ASK | Thailand | X | X |
| **Swap Spreads / Forwards** | | | | | |
| **Swap Swap Spreads (Dual Currency)** | | | | | |
| | HKD/USD | BID/ASK | Hong Kong | X | X |
| | KRW/USD (CRS & IRS Spreads) | BID/ASK | Korea | X | X |
| **Swap Swap Spreads (Term)** | | | | | |
| | HKD | MID | Hong Kong | X | X |
| **Swap Bond Futures Spreads** | | | | | |
| | AUD | BID/ASK | Australia | X | X |
| **Swap Bond Spreads** | | | | | |
| | HKD | BID/ASK | Hong Kong | X | X |
| **NON-DELIVERABLE SWAPS** | | | | | |
| **Non-Deliverable (Cross Currency Swaps)** | | | | | |
| | CNY/USD | BID/ASK | Hong Kong/Singapore | X | X |
| | TWD/USD | BID/ASK | Hong Kong/Singapore | X | X |
| | KRW/USD | BID/ASK | Korea | X | X |
| | INR/USD | BID/ASK | Singapore | X | X |
| | IDR/USD | BID/ASK | Singapore | X | X |
| | PHP/USD | BID/ASK | Singapore | X | X |
| | THB/USD | BID/ASK | Singapore | X | X |
| | VND/USD | BID/ASK | Singapore | X | X |
| | MYR/USD | BID/ASK | Singapore | X | X |
| | KRW/USD ND CRS/IRS SPRD | BID/ASK | Korea | X | X |

| Product | Currency / Instrument | Quoted Fields | Market / Data Origination | Intraday | End of Day |
|---|---|---|---|---|---|
| **Non-Deliverable (Interest Rate Swaps)** | | | | | |
| | MYR | BID/ASK | Singapore | X | X |
| | THB | BID/ASK | Singapore | X | X |
| | THBFIX Basis Swap | BID/ASK | Singapore | X | X |
| | INR (OIS) | BID/ASK | Singapore | X | X |
| | INR (MIFOR) | BID/ASK | Singapore | X | X |
| | CNY | BID/ASK | Singapore | X | X |
| | KRW | BID/ASK | Korea | X | X |
| | TWD | BID/ASK | Singapore | X | X |
| **INTEREST RATE OPTIONS** | | | | | |
| **Swaption Volatilities & Premiums** | | | | | |
| | AUD | MID (VOLS), BID /ASK (PREMIUM | Australia | | X |
| | HKD | MID (Prem/Impl Vol/BP Vol) | Hong Kong | | X |
| | CNY | BID/ASK | Hong Kong | | X |
| | SGD | BID/ASK | Singapore | | X |
| | KRW | BID/ASK | Singapore | | X |
| | IDR | BID/ASK | Singapore | | X |
| | INR | BID/ASK | Singapore | | X |
| | THB | BID/ASK | Singapore | | X |
| | TWD | BID/ASK | Singapore | | X |
| | MYR | BID/ASK | Singapore | | X |
| **Cap/Floor Volatilities & Premiums** | | | | | |
| | AUD | BID/ASK | Australia | | X |
| | HKD | MID (Prem/Impl Vol/BP Vol) | Hong Kong | | X |
| | CNY | BID/ASK | Hong Kong | | X |
| | SGD | BID/ASK | Singapore | | X |
| | KRW | BID/ASK | Singapore | | X |
| | IDR | BID/ASK | Singapore | | X |
| | INR | BID/ASK | Singapore | | X |
| | THB | BID/ASK | Singapore | | X |
| | TWD | BID/ASK | Singapore | | X |
