

PIX US Pulp Indices

Methodology and price specifications – December 2019

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Mission statement

Fastmarkets is a leading commodity price reporting agency (PRA) covering the metals, mining, minerals and forest products industries. Our products include Metal Bulletin, American Metal Market, RISI, FOEX, Random Lengths and Industrial Minerals. For more than 100 years we have been providing commodities price reporting services for use by market participants in their day-to-day commercial activities.

These services include assessments and indices of commodity prices as well as news, research and commentary on the underlying markets.

Our mission is to meet the market's data requirements honestly and independently, acting with integrity and care to ensure that the trust and confidence placed in the reliability of our pricing methodologies is maintained. We do not have a vested interest in the markets on which we report.

Introduction

Fastmarkets FOEX, in Helsinki, Finland, operating under the Finnish law, produces trademarked PIX price indices for selected pulp, paper, recovered paper and packaging grades as well as for wood-based biomass and bioenergy products like pellets and wood chips. The first PIX pulp index was launched in September 1996. Fastmarkets FOEX owns the trade mark rights to PIX Index.

Fastmarkets' reporters are required to abide by a code of conduct and clear pricing procedures during their market reporting and pricing activities. Fastmarkets is completely independent and has no vested commercial interest in any of the markets it prices.

We are the world's largest dedicated forest products price reporting team. We have offices in New York, Boston, Oakland, Eugene, Charlottesville, Atlanta, Brussels, Helsinki, Beijing, Shanghai, Singapore and Sao Paulo.

The aim of this document is to provide a clear overview of Fastmarkets methodology and specifications for the PIX US Pulp Indices. If you have any questions, please contact Fastmarkets FOEX director Tytti Inkinen, tytti.inkinen@fastmarkets.com.

Price discovery process and methodology

Methodology Rationale

Fastmarkets FOEX produces independent, fair and representative price indices for global market pulp on a weekly basis. Fastmarkets FOEX's rationale is to adopt and develop the price discovery process and the methodology described in the present guide to produce indices that are a consistent and representative indicator of value of the market to which they relate for the trading period they measure, as well as for the change in prices from one week to the next.

The PIX pulp benchmark index is calculated and confirmed by Fastmarkets FOEX based on confidential price information of actual, physical trades of pulp, collected on a weekly basis by telephone and email from companies trading in pulp. It represents the gross price agreed on contract business for pulp used for paper or paperboard production. The method of index calculation is fixed. The index has a large market coverage and a stable group of price providers from week to week.

The time period, or window, identified to assess a market (eg, daily, bi-weekly, weekly, monthly) is determined by Fastmarkets FOEX after considering the number of data points that Fastmarkets FOEX can reasonably expect to collect on a consistent basis over the selected period to support the price assessment process.

Data collection criteria

Fastmarkets FOEX staff aim to talk to a broad sample of market participants specifically involved in the buying and selling of the pulp grade of interest, with a

good representation of both sides of the market. Pulp producers, buyers, agents and trading houses, including buyers/sellers acting on behalf of another buyer/seller, qualify as price providers. If a trading house buys and sells on its own account, those prices are not accepted into the index calculation.

Price data is collected weekly from price providers, typically by email or by phone. Possibilities to use other alternative ways will be followed-up whenever deemed useful.

Price data reported to Fastmarkets FOEX by noon Finnish time on Monday (or the last working day preceding publication day) will be included in the index calculations for the publishing on Tuesday (or exceptional working day). Fastmarkets FOEX has the discretionary right to decide whether to include price data received after noon on Monday into the index calculation that week.

Reported price data will be stored at Fastmarkets FOEX for a period of seven years.

Price providers designate a person and a deputy for the price reporting task. Each price provider shall report their prices each week or provide a note of how long the last reported price is valid, or report "no transactions" if a provider has no eligible transactions in a given week.

Price providers agree to report their prices according to the methodology described in this document and based on all transactions meeting the specifications and to consult with Fastmarkets FOEX if they have any doubts as to the validity of a price to be reported.

Fastmarkets FOEX encourages organizations to submit all their pricing data, especially all the concluded transactions.

Fastmarkets FOEX welcomes organizations to submit transaction data from authorized back office functions.

Company-specific data received from the price providers is accessible only to personnel employed by Fastmarkets FOEX. Board Members do not have access to this data.

Fastmarkets FOEX' personnel dealing with the confidential price data or other sensitive information received from the price providers for the purpose of PIX index calculations, commits to life-long confidentiality agreements, as part of their employment agreement, not to disclose the data received, nor the source, outside Fastmarkets FOEX.

Fastmarkets FOEX commits to compile the price data, to calculate the index values and to publish the index values in accordance with the rules and specifications set forth in this document.

What price data providers submit

Each week, data providers submit prices reflecting all eligible transactions, to the extent possible with reasonable efforts, taking into account the practical problems in the weekly sales administrative work to collect all required transactions.

