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ARGUS POSSIBILITY CURVES: CRUDE

Contents:

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The most up-to-date Argus Possibility Curves: Crude methodology is available on www.argusmedia.com

Methodology overview

Argus Possibility Curves: Crude show the likelihood that daily crude time spreads and monthly average crude prices will be within specified price ranges, the drivers of those possibilities and the balance of risk.

The possibility curves rely on Argus data science and market expertise and the extensive history of price assessments and insight reported by Argus journalists.

Argus Possibility Curves: Crude

The Argus Possibility Curves: Crude service includes several possibility curves — each point of which is a pair of possibility and crude price or price spread — and an online visualisation dashboard of the data feed and their underlying drivers.

Argus possibility curves are an independent view of the cumulative distribution function for possible prices and price spreads of the crudes and timings listed below.

Possibilities are published for 399 quantiles, each representing a 0.25 percentage point likelihood from 0.25pc to 99.75pc. For each quantile a price is published — the price or price spread at daily exchange settlement of the relevant futures contracts, or the monthly average price of Nymex WTI, Ice Brent, Argus WTI Houston, Argus WCS Houston or Argus Mars.

For example, a price of 50¢/bl for the 50pc quantile for WTI crude intermonth spreads indicates that there is a 50pc likelihood that the front-month WTI contract will be no more than 50¢/bl above the second-month WTI contract at the next exchange settlement.

Uses

The Argus Possibility Curves: Crude service might be used for analysing business strategies, informing business decisions, identifying and measuring risks, valuing exposures, instruments or positions, conducting stress testing, assessing adequacy of capital, managing client assets, measuring compliance with internal limits, maintaining the formal control apparatus of the user, or meeting financial or regulatory reporting requirements and issuing public disclosures.

Construction

Argus possibility curves are created through statistical analysis and algorithmic processing of a variety of data sources including but not limited to the prices and traded volumes of liquid and illiquid physical and financial markets, fundamentals and other data.

The model

In keeping with standard industry practice, the Argus Possibility Curves: Crude model is a quantitative approach that applies statistical, economic, financial, and mathematical theories, techniques, and assumptions to process input data into quantitative estimates.

The model involves inputs based on Argus' expert judgment used to produce quantitative output.

The shape of each possibility curve is broadly defined by four distribution parameters — location, dispersion, skewness and kurtosis — which are linked to the crude price or time spread through a distribution function.

The curated universe of Argus data is provided to a machine learning process for the determination of the best combination of drivers for each distribution parameter, by accounting for common information among them each day or month, and the functions through which those drivers are included in the model to produce the final possibility curves. The machine learning framework maintains a balance between its two core objectives — fidelity to the data and managing model complexity.

Those chosen drivers, the functions through which they are included in the model, and the possibility curves they produce are subject to statistical scrutiny to evaluate their predictive value and their appropriateness for inclusion in the day's model.

Underlying data

Most underlying data sets include at least five years of historical data, although Argus may consider or emphasise longer or shorter historical periods as befits the market situation at the time. The Argus Possibility Curves: Crude service may incorporate both proprietary and publicly available data selected by Argus market experts and secondary data generated by the model itself.

Grades of crude and time periods covered

Daily Ice Brent time spreads
The settlement price of the front-month Ice Brent crude futures contract less the settlement price for the second-month Ice Brent crude futures contract.

Daily Nymex WTI time spreads
The settlement price of the front-month Nymex WTI crude futures contract less the settlement price for the second-month Nymex WTI futures contract.

Daily Ice Brent settlements

The settlement price of the front-month and second-month Ice Brent crude futures contracts.

Daily Nymex WTI settlements

The settlement price of the front-month and second-month Nymex WTI crude futures contracts.

Nymex WTI monthly

Three possibilities curves are published each month.

- The average of daily front-month Nymex WTI settlement prices during the month of publication.
- The average of daily front-month Nymex WTI settlement prices during the month after publication.
- The average of daily front-month Nymex WTI settlement prices during the second month after publication.

For example, on 1 May, Argus published possibility curves for the average Nymex WTI front-month settlement for the trading months of May, June and July.

Ice Brent monthly

Three possibilities curves are published each month.

- The average of daily front-month Ice Brent settlement prices during the month of publication.
- The average of daily front-month Ice Brent settlement prices during the month after publication.
- The average of daily front-month Ice Brent settlement prices during the second month after publication.

For example, on 1 May, Argus published possibility curves for the average Ice Brent front-month settlement for the trading months of May, June and July.