| | MYR | BID/ASK | Singapore | | X |

| Product | Currency / Instrument | Quoted Fields | Market/Data Origination | Intraday | End of Day |
|---|---|---|---|---|---|
| **INTEREST RATE DERIVATIVES - STIRs** | | | | | |
| **Forward Rate Agreements** | | | | | |
| **FRAs 3M** | | | | | |
| | CHF | BID/ASK | Lon | X | X |
| | CZK | BID/ASK | Lon | X | X |
| | EUR | BID/ASK | Lon | X | X |
| | EUR /Today | BID/ASK | Lon | X | X |
| | EUR /Tomorrow | BID/ASK | Lon | X | X |
| | GBP | BID/ASK | Lon | X | X |
| | HUF | MID | Lon | X | X |
| | JPY | BID/ASK | Lon | X | X |
| | PLN | MID | Lon | X | X |
| | RUB | BID/ASK | Lon | X | X |
| | TRY | BID/ASK | Lon | X | X |
| | USD | BID/ASK | Lon | X | X |

| Product | Currency / Instrument | Quoted Fields | Market/Data Origination | Intraday | End of Day |
|---|---|---|---|---|---|
| **FRAs 6M** | | | | | |
| | CHF | BID/ASK | Lon | X | X |
| | CZK | BID/ASK | Lon | X | X |
| | EUR | BID/ASK | Lon | X | X |
| | EUR /Today | BID/ASK | Lon | X | X |
| | EUR /Tomorrow | BID/ASK | Lon | X | X |
| | GBP | BID/ASK | Lon | X | X |
| | HUF | MID | Lon | X | X |
| | JPY | BID/ASK | Lon | X | X |
| | PLN | MID | Lon | X | X |
| | USD | BID/ASK | Lon | X | X |
| **FRAs 9M** | | | | | |
| | USD | BID/ASK | Lon | X | X |
| **FRAs 12M** | | | | | |
| | CHF | BID/ASK | Lon | X | X |
| | EUR | BID/ASK | Lon | X | X |
| | GBP | BID/ASK | Lon | X | X |
| **FRAs IMM 3M** | | | | | |
| | CHF | BID/ASK | Lon | X | X |
| | GBP | BID/ASK | Lon | X | X |
| | JPY | BID/ASK | Lon | X | X |
| **FRAs IMM 6M** | | | | | |
| | CHF | BID/ASK | Lon | X | X |
| | GBP | BID/ASK | Lon | X | X |
| **FRAs IMM 12M** | | | | | |
| | GBP | BID/ASK | Lon | X | X |
| **Interest Rate Swaps (STIRS)** | | | | | |
| **Short Swaps (v 1M)** | | | | | |
| | CHF Ann Act/360 vs 1M LIBOR | BID/ASK | Lon | X | X |
| | GBP Ann Act/365 vs 1M LIBOR | BID/ASK | Lon | X | X |
| | EUR Ann Act/360 vs 1M EURIBOR | BID/ASK | Lon | X | X |
| | JPY Ann Act/360 vs 1M LIBOR | BID/ASK | Lon | X | X |
| | USD Ann Act/360 vs 1M LIBOR | BID/ASK | Lon | X | X |
| **Short Swaps (v 3M)** | | | | | |
| | CHF Ann 30/360 vs 3M LIBOR | BID/ASK | Lon | X | X |
| | EUR Ann 30/360 vs 3M EURIBOR | BID/ASK | Lon | X | X |
| | GBP Ann Act/365 vs 3M LIBOR | BID/ASK | Lon | X | X |
| | USD 6M LIBOR vs 3M LIBOR | BID/ASK | Lon | X | X |
| **Swaps - IMM** | | | | | |
| | CHF Ann Act/360 v 3M LIBOR IMM | BID/ASK | Lon | X | X |
| | EUR Ann Act/360 vs 3M EURIBOR IMM | BID/ASK | Lon | X | X |