“Transaction” is defined as either of the following:

1. Final agreement on price for delivery of a specific quantity of pulp during the current month and each delivery against that agreement during the same month.
2. Final agreement on the price of pulp that has already been shipped within the current month or the month preceding the reporting date.

In order to further improve the accuracy of the index movements and to secure as many price points as possible every week, price providers are encouraged to report both the price when it is agreed and the price of every delivery from seller to buyer or an invoice against that price agreement.

However, pulp already under buyer's ownership delivered from buyer's port warehouse to the mill, should not be considered as a market transaction and should not lead to price reporting.

An “eligible transaction” is a transaction that meets the specifications in below.

Providers have the option to submit prices in one of two ways:

1. Separate transaction prices: Providers submit prices reflecting all eligible transactions and additionally submit the share (either tonnage or %) of each of these transactions of the total volume of eligible transactions of that week.
2. Single weighted average price: Providers submit a single price reflecting the weighted average price of all eligible transactions over the previous week.

This weighted average can be calculated based on actual weekly volumes, average weekly volume calculated from the annual contract or from an annual estimate. The method should however be consistently used from week to week to the extent possible with reasonable efforts.

Price specifications and reference units

Fastmarkets FOEX has clear specifications for all the price points that it covers. All the reference units, such as currency and volume, are in line with recognized pulp and paper markets trading conventions.

Fastmarkets FOEX specifications detail the material's characteristics or quality, location, incoterm, payment terms and the minimum volume accepted. These specifications are determined in consultation with market participants and following industry convention. Reporters ensure that the information they receive matches these specifications.

All Fastmarkets FOEX price specifications define the minimum lot size accepted.

Criteria to discard pricing data

Transactions are against contract-based business or other recurring business with similar pricing and discounting terms, complying with the General Trade Rules for physical pulp business for paper or paperboard production purposes between companies regularly buying or selling pulp.

Specifically excluded are:

- Spot transactions: One-off transactions whose price is typically at a level from which no further discounts, allowances or performance rebates are given.
- Integrated shipments: shipments between affiliated parties.
- Indexed-price transactions: transactions whose prices are, according to the supply contract, tied to PIX or any other pulp price index.
- Index as fall-back mechanism: Some contracts stipulate that prices are negotiated between buyer and seller but that PIX or another index can be used to settle prices if the buyer and seller can't agree on a price. Transactions under these contracts are not considered indexed and thus shall be submitted to the index.

Procedure to ensure consistency in the price discovery procedures

All Fastmarkets FOEX price indices are set by a first staff member who covers that specific market, peer reviewed by a second staff member, and always signed-off and approved by a senior staff member prior to publication. This peer review process is in place to make sure that pricing procedures and methodologies are correctly and consistently applied and to ensure integrity and quality of the published prices.

Fastmarkets FOEX staff are formally trained in the price discovery process and must abide by a written Code of Conduct and pricing procedures.

On a regular basis (i.e. annually for the main pulp grades), Fastmarkets FOEX staff reviews markets and methodologies to ensure that assessment methodologies and the assessments they produce are appropriate for the market. Fastmarkets FOEX has also committed to conducting one external audit per year of one key assessment.

Data validation

Fastmarkets FOEX reviews the incoming price data in order to check its consistency with the reporting rules. If the price data looks questionable, Fastmarkets FOEX contacts the price provider.

Weighting of Data

Weighting between price providers is achieved by assigning more price points to larger buyers/sellers than to smaller ones. The number of price points assigned to each provider is scaled by the annual volume of sales or purchases of market pulp in each main index grade (BSKP excl. fluff, BHKP). See Appendix 1.

Market pulp includes integrated exports but not company internal volumes within the country of production. Each price reporter's weight is kept constant through the year, if no major changes occur in production capacity or purchasing volumes. Volumes are checked at the turn of the year for defining the weighting for the following year.

While input to the index is generally evenly split between buyers and sellers, the share can vary from week to week. To limit volatility caused by a shift in the share of the buyer/seller data, Fastmarkets FOEX strives to have buyer and seller data each represent 50% of the index.

The weighting of any single data provider's data is limited so that it doesn't dominate the index. No single data provider's data will be weighted so that it contributes more than 50% of total number of prices included in the index calculation.

Aggregation of weighted average prices

If data providers submit a single weighted average price (see Section 1.3 above), that price point is included in the week's collected price points multiple times, according to the number of price points the data provider is allowed. For instance, if a seller of NBSKP is allowed 5 price points and submits a single weighted average price of \$X in a given week, then \$X is included 5 times in that week's collected price points.

Calculation procedure

The index value is the arithmetic average of the price points included. The highest and lowest 10 % of the number of price points are removed before calculating the PIX index values. This is done to eliminate clerical errors in the price reporting and to

dampen any possible attempts to manipulate the PIX index value in one direction or the other.