Argus WTI Houston monthly

Three possibilities curves are published each month.

- The average of daily Argus WTI Houston front-month price assessments during the month of publication.
- The average of daily Argus WTI Houston front-month price assessments during the month after publication.
- The average of daily Argus WTI Houston front-month price assessments during the second month after publication.

For example, on 1 May, Argus published possibility curves for the average of daily Argus WTI Houston front-month price assessments for the publication months of May, June and July.

Argus WCS Houston monthly

Three possibilities curves are published each month.

- The average of daily Argus WCS Houston front-month price assessments during the month of publication.
- The average of daily Argus WCS Houston front-month price assessments during the month after publication.
- The average of daily Argus WCS Houston front-month price assessments during the second month after publication.

For example, on 1 May, Argus published possibility curves for the average of daily Argus WCS Houston front-month price assessments for the publication months of May, June and July.

Argus Mars monthly

Three possibilities curves are published each month.

- The average of daily Argus Mars front-month price assessments during the month of publication.
- The average of daily Argus Mars front-month price assessments during the month after publication.
- The average of daily Argus Mars front-month price assessments during the second month after publication.

For example, on 1 May, Argus published possibility curves for the average of daily Argus Mars front-month price assessments for the publication months of May, June and July.

Timing

Daily time spread and settlement possibility curves are published Monday-Friday, except when that day is not an Ice Brent trading day or the following day not a Nymex WTI trading day.

Daily time spread and settlement possibility curves follow the Ice and CME holiday schedules. Forward months roll three days before expiry.

Monthly possibility curves are published by the third trading or Argus publication day of each calendar month.

A publication scheduled is available at www.argusmedia.com

Units of assessment

Drivers are ranked by weight within the model that determines the shape of the possibility curves. Weights of the top drivers add up to 100 and are based on the data input into the machine learning framework after any transformations that may have been applied to the raw data.

Crude prices and differentials are published in $/bl.

Corrections to assessments

Argus will on occasion publish corrections to possibility curves only if there has been an error in the execution of the model or similar technical error. Possibility curves are published with the information available to Argus at the time. Subsequent revisions to input data, including Argus price assessments, may result in an update to the possibility curves for a given day (the publication of a second curve for a specific day) but will not result in the correction of previously published possibility curves (the replacement of a previously published curve).

Model development and validation

Argus models are developed using a process that includes: a clear statement of purpose to ensure that the model is developed in line with its intended use; sound design, theory, and logic underlying the model; robust model methodologies and processing components; rigorous assessment of data quality and relevance; and appropriate documentation.

Models are validated as performing as expected, in line with their design objectives and uses. Validation is performed by a team that was not responsible for the development of the daily or monthly model. All model components, including input, processing and reporting, are subject to validation and diagnostic processes. These diagnostic processes include the examination of model residuals using probability integral transform (PIT) residuals or normalised (randomised) quantile residuals.

Historical data are also scrutinised for irregularities. Model outputs are analysed for overall accuracy and the trend in errors, particularly regarding performance under various market regimes including but not limited to periods of low or high volatility or low or high outright prices. The analysis informs use of the model in producing the final possibility curves, including any overlays or adjustments made to its output.

Ethics and compliance

Argus has a strict ethics policy that applies to all staff. The policy can be found on our website at www.argusmedia.com. Included in this policy are restrictions against staff trading in any energy commodity or energy related stocks, and guidelines for accepting gifts.

Changes to methodology

Formal proposals to change methodologies typically emerge out of the ongoing process of internal and external review of the methodologies. Formal procedures for external consultation regarding material changes to existing methodologies will be initiated with an announcement of the proposed change.
This announcement will include:

- Details on the proposed change and the rationale
- Method for submitting comments with a deadline for submissions

Argus will provide sufficient opportunity for stakeholders to analyse and comment on changes, but will not allow the time needed to follow these procedures to create a situation wherein unrepresentative or false prices are published, markets are disrupted, or market participants are put at unnecessary risk.

Argus will engage with industry throughout this process in order to gain acceptance of proposed changes to methodology. Argus cannot however guarantee universal acceptance and will act for the good order of the market and ensure the continued integrity of its work as an overriding objective.

Following the consultation period, Argus management will commence an internal review and decide on the methodology change.

This will be followed by an announcement of the decision, which will be published in the relevant Argus report and include a date for implementation.

The latest available methodology is available at www.argusmedia.com.