| | GBP Ann Act/365 vs 3M LIBOR IMM (12M) | BID/ASK | Lon | X | X |
| | GBP Ann Act/365 vs 3M LIBOR IMM (24M) | BID/ASK | Lon | X | X |
| | USD Ann Act/360 vs 3M LIBOR IMM | | | | |
| **STIR Spreads** | | | | | |
| | LIFFE SONIA FRA Spread | BID/ASK | Lon | X | X |
| | IMM FRA EONIA Spread | BID/ASK | Lon | X | X |
| **Overnight Index Swaps** | | | | | |
| **OIS** | | | | | |
| | AUD | BID/ASK | Lon | X | X |
| | CAD | BID/ASK | Lon | X | X |
| | CHF (TOIS) | BID/ASK | Lon | X | X |
| | EUR EONIA | BID/ASK | Lon | X | X |
| | EUR EONIA Fwd | BID/ASK | Lon | X | X |
| | EUR EONIA ECB Meeting Dates | BID/ASK | Lon | X | X |
| | GBP SONIA | BID/ASK | Lon | X | X |
| | GBP SONIA Fwd | BID/ASK | Lon | X | X |
| | GBP SONIA MPC Meeting Dates | BID/ASK | Lon | X | X |
| | JPY TONAR | BID/ASK | Lon | X | X |
| | JPY TONAR BoJ Meeting Dates | BID/ASK | Lon | X | X |
| | NZD | BID/ASK | Lon | X | X |
| | USD | BID/ASK | Lon | X | X |

| Product | Currency / Instrument | Quoted Fields | Market/Data Origination | Intraday | End of Day |
|---|---|---|---|---|---|
| **INTEREST RATE DERIVATIVES - IR SWAPS** | | | | | |
| **Interest Rate Swaps** | | | | | |
| **IRS** | | | | | |
| | AED Ann Act/360 vs 3M AEIBOR | BID/ASK | Bahrain | X | X |
| | AUD SemiAnn Act/365 vs 6M BBill (<3Yv3M) | BID/ASK | Lon | X | X |
| | CAD SemiAnn/Act365 vs 3M Bank Bill | BID/ASK | Lon | X | X |
| | CHF Ann 30/360 vs 6M LIBOR | BID/ASK | Lon | X | X |
| | CZK Ann Act/360 vs 6M PRIBOR | BID/ASK | Lon | X | X |
| | DKK Ann 30/360 vs 6M CIBOR (1Yv3M) | BID/ASK | Lon | X | X |
| | EUR Ann 30/360 vs 6M EURIBOR | BID/ASK | Lon | X | X |
| | EUR Ann 30/360 vs 1M EURIBOR | BID/ASK | Lon | X | X |
| | EUR Ann 30/360 vs 3M EURIBOR | BID/ASK | Lon | X | X |
| | GBP Ann Act/365 vs 3M LIBOR | BID/ASK | Lon | X | X |
| | GBP SemiAnn Act/365 vs 3M LIBOR | BID/ASK | Lon | X | X |
| | GBP SemiAnn Act/365 vs 6M LIBOR | BID/ASK | Lon | X | X |
| | GBP SemiAnn Act/365 vs 6M LIBOR (Gilt M) | BID/ASK | Lon | X | X |
| | HUF Ann Act/365 vs 6M BUBOR | BID/ASK | Lon | X | X |
| | ILS Ann Act/365 v 3M TELBOR | BID/ASK | Lon | X | X |
| | JPY SemiAnn Act/365 vs 6M LIBOR | BID/ASK | Lon | X | X |
| | NOK Ann 30/360 vs 6M NIBOR (1Yv3M) | BID/ASK | Lon | X | X |
| | NZD SemiAnn Act/365 vs 3M Bank Bill | BID/ASK | Lon | X | X |
| | PLN Ann Act/Act vs 6M WIBOR | BID/ASK | Lon | X | X |
| | RUB Ann Act/Act vs 3M MOSPRIME | BID/ASK | Lon | X | X |
| | SAR Ann Act/360 vs 3M SAIBOR | BID/ASK | Bahrain | X | X |
