SMART
MARKETS™

Standardised & Contextualised
Fixed Income

SMART MARKETS™ API HIGH-LEVEL OVERVIEW

V0.6 – MAY 2024

INTRODUCTION

Smart Markets™ is a data and analytics solution provided by Mosaic Smart Data and powered, at launch, with post-trade settlement data from Euroclear.

Smart Markets™ can be accessed via a web-based user interface as well as a secure HTTP API. This document provides an overview of the API. Details of the user interface, including access to a free trial, can be found at https://mosaicsmartdata.com/smartmarkets.

DATASETS

Datasets available through the Smart Markets™ API comprise:

- **Transaction-level data**: array of individual transactions, which include the details of the traded Fixed Income instrument, traded notional, risk and the categorisation of the buyer and seller institutions (more details on the categorisation of counterparties in the next sections). More than 5 years of historical transactional data are available to query via API.
  Note: Access to individual transactions is only available 30 days after the settlement date (S+30).

- **Aggregated transactional data**: aggregated transactional data at an instrument (ISIN) and trade date levels. It includes the break-down of the directional flow broken down by counterparty categories (more details on the categorisation of counterparties in the next sections). More than 5 years of historical transactional data are available to query via API.
  Note: Access to aggregated transactions is available the business day after settlement date (S+1).

- **Holdings and Liquidity Scoring data:** Holdings data specific to a given instrument (ISIN) and reference date. This includes free-floating volumes (calculated by subtracting the total balance held by central banks or by collateral takers from the total balance held within the CSD) and Concentration (the number of holders over which the securities holdings are spread).

- **Settlement failure ratios data**: This dataset includes, for a given instrument on the reference date, statistics on settlement status count, expressed in terms of number of transactions, that succeeded to settle, that failed to settle for a different set of reasons (fail to match, lack of securities, lack of cash…), as well as the Fail Ratio expressed as a percentage.

PRODUCT SCOPE

The Euroclear dataset comprises Government Bonds, SSA Bonds, and global Corporate Bonds settled through Euroclear EB and Euroclear ESES. It also includes transactions settled between these CSDs and other CSDs. Data can be requested by Asset Class (Rates or Credit) and trade date. It can also be filtered by Product Type (e.g. Gilts, GBP Corps, Euro-core).

LICENCE SCOPE

API access to each of the Euroclear data sets listed above is licensed separately on an annual subscription basis. The license permits internal usage of the data. Redistribution of the data, including providing access to any 3rd parties is forbidden.

DATASETS DETAILS

The Smart Markets™ API allows clients to access the following data points observed within the CSDs in scope (for instance, Euroclear EB and Euroclear ESES):

- **Transaction-level data**: array of individual transactions, which include the details of the traded Fixed Income instrument, traded notional, risk and the categorisation of the buyer and seller institutions (more details on the categorisation of counterparties in the next section).
  Note: Access to individual transactions is only available 30 days after the settlement date (S+30).

- **Aggregated transactional data**: aggregated transactional data at an instrument (ISIN) and trade date levels. It includes the break-down of the directional flow broken down by counterparty categories (more details on the categorisation of counterparties in the next section).
- *Note: Access to aggregated transactions is available the business day after settlement date (S+1).*

- **Holdings and Liquidity Scoring data:** Holdings data specific to a given instrument (ISIN) and reference date. This includes free-floating volumes (calculated by subtracting the total balance held by central banks or by collateral takers from the total balance held within the CSD) and Concentration (the number of holders over which the securities holdings are spread).

- **Settlement failure ratios data**: This dataset includes, for a given instrument on the reference date, statistics on settlement status count, expressed in terms of number of transactions, that succeeded to settled, that failed to settle for a different set of reasons (fail to match, lack of securities, lack of cash…), as well as the Fail Ratio expressed as a percentage.

TRANSACTION-LEVEL DATA

Transactional-level data provided by the Smart Markets™ API include the following attributes:

- **Bond instrument static data**. Basic details of the security the transactional data refers to. This data includes ISIN, Currency, Tenor.
- **Trade Date**. Date at which the trade has been executed.
- **Settlement Date**. Date at which the financial instruments are contractually to be delivered or received.
- **Settled Notional**. This is available in the native currency of the security.
- **EUR equivalent** of Settled Notional.
- **USD equivalent** of Settled Notional**.**
- **Settled DV01**. This is the interest rate risk (Dollar Value of 1 bps) correspondent to the settled notional of the security. This is available in the native currency of the security, only for AssetClass = Rates.
- **Settled CS01**. This is the credit spread risk (Dollar Value of 1 bps of credit spread change) correspondent to the settled notional of the security. This is available in the native currency of the security, only for AssetClass = Credit.
- **"Clean" Price.** "Clean" prices are computed from settlement prices (aka "Dirty" prices) and removing any accrued interest.

