❮Doing data differently❯

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Helping the global financial community make informed decisions through the provision of fast, accurate, timely and affordable reference data services

With more than 20 years of experience, we offer comprehensive and complete securities reference data for equities and fixed income instruments around the globe.

Our customers can rely on our successful track record to efficiently deliver high quality data sets including:

- Worldwide Corporate Actions
- Worldwide Fixed Income
- Security Reference File
- Worldwide End-of-Day Prices

Exchange Data International has recently expanded its data coverage to include economic data. Currently it has three products:

- African Economic Data www.africadata.com
- Economic Indicator Service (EIS)
- Global Economic Data

Our professional sales, support and data/research teams deliver the lowest cost of ownership whilst at the same time being the most responsive to client requests.

As a result of our on-going commitment to providing cost effective and innovative data solutions, whilst at the same time ensuring the highest standards, we have been awarded the internationally recognized symbol of quality ISO 9001.

Headquartered in United Kingdom, we have staff in Canada, India, Morocco, South Africa and United States.

Contents

Introduction

This document explains the evaluated pricing methodology that Exchange Data International (EDI) employs to provide independent and transparent valuations and analytics for fixed income securities to its customers.

EDI's proprietary evaluated pricing methodology uses market information to produce evaluated prices and analytics for fixed income securities of the Canadian and US markets in the most efficient way possible in order to give fixed income asset managers an optimized tool to assist them in improving their asset management decisions and risk management/regulatory reporting processes.

High Level Approach to Fixed Income Securities Pricing

Multiple sources

Exchange Data International uses many different sources for fixed income securities information. These sources include the trading desks of major investment dealers and banks.

There are several benefits to using multiple dealer sources:

- ✓ Experts on specific markets lend great insight and are consulted with as needed, giving Exchange Data International the "heads up" on the latest developments in those markets.

- ✓ Technical factors affecting delivery of information from any one source will not affect Exchange Data International's ability to deliver on time, allowing for consistent delivery to our customers since no one source is relied upon.

- ✓ It gives Exchange Data International the ability to filter out source biases.

Validation process

All sourced information is verified against Exchange Data International's proprietary tolerance reports and curves. They are then further analyzed by our trained analysts, who filter out the relevant information and make adjustments where necessary.

Terms and conditions

Using a comprehensive database of terms and conditions, Evaluated Prices are computed for a large range of fixed income securities, including securities with the following characteristics:

✓ Floating Rate Coupon

✓ Fixed-Floating Rate Coupon

✓ Step-Up / Step-Down Coupon

✓ Zero-Coupon

✓ Strip (Principal Strip / Coupon Strip)

✓ Callable / Puttable

✓ Inflation-linked ("Real-Return Bonds")

Fixed Income Securities Pricing Methodology

Curve Pricing

Exchange Data International receives multiple prices/yields/bids/asks from its sources, for a number of different issuers. Depending on client specifications, Exchange Data International will either use the bid or the mid ((bid + ask) / 2) to build the issuer curves.

The resulting issuer curves are checked against each source and an Exchange Data International curve is generated for each issuer. All fixed income securities are then priced off the respective curves using linear interpolation and extrapolation.

Curve pricing is employed by Exchange Data International to price fixed income securities from the following issuers:

- ✓ National Governments
- ✓ Canadian provinces

Spread Pricing

Spread pricing uses multiple sources to spot the most liquid securities of a specific issuer by virtue of specific factors such as agreement amongst sources, tightness in the bid-ask spread, etc. Analysts also look at source prices every day to determine the most liquid points on the issuer curve and the illiquid issues are then interpolated/extrapolated off that curve. This interpolation/extrapolation method also allows quick validation of incorrect source prices.

All securities are priced using a spread off the underlying government interpolated/extrapolated curve using data collected from the liquid securities of the same issuer. All terms and conditions are taken into account when comparing illiquid securities to liquid ones.

Spread pricing is employed by Exchange Data International to price fixed income securities from the following issuers:

- ✓ Agencies, Crown corporations and Corporates are priced using the Government Curve
- ✓ Canadian municipals are priced using their respective Provincial Curve

Bond pricing model

Once Exchange Data International has computed the yield for a fixed income security, the price of the security is then evaluated using the market standard, long form model. This means that Exchange Data International does not use an approximation formula but actually computes all discounted coupons individually and then adds them together to the discounted principal amount to get the bond price.