| | SEK Ann 30/360 vs 3M STIBOR | BID/ASK | Lon | X | X |
| | TRY Ann Act/360 vs 3M TRYIBOR | BID/ASK | Lon | X | X |
| | USD Ann Act/360 vs 3M LIBOR | BID/ASK | Lon | X | X |
| | ZAR Q Act/365 vs 3M JIBAR | BID/ASK | Lon | X | X |
| **IRS - ICAP London Closing Rate** | | | | | |
| | AUD SemiAnn Act/365 vs 6M BBill (<3Yv3M) | BID/ASK | Lon | | X |
| | CAD SemiAnn/Act365 vs 3M Bank Bill | BID/ASK | Lon | | X |
| | CHF Ann 30/360 vs 6M LIBOR | BID/ASK | Lon | | X |
| | CZK Ann Act/360 vs 6M PRIBOR | BID/ASK | Lon | | X |
| | DKK Ann 30/360 vs 6M CIBOR (1Yv3M) | BID/ASK | Lon | | X |
| | EUR Ann 30/360 vs 6M EURIBOR | BID/ASK | Lon | | X |
| | GBP SemiAnn Act/365 vs 6M LIBOR | BID/ASK | Lon | | X |
| | HUF Ann Act/365 vs 6M BUBOR | BID/ASK | Lon | | X |
| | JPY SemiAnn Act/365 vs 6M LIBOR | BID/ASK | Lon | | X |
| | NOK Ann 30/360 vs 6M NIBOR (1Y v3M) | BID/ASK | Lon | | X |
| | PLN Ann Act/Act vs 6M WIBOR | BID/ASK | Lon | | X |
| | SEK Ann 30/360 vs 3M STIBOR | BID/ASK | Lon | | X |
| | USD Ann Act/360 vs 3M LIBOR | BID/ASK | Lon | | X |
| | ZAR Q Act/365 vs 3M JIBAR | BID/ASK | Lon | | X |
| **IRS - Cross Currency Swaps** | | | | | |
| | BGN Ann Act/360 vs EUR 3M EURIBOR | BID/ASK | Lon | X | X |
| | HRK Ann Act/360 vs EUR 3M EURIBOR | BID/ASK | Lon | X | X |
| | KZT Ann Act/Act vs USD 3M LIBOR | BID/ASK | Lon | X | X |
| | RON Ann Act/360 vs EUR 3M EURIBOR | BID/ASK | Lon | X | X |
| | RUB Ann Act/360 vs USD 3M LIBOR | BID/ASK | Lon | X | X |
| | TRY Ann Act/360 vs USD 3M LIBOR | BID/ASK | Lon | X | X |
| **Basis Swaps** | | | | | |
| ***(x2 Swap Basis)** | | | | | |
| | CHF 3M LIBOR vs 1M LIBOR | BID/ASK | Lon | X | X |
| | CHF 6M LIBOR vs 1M LIBOR | BID/ASK | Lon | X | X |
| | CHF 6M LIBOR vs 3M LIBOR | BID/ASK | Lon | X | X |
| | CHF 6M LIBOR vs 3M LIBOR 1W Fwd | BID/ASK | Lon | X | X |
| | CZK 6M PRIBOR vs 3M PRIBOR | BID/ASK | Lon | X | X |
| | * DKK AB vs 3M CIBOR, AB vs 1M CIBOR | BID/ASK | Lon | X | X |
| | * DKK AB vs 6M CIBOR, AB vs 1M CIBOR | BID/ASK | Lon | X | X |
| | * DKK AB vs 6M CIBOR, AB vs 3M CIBOR | BID/ASK | Lon | X | X |
| | EUR 12M EURIBOR vs 3M EURIBOR | BID/ASK | Lon | X | X |
| | EUR 12M EURIBOR vs 6M EURIBOR | BID/ASK | Lon | X | X |
| | EUR 3M EURIBOR vs 1M EURIBOR | BID/ASK | Lon | X | X |
| | EUR 6M EURIBOR vs 1M EURIBOR | BID/ASK | Lon | X | X |
| | EUR 6M EURIBOR vs 3M EURIBOR | BID/ASK | Lon | X | X |
| | EUR 3M EURIBOR vs 3M LIBOR | BID/ASK | Lon | X | X |
| | EUR 6M EURIBOR vs 6M LIBOR | BID/ASK | Lon | X | X |