- **"Dirty" Price.** Trade settlement price, which include any accrued interest up to the settlement date.
- **Yield.** Yields are computed from "Clean" prices and are expressed as a percentage (annual yield to maturity).
- **Spread to Benchmark.** Applicable for securities with AssetClass = Credit only. This is the spread between Corporate Bond yield and correspondent benchmark Yield, expressed in bps.
- **Categorisation of the Buyer.** See table below for more details on the Categorisation of counterparties (buyer/seller) involved in the transaction.
- **Categorisation of the Seller.** See table below for more details on the Categorisation of counterparties (buyer/seller) involved in the transaction.

Note: this non-exhaustive list of data attributes is provisional and subject to change upon communication from Mosaic Smart Data.

Categorisation of counterparties (buyer/seller) involved in the transaction.

Counterparty type	Definition
Broker dealers	Includes securities brokers, investment banks and capital market desks.
Corporates	Includes companies producing goods or non-financial services.
Depository institution	Includes institutions involved in deposit banking or closely related functions like custodians, saving banks, private banks, commercial banks.
Government-related financial institutions	Includes all government related institutions such as government agencies, infrastructure and development banks, and supra-national institutions. Central banks are excluded.
Insurance	Represents insurance and reinsurance companies, including insurance agents, brokers & services.
Investment managers	Includes all asset managers, wealth managers, fund managers, ETFs, mortgage lenders, CDOs, CLOs, and Stichtingen.
Market infrastructures	Includes exchanges, clearing houses, CCPs, and CSDs.
Other financial institutions	Includes non deposit-taking financial institutions, like consumption credit lenders, fund service companies and trustees.
Real estate	Includes real estate operators, developers, brokers.
Unknown	Indicates the other side of cross border trades where one party has settled the trade outside of CSD.

Sample transactional-data JSON file (non-exhaustive list of fields):


```
{
  "links" : [
    { "rel": "self", "method": "GET", "url": "<URL for current page>" },
    { "rel": "nextPage", "method": "GET", "url": "<URL for next page in result set>" }
  ],
  "transactionDetails : [
   {
   "tradeDate": "2024-05-02",
   "instrumentCurrency": "USD",
   "instrumentPrimaryId": "XS1910827887",
   "tradeTenor": "7Y",
   "instrumentIssuer": "GOVERNMENT OF THE UNITED STATES OF AMERICA"
   "tradeSettlementDate": "2024-05-02",
   "tradeNotional": 500000    ,
   "tradeNotionalEUR": 466607.8641771309,
   "tradeNotionalUSD": 500000,
   "tradeDV01": 331.51443307086623,
   "tradeCleanPrice": 94.7184094488189,
   "tradeDirtyPrice": 97.129,
   "tradeYield": 9.837752870005174,
   "tradeBuyerPartyCategory": "OTHER FINANCIAL INSTITUTIONS",
   "tradeSellerPartyCategory": "DEPOSITORY INSTITUTIONS",
   }
  ]
}
```


Note: this JSON format is provisional and subject to change upon communication from Mosaic Smart Data.

AGGREGATED TRANSACTIONAL DATA

The Smart Markets™ API allow clients to access transactional data aggregated at the following levels:

- **tradeDate** (date at which the trade has been executed) level
  and
- **ISIN** (instrument identifier) i.e. at instrument level

For instance, API clients can access the aggregate of all transactions that occurred on a given day (e.g. 2024-05-03) and for a given instrument (e.g. FR001400L834).

Additionally, for any given Trade Date and ISIN, the Smart Markets™ API provides a break-down of directional flow by Counterparty Types (more details on the categorisation of counterparties in the previous section) to allow users to identify the amount of directional flow attributable to each Counterparty Type.

Visual example of directional flow data points available in the aggregated transactional data Smart Markets™ API, for ISIN = FR001400L834 and TradeDate = 2024-04-30, broken down by Counterparty Types and Side (Buy/Sell).