To be more precise, the following formula is used to compute a Clean Price, taking into account all terms and conditions, such as periodicity of coupon payments (annual, semi-annual, quarterly, monthly, etc.), day count conventions (Act/Act, Act/365, 30/360, etc.), etc.

$$Clean\ Price = \sum_{i=1}^{n} \frac{c}{(1+y/k)^{kt_i}} + \frac{100}{(1+y/k)^{kt_n}} - Accrued\ Interest$$

Price validation

Exchange Data International has controls in place to validate the evaluated prices it computes for customers. Most of the controls are imbedded in the pricing process and are run automatically while some controls require the active involvement of one of our pricing analysts:

- **Automated:** In the event when an automated control is breached, the pricing analyst will receive an automated message as well as a report detailing the breach (Which security is impacted? What is the reason for the breach? etc.)

  For example, a daily bond price variation over a certain absolute threshold will trigger an automated message alert while a price exception report is sent automatically to the pricing analyst. To give another example, the same process will also be triggered if the daily bond price variation is exactly 0% for a security.

- **Manual:** Once the pricing process is completed, various reports are automatically generated to inform the analyst of certain statistics (average daily variation, maximum/minimum daily variation, etc.) regarding the daily variation of prices, which are then compared to daily variations in the government curve and other issuer of similar type and credit quality, allowing the analyst the ability to identify when and where a manual pricing adjusment is needed and while giving him time to perform the adjustment before delivering the price files to customers.

Operational Processes

Robust file delivery

Pricing files can be picked up by customers via Exchange Data International's FTP sites.

Two different FTP sites (.com, .net) are employed to ensure that pricing files can still be delivered to customers in the event that one FTP site is down.

Flexible delivery process

Depending on the specifications of the customers, pricing files can be delivered at flexible times during the business day and the file format is always fully customized to the customer's requirements.

Exchange Data International also offers the possibility to receive more than one pricing file, at different "snapshot" times during the business day. For example, a client could receive a 12:00 pm snapshot, 2:00 pm snapshot and 4:00 pm snapshot.

Add process

When a new security is being added by the client, the "adds" are researched in full and all terms and conditions are gathered prior to pricing the security using our proprietary pricing methodology.

Once all the terms and conditions are found and validated by the pricing analyst, the security is then added to the pricing process. The analyst determines at that point which pricing methods will be employed by Exchange Data International for that security and the security is now ready to be priced.

Exchange Data International requires that the customers request is made before 3:00 p.m. EST. if delivery of an evaluated price for the security is expected the same day.

Removal process

Unless otherwise specified by the client, fixed income securities will be valued at their principal amount (100) at Maturity Date and will be automatically removed from the price file the next day.

Challenge process

Challenges are a process used by Exchange Data International's customers to verify the valuation of a security on a given date. Exchange Data International believes that this process is a great opportunity to help customers improve their understanding of our pricing methodology.

The process starts with the client contacting Exchange Data International, typically via email, with the details of the challenge in question. It is generally expected that the client offer:

- ✓ the security ID;

- ✓ description of the security (issuer, maturity date, coupon);

- ✓ date of the valuation;

- ✓ a general client comment on why this specific valuation is challenged on that day.

The information will be passed along to the pricing analyst responsible for the valuation, who will respond to the client with their findings and any supporting information. If the security's price need to be revised, a confirmation of the revision will be sent to the client.

Customization

EDI is proud to offer the most effective and efficient solutions tailored to meet each individual customer's needs. We offer a range of customization options including:

- Delivery-based solutions to complement existing client infrastructure.
- Content provided at the geographical or portfolio holding level.
- Feeds containing particular formats, field content and integrated client level data items.

EDI uses its extensive data research expertise to source, scrub and integrate new client specified data items with existing products and services. For instance, a request from a multinational investment bank to source the DR universe and map it against its underlying share portfolio ultimately led to the development of EDI's successful Depositary Receipt Database.

In addition, EDI was the first vendor to successfully launch an ISO 15022 Corporate Action Messaging feed. This enables customers to reduce costs and increase efficiency by removing the need for multiple feed handlers.

Support

Customer Support

Monday – Friday
Open 24 hours

Saturday
12AM - 8AM (GMT)

Sunday
11PM-12AM(GMT)

Call +44 207 324 0020

Email: support@exchange-data.com

Customer support is closed Christmas and New Year's Day.

We aim to acknowledge all queries within an hour of receipt and answer queries within 24 hours where possible.

We will send a progress report if a query is not resolved within that time-frame. We resolve around 95% of customer queries within 24 hours.

All queries sent to our Support department are filtered and dispatched to the relevant department. An IT staff member is engaged in the communication process to resolve complicated technical issues.

www.exchange-data.com

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