| | EUR EONIA vs USD 3M Fed Funds | BID/ASK | Lon | X | X |
| | * EUR AB vs 12M, AB vs 3M EURIBOR | BID/ASK | Lon | X | X |
| | * EUR AB vs 12M, AB vs 6M EURIBOR | BID/ASK | Lon | X | X |
| | * EUR AB vs 3M, AB vs 1M EURIBOR | BID/ASK | Lon | X | X |
| | * EUR AB vs 6M, AB vs 1M EURIBOR | BID/ASK | Lon | X | X |
| | * EUR AB vs 6M, AB vs 3M EURIBOR | BID/ASK | Lon | X | X |
| | * EUR AB vs 6M, AB vs 3M EURIBOR Fwd | BID/ASK | Lon | X | X |
| | * EUR AB vs 6M, AB vs 3M EURIBOR IMM | BID/ASK | Lon | X | X |
| | * EUR AM vs 3M, AM vs EONIA | BID/ASK | Lon | X | X |

| Product | Currency / Instrument | Quoted Fields | Market/Data Origination | Intraday | End of Day |
|---|---|---|---|---|---|
| **Basis Swaps continued** | | | | | |
| | GBP 12M LIBOR vs 3M LIBOR | BID/ASK | Lon | X | X |
| | GBP 12M LIBOR vs 6M LIBOR | BID/ASK | Lon | X | X |
| | GBP 3M LIBOR vs 1M LIBOR | BID/ASK | Lon | X | X |
| | GBP 6M LIBOR vs 1M LIBOR | BID/ASK | Lon | X | X |
| | GBP 6M LIBOR vs 3M LIBOR | BID/ASK | Lon | X | X |
| | HUF 6M BUBOR vs 3M BUBOR | BID/ASK | Lon | X | X |
| | JPY 6M LIBOR vs 3M LIBOR | BID/ASK | Lon | X | X |
| | JPY 6M LIBOR vs 6M TIBOR | BID/ASK | Lon | X | X |
| | * NOK AB vs 3M NIBOR, AB vs 1M NIBOR | BID/ASK | Lon | X | X |
| | * NOK AB vs 6M NIBOR, AB vs 1M NIBOR | BID/ASK | Lon | X | X |
| | * NOK AB vs 6M NIBOR, AB vs 3M NIBOR | BID/ASK | Lon | X | X |
| | PLN 6M WIBOR vs 3M WIBOR | BID/ASK | Lon | X | X |
| | * SEK AB vs 3M STIBOR, AB vs 1M STIBOR | BID/ASK | Lon | X | X |
| | * SEK AB vs 6M STIBOR, AB vs 1M STIBOR | BID/ASK | Lon | X | X |
| | * SEK AB vs 6M STIBOR, AB vs 3M STIBOR | BID/ASK | Lon | X | X |
| | USD 3M LIBOR vs 1M LIBOR | BID/ASK | Lon | X | X |
| | USD 3M LIBOR vs 1M LIBOR 1W Fwd | BID/ASK | Lon | X | X |
| | USD 3M LIBOR vs 1M LIBOR Fwd IMM | BID/ASK | Lon | X | X |
| | USD 6M LIBOR vs 3M LIBOR | BID/ASK | Lon | X | X |
| | USD 6M LIBOR vs 3M LIBOR 1W Fwd | BID/ASK | Lon | X | X |
| | USD 6M LIBOR vs 3M LIBOR Fwd IMM | BID/ASK | Lon | X | X |
| **Cross Currency Basis Swaps** | | | | | |
| | AUD 90D Bank Bill vs EUR 3M EURIBOR | BID/ASK | Lon | X | X |
| | AUD 90D Bank Bill vs USD 3M LIBOR | BID/ASK | Lon | X | X |
| | BGN 3M SOFIBOR vs EUR 3M EURIBOR | BID/ASK | Lon | X | X |
| | CAD 3M BA vs EUR 3M EURIBOR | BID/ASK | Lon | X | X |
| | CAD 3M BA vs USD 3M LIBOR | BID/ASK | Lon | X | X |
| | CHF 3M LIBOR vs EUR 3M EURIBOR | BID/ASK | Lon | X | X |
| | CHF 3M LIBOR vs USD 3M LIBOR | BID/ASK | Lon | X | X |
| | CZK 3M PRIBOR vs EUR 3M EURIBOR | BID/ASK | Lon | X | X |