			Buy	Sell
ISIN	Day	Counterparty Type	Current	Current
FR001400L834	30, Apr 2024	BROKER DEALERS	548.07 M	120.92 M
		CORPORATES	550.00 M	0
		DEPOSITORY INSTITUTIONS	2.70 B	2.98 B
		GOVERNMENT RELATED FINA...	24.00 M	0
		MARKET INFRASTRUCTURES	1.84 B	2.47 B
		NON EUROCLEAR	221.04 M	299.30 M

For each combination of ISIN, TradeDate, CounterpartyType and Side (Buy/Sell), the Smart Markets™ API provides the following data points:

- **ISIN** – Identifier of the instrument the aggregated trade data refers to.
- **TradeDate** - Trade Date the aggregated trade data refers to.
- **CounterpartyType** – Counterparty categorisation the aggregated trade data refers to.
- **Side** – Side (Buy/Sell) the aggregated trade data refers to.
- **Total Notional** – Total settled notional in native currency.
- **Currency** - 3-char ISO code of the native currency of the bond.
- **EUR Notional** – Euro equivalent of total settled notional, based on EOD FX rate specific to the settlement date of the transactions.
- **USD Notional** – US Dollar equivalent of total settled notional, based on EOD FX rate specific to the settlement date of the transactions.
- **Total Dv01** – Total interest rate risk (Dollar Value of 1 bps) traded for the selected security. This is available in the native currency of the security, only for AssetClass = Rates.
- **Total CS01** - Total credit spread risk (Dollar Value of 1 bps of credit spread change) for the selected security. This is available in the native currency of the security, only for AssetClass = Credit.
- **Average Spread to Benchmark.** Volume-weighted average of the spread between Corporate Bond yield and correspondent benchmark Yield, expressed in bps. Applicable for securities with AssetClass = Credit only.
- **Average Clean Price** - Volume-weighted average of “Clean” prices, which are computed from settlement prices (aka “Dirty” prices) by removing any accrued interest.
- **Average Yield** - Volume-weighted average of the transactions’ yield, computed from “Clean” prices and are expressed as a percentage (annual yield to maturity).

Sample JSON format for aggregated transactions:


```
{
  "links" : [
    { "rel": "self", "method": "GET", "url": "<URL for current page>" },
    { "rel": "nextPage", "method": "GET", "url": "<URL for next page in result set>" }
  ],
  "aggregatedTransactions": [
   {
   "tradeDate": "2024-05-02",
   "instrumentPrimaryId": "XS1910827887",
   "tradePartyCategory": "BROKER DEALERS",
   "tradeSidePartyCategory": "BUY",
   "instrumentCurrency": "USD",
   "totalNotional": 50000000,
   "totalNotionalEUR": 46660786.42,
   "totalNotionalUSD": 50000000,
   "totalDV01": 33151.44,
   "averageCleanPrice": 94.718,
   "averageDirtyPrice": 97.129,
   "averageYield": 9.83775
   },
   {
   "tradeDate": "2024-05-02",
   "instrumentPrimaryId": "XS1910827887",
   "tradePartyCategory": "BROKER DEALERS",
   "tradeSidePartyCategory": "SELL",
   "instrumentCurrency": "USD",
   "totalNotional": 10000000,
   "totalNotionalEUR": 9332157.2,
   "totalNotionalUSD": 10000000,
   "totalDV01": 6630.2,
   "averageCleanPrice": 94.911,
   "averageDirtyPrice": 97.321,
   "averageYield": 9.7453
   },

       <<< IT THEN REPEATS FOR ALL OTHER COUNTERPARTY TYPES >>>

  ]
}
```


Note: this JSON format is provisional and subject to change upon communication from Mosaic Smart Data.

HOLDINGS AND LIQUIDITY SCORING DATA

The Smart Markets™ API allows clients to access anonymised bond and holding and liquidity scoring data. In particular, for any given instrument (ISIN) and reference date, the following data points are available:

- **freeFloatHolding** – The current holding free-float of the financial instrument is calculated by substracting the total balance held by central banks or by collateral takers.
- **Concentration** - The number of holders over which the securities holdings are spread.
  Note: If there are one or two holders, or if there was no holding on the reference date, then the system will not report this field.
- **averageHoldingSize** - The average amount of holding per holder.
- **medianHoldingSize** – The Median holding size is the middle value of the sorted list of all holding size values.
- **LiquidityScore** – SmartMarkets™ proprietary liquidity scoring of the security. More details about the Liquidity Scoring logic are available upon request at the following email: smartmarkets@mosaicsmartdata.com.