| | DKK 3M CIBOR vs EUR 3M EURIBOR | BID/ASK | Lon | X | X |
| | DKK 3M CIBOR vs USD 3M LIBOR | BID/ASK | Lon | X | X |
| | EUR 3M EURIBOR vs USD 3M LIBOR | BID/ASK | Lon | X | X |
| | GBP 3M LIBOR vs EUR 3M EURIBOR | BID/ASK | Lon | X | X |
| | GBP 3M LIBOR vs USD 3M LIBOR | BID/ASK | Lon | X | X |
| | HRK 3M ZIBOR vs EUR 3M EURIBOR | BID/ASK | Lon | X | X |
| | HUF 3M BUBOR vs EUR 3M EURIBOR | BID/ASK | Lon | X | X |
| | JPY 3M LIBOR vs EUR 3M EURIBOR | BID/ASK | Lon | X | X |
| | JPY 3M LIBOR vs USD 3M LIBOR | BID/ASK | Lon | X | X |
| | NOK 3M NIBOR vs EUR 3M EURIBOR | BID/ASK | Lon | X | X |
| | NOK 3M NIBOR vs USD 3M LIBOR | BID/ASK | Lon | X | X |
| | NZD 90D Bank Bill vs EUR 3M EURIBOR | BID/ASK | Lon | X | X |
| | NZD 90D Bank Bill vs USD 3M LIBOR | BID/ASK | Lon | X | X |
| | PLN 3M WIBOR vs EUR 3M EURIBOR | BID/ASK | Lon | X | X |
| | RON 3M RBOR vs EUR 3M EURIBOR | BID/ASK | Lon | X | X |
| | RUB 3M MOS Prime vs USD 3M LIBOR | BID/ASK | Lon | X | X |
| | SEK 3M STIBOR vs EUR 3M EURIBOR | BID/ASK | Lon | X | X |
| | SEK 3M STIBOR vs USD 3M LIBOR | BID/ASK | Lon | X | X |
| | TRY 3M TRYIBOR vs USD 3M LIBOR | BID/ASK | Lon | X | X |
| | ZAR 3M JIBAR vs EUR 3M EURIBOR | BID/ASK | Lon | X | X |
| | ZAR 3M JIBAR vs USD 3M LIBOR | BID/ASK | Lon | X | X |
| **Constant Maturity Swaps** | | | | | |
| **CMS** | | | | | |
| | EUR vs 3M EURIBOR | BID/ASK | Lon | X | X |
| **Swap Spreads** | | | | | |
| **Swap Swap (Term) Spreads** | | | | | |
| | EUR 6M EURIBOR 1Y (2Y etc) vs 10Y | BID/ASK | Lon | X | X |
| **Swap Swap Spreads** | | | | | |
| | GBP 6M LIBOR vs OIS SONIA | MID | Lon | X | X |
| **Yield Spreads/Swap Bond Spreads** | | | | | |
| | AUD (v Bond Future) | BID/ASK | Lon | X | X |
| | CAD | BID/ASK | Lon | X | X |
| | GBP | BID/ASK | Lon | X | X |
| | GBP | BID/ASK | Lon | X | X |
| | USD | BID/ASK | Lon | X | X |

| Product | Currency / Instrument | Quoted Fields | Market/Data Origination | Intraday | End of Day |
|---|---|---|---|---|---|
| **Zero Coupon Curve * (End of Day)** | | | | | |
| | AUD | BID/ASK (DF & Outright) | Lon | | X |
| | CAD | BID/ASK (DF & Outright) | Lon | | X |
| | CHF | BID/ASK (DF & Outright) | Lon | | X |
| | CZK | BID/ASK (DF & Outright) | Lon | | X |
| | DKR | BID/ASK (DF & Outright) | Lon | | X |
| | EUR | BID/ASK (DF & Outright) | Lon | | X |
| | GBP | BID/ASK (DF & Outright) | Lon | | X |
| | HUF | BID/ASK (DF & Outright) | Lon | | X |
| | JPY | BID/ASK (DF & Outright) | Lon | | X |
| | NOK | BID/ASK (DF & Outright) | Lon | | X |
| | NZD | BID/ASK (DF & Outright) | Lon | | X |
| | PLN | BID/ASK (DF & Outright) | Lon | | X |
| | RUB | BID/ASK (DF & Outright) | Lon | | X |
| | SEK | BID/ASK (DF & Outright) | Lon | | X |
| | TRY | BID/ASK (DF & Outright) | Lon | | X |
| | USD | BID/ASK (DF & Outright) | Lon | | X |
| | ZAR | BID/ASK (DF & Outright) | Lon | | X |
| **INTEREST RATE OPTIONS** | | | | | |
| **Swaption Volatilities & Premiums** | | | | | |
| | EUR | MID (Prem/Impl Vol/BP Vol) | Lon | X | X |
| | GBP | MID (Prem/Impl Vol/BP Vol) | Lon | X | X |
| | CHF | MID (Prem/Impl Vol/BP Vol) | Lon | X | X |
| | SEK | MID (Prem/Impl Vol/BP Vol) | Lon | X | X |
| | DKK | MID (Prem/Impl Vol/BP Vol) | Lon | X | X |
| | NOK | MID (Prem/Impl Vol/BP Vol) | Lon | X | X |
| | JPY | MID (Prem/Impl Vol/BP Vol) | Tokyo/Lon | X | X |
| **Cap/Floor Volatilities & Premiums** | | | | | |
| | EUR | MID (CPrem/FPrem/Impl Vol) | Lon | X | X |
| | GBP | MID (CPrem/FPrem/Impl Vol) | Lon | X | X |
| | CHF | MID (CPrem/FPrem/Impl Vol) | Lon | X | X |
| | SEK | MID (CPrem/FPrem/Impl Vol) | Lon | X | X |
| | DKK | MID (CPrem/FPrem/Impl Vol) | Lon | X | X |
| | NOK | MID (CPrem/FPrem/Impl Vol) | Lon | X | X |
| | JPY | MID (CPrem/FPrem/Impl Vol) | Tokyo/Lon | X | X |
| **Forward Cap/Floor/ATM Straddles/Spreads** | | | | | |
| | EUR | MID (Prem/ImplVol/BPVol/Spread) | Lon | X | X |
| | GBP | MID (Prem/ImplVol/BPVol/Spread) | Lon | X | X |
| | CHF | MID (Prem/ImplVol/BPVol/Spread) | Lon | X | X |
| **INFLATION DERIVATIVES** | | | | | |
| **Inflation Swaps** | | | | | |
| | HICPXT | BID/ASK | Lon | X | X |
| | HICP | BID/ASK | Lon | X | X |
| | FRCPI | BID/ASK | Lon | X | X |
| | GRCPI | BID/ASK | Lon | X | X |
| | ITCPI | BID/ASK | Lon | X | X |
| | SPIPC | BID/ASK | Lon | X | X |
| | UKRPI | BID/ASK | Lon | X | X |
| | USCPI | BID/ASK | Lon | X | X |

* Note instruments/currencies listed subject to occasional change

| Product | Currency / Instrument | Quoted Fields | Market/Data Origination | Intraday | End of Day |
|---|---|---|---|---|---|
| **INTEREST RATE DERIVATIVES - FRAs/STIRs** | | | | | |
| **Forward Rate Agreements** | | | | | |
| **FRA's - 3M** | | | | | |
| | USD | BID/ASK | NY | X | X |
| | CAD | BID/ASK | NY | X | X |
| **FRA's - 6M** | | | | | |
| | USD | BID/ASK | NY | X | X |
| | CAD | BID/ASK | NY | X | X |
| **FRA's - 9M** | | | | | |
| | USD | BID/ASK | NY | X | X |
| **FRA's - 12M** | | | | | |
| | USD | BID/ASK | NY | X | X |
| **FRA's - 3M IMM** | | | | | |