SETTLEMENT SUCCESS RATIO DATA

The Smart Markets™ API allows clients to access anonymised data on a given bond's Settlement success/failure ratio. In particular, for any given instrument (ISIN) and reference date, the following data points are available:

- **SucceededTransactions** – Total number of transactions that settled on the intended settlement date
- **FailedTransactions** – Total number of transactions that failed to settle on the intended settlement date
- **UnmatchedTransactions** – Total number of transactions that failed to settle on the intended settlement date because the correspondent matching instruction from counterparty was missing.
- **UnsettledTransactions** – Total number of transactions that failed to settle on the intended settlement date as there was a lack of securities, lack of cash, or other reasons.
- **FailRatio** – Number of failed transactions divided by the total number of transactions (i.e. Succeeded transactions plus failed transactions).

AUTHENTICATION

To access the data, the client needs a combination of client-owned credentials (client private key and its corresponding public key certificate) and credentials generated by Mosaic Smart Data on its behalf (API key(s) and client ID).

These combined credentials allow the client to request a secured and signed access token and set up a secure communication channel (mutual authenticated HTTPS session) to get authenticated and authorized to the subscribed services.

QUERY MECHANISM AND PARAMETERS

Once authenticated with such combined credentials, the Smart Markets™ API is accessible via the HTTPS REST endpoints:

- Transaction-level data: https://data.api.smartmarkets.mosaicsmartdata.net/v1/transactions
- Aggregated transactions data: https://data.api.smartmarkets.mosaicsmartdata.net/v1/aggregateTransactions
- Holdings and Liquidity Scoring data: https://data.api.smartmarkets.mosaicsmartdata.net/v1/holdings
- Settlement ratios data: https://data.api.smartmarkets.mosaicsmartdata.net/v1/settlementRatios

For each of the above endpoints, the request parameters need to be supplied with the request, to filter the result set returned.

Key search parameters are:

- **dataSource** [mandatory]. This parameter specifies the source system/organisation (typically, a CSD e.g. Euroclear) the data is sourced from.

- **referenceDate** [mandatory, format = yyyy-mm-dd]. Reference date for the query. Please note that for transactions-related queries, the referenceDate is the transaction execution date, not the settlement date.

- **assetClass** [mandatory, accepted values = "Rates", "Credit"]. This specifies whether the selected instruments are Rates products (Govt bonds, Municipals and SSAs) or Credit product (Corporate Bonds).

- **productType** [optional, accepted values as per below]. This specifies the product types of the request, as per the Smart Markets™ product taxonomy:

assetClass = Rates	assetClass = Credit
AUSSIE GOVT BOND	AUD CORPS
CANADIAN GOVT BOND	CAD CORPS
EM ASIA (HARD)	CEEMEA CORPS
EM ASIA (LOCAL)	CEEMEA EUROZONE CORPS
EM CEEMEA (HARD)	EMASIA CORPS
EM CEEMEA (LOCAL)	EUR CORPS
EM CEEMEA EUROZONE	GBP CORPS
EM LATAM (HARD)	JPY CORPS
EM LATAM (LOCAL)	LATAM CORPS
EURO-CORE	NZD CORPS
EURO-PERIPHERY	US CORPS
EURO-SEMICORE	
GILTS	
HK GOVT BOND	
JGB	
SCANDI GOVT BOND	
SSA	
US TREASURIES	

Note: this list of Product Types is provisional and subject to change upon communication from Mosaic Smart Data.

For example, the following request to the Smart Markets™ API would return all UK Gilts transaction-level data for trades executed on the 2nd April 2024 and settled (either on the 2nd or on the following days) within the Euroclear CSDs.

```
https://data.api.euroclear.mosaicsmartdata.net/v1/transactions?dataSource=euroclear&referenceDate=2024-04-02&assetClass=Rates&productType=GILTS
```

API RESPONSES AND PAGINATION

The Smart Markets™ API returns a JSON response containing two elements:

- **links** - contains a reference to the current page, and the next page (if any)
- a body data section (one of **TransactionDetails, AggregatedTransactions, Holdings, SettlementRatios**) - contains an array of objects containing the details of the transactions, aggregate transactions data, Holdings data or Settlement Failure data respectively.

Sample JSON format (for showing pagination):

```
{
  "links" : [
    { "rel": "self", "method": "GET", "url": "<URL for current page>" },
    { "rel": "nextPage", "method": "GET", "url": "<URL for next page in result set>" }
  ],
  "transactionDetails : [
   …
  ]
}
```

Note: this JSON format is provisional and subject to change upon communication from Mosaic Smart Data.