| | USD | BID/ASK | NY | X | X |
| **FRA's - 6M IMM** | | | | | |
| | USD | BID/ASK | NY | X | X |
| **IMM Swaps** | | | | | |
| | CAD | BID/ASK | NY | X | X |
| | USD | BID/ASK | NY | X | X |
| **Overnight Index Swaps (OIS)** | | | | | |
| | USD | BID/ASK, MID | NY | X | X |
| **Mortgage Derivatives - CMM** | | | | | |
| **CMM FRA's-Contracts** | | | | | |
| | USD | MID Yield, vs. Spot, Roll, vs TBA | NY | X | X |
| **CMM FRA'S-Term** | | | | | |
| | USD | MID Yield, vs. Spot, Roll, vs TBA | NY | X | X |
| **CMM FNMA TBA's - Fixing** | | | | | |
| | USD | Fixing | NY | X | X |
| **CMM EFP** | | | | | |
| | USD | Coupon, Mid(Price), Quantity | NY | X | X |
| **INTEREST RATE DERIVATIVES - IR SWAPS** | | | | | |
| **Interest Rate Swaps** | | | | | |
| | CAD | Spread_Bid, Spread_Ask,Mid_Yield | NY | X | X |
| | USD | Spread_Bid, Spread_Ask, AMBid, AMAsk, ABBid, ABAsk, SMBid, SMAsk, SBBid, SBAsk | NY | X | X |
| **Other Interest Rate Swaps** | | | | | |
| | EUR | BID/ASK | NY | X | X |
| | GBP | BID/ASK | NY | X | X |
| | CHF | BID/ASK | NY | X | X |
| | JPY | BID/ASK | NY | X | X |

| Product | Currency / Instrument | Quoted Fields | Market/Data Origination | Intraday | End of Day |
|---|---|---|---|---|---|
| **Basis Swaps** | | | | | |
| | USD Prime / Libor 3M | BID(Pay), ASK(Receive) | NY | X | X |
| | USD CP / Libor 3M | BID(Pay), ASK(Receive) | NY | X | X |
| | USD FF / Libor 3M | BID(Pay), ASK(Receive) | NY | X | X |
| | USD T-Bills / Libor 3M | BID(Pay), ASK(Receive) | NY | X | X |
| | USD Libor 1M / Libor 3M | BID(Pay), ASK(Receive) | NY | X | X |
| | USD Libor 1M / Libor 6M | BID(Pay), ASK(Receive) | NY | X | X |
| | USD Libor 3M / Libor 6M | BID(Pay), ASK(Receive) | NY | X | X |
| | CAD BA 1M/ BA 3M | BID(Pay), ASK(Receive) | NY | X | X |
| **CMS** | | | | | |
| **CMS v 3M Libor** | | | | | |
| | USD | BID/ASK | NY | X | X |
| **BMA Swaps** | | | | | |
| **BMA MUNI Swaps** | | | | | |
| | BMA Muni Swaps | BID/ASK | NY | X | X |
| | BMA Swap vs USD Libor | BID/ASK | NY | X | X |
| | BMA Muni Ratio | BID/ASK | NY | X | X |
| **INTEREST RATE OPTIONS** | | | | | |
| **Swaption Volatilities & Premiums** | | | | | |
| | USD | MID (Prem/Impl Vol/BP Vol) | NY | X | X |
| **Cap/Floor Volatilities & Premiums** | | | | | |
| | USD | MID (CPrem/FPrem/Impl Vol/Strike) | NY | X | X |
| **ATM Forward Cap/Floor Volatilities & Strikes** | | | | | |
| | USD | BID/ASK, ATM Strike | NY | X | X |

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