Validity time of price points

If a price provider does not report prices in a given week (e.g. a company may not have sales or purchases during that week) Fastmarkets FOEX may use the previous price points received, but only for one additional week.

Fall-back procedure

In the unlikely event that there are not enough eligible price points in a given week, and the lack of price points is threatening to distort the index development, Fastmarkets FOEX reserves the right to roll forward previous price data beyond the limits mentioned above. Fastmarkets FOEX may also state that because there is an insufficient number of price points, the previous week's index value will be republished.

Monthly average prices

The monthly average of any of the PIX indexes is calculated by Fastmarkets FOEX as a straight arithmetic average from the weekly PIX index values of the month in question. The average value is published together with the last weekly index value (included in the monthly average).

Methodology and specification review process

Fastmarkets FOEX continually develops and revises its methodologies in consultation with industry participants,

aiming to adopt product specifications and trading terms and conditions that actually reflect and are representative of typical working practices in the industry. Changes to the methodology and/or price specification are implemented following a consultation process which starts with Fastmarkets FOEX posting on its website an advance pricing notice providing clear details and a timeframe for the change proposed. The objective of the consultation process is to give market participants sufficient time and opportunity to provide feedback about the proposed change.

For more details on the formal review of the methodology and the consultation process to propose changes to the methodology, refer to Fastmarkets FOEX's Methodology Review and Change Consultation Process available on Fastmarkets FOEX's website.

Price correction policy

Publication of price errors can occasionally happen for reasons that may include technical input errors or incorrect application of the methodology. To minimise the inconvenience to our subscribers, Fastmarkets FOEX aims to investigate each error as soon as it becomes aware of it and to publish a correction promptly on our website through a pricing notice with an explanation of the reason for the correction.

Fastmarkets FOEX will publish a correction of a price only where it has established undeniably that there has been an error. Fastmarkets FOEX price assessments are produced based on the best data available at the time of the assessment. It will not

retroactively change a price based on new information or additional submission of data received after a respective pricing session has closed.

Become a contributor to the price discovery process

Fastmarkets FOEX continually seeks to increase the number of market sources willing to take part in the price discovery process. The main condition Fastmarkets FOEX requires from contributors is for them to be active participants in the spot market. Fastmarkets FOEX' Data Submitter Policy provides guidelines defining the high level of data quality and integrity that Fastmarkets FOEX expects from contributing organization providing pricing data. Market participants that wish to provide pricing data and be part of the price discovery process should first read the Data Submitter Policy available on the Fastmarkets FOEX website.

All data sources are subject to review before their data submitted is fully taken into account in the pricing process. The aim is to make sure that submitters are trustworthy and have sufficient visibility and understanding of the market to be able to provide viable price data.

If you want to become a contributor to Fastmarkets FOEX pricing or have questions or comments about the methodology and price specifications, please contact Fastmarkets FOEX director Tytti Inkinen, tytti.inkinen@fastmarkets.com.

Price specifications

Description: PIX US NBSK Gross
Quantity: min 100 metric tons
Location: US
Incoterm: Delivered to customer/customer's warehouse in the US
Timing: Price for a regular customer for pulp intended to be delivered within the current month or latest during the month following the trade.
Unit: Metric ton
Currency: US Dollar
Payment terms: The price is a gross transaction price on standard delivery and payment terms between buyer and seller, 30 days net or the most frequent payment term used.
Price Type: Gross prices before customer-specific discounts or rebates. These discounts and rebates are typically agreed upon in long-term agreements. Any additional temporary discounts or rebates which differ from the long-term agreements are to be deducted from the price reported. Prices reflected only include those with a final agreement for the month, i.e. without a retroactive adjustment clause.
Publication: Weekly, on Tuesdays at 12 noon Helsinki time. If Tuesday falls on a public holiday in Finland, the index will be published on the first working day thereafter.
Notes: Prices are for Prime quality, commodity grade Northern bleached softwood kraft pulp.
Technical quality criteria: standard dryness 90%. Brightness 88 or higher (for standard ECF/TCF).

Description: PIX US NBSK Net Change Index
Quantity: min 100 metric tons
Location: US
Incoterm: Delivered in the US
Timing: All orders placed or received during the reporting month.
Unit/Currency: Change index based on a starting point of 100 in January 2016. No dollar level is shown.
Payment terms: The price is a net transaction price on standard delivery and payment terms between buyer and seller, 30 days net or the most frequent payment term used.
Transaction Type: All transactions whether contract or spot.
Publication: Monthly, on the first Tuesday of the month after the 5th of the month at 12 noon Helsinki time. If Tuesday falls on a public holiday in Finland, the index will be published on the first working day thereafter.
Notes: Prices are for Prime quality, commodity grade Northern bleached softwood kraft pulp.
Technical quality criteria: standard dryness 90%.

Revision History

Changes to methodology and specifications will be tracked here.

December 2019 – Adds 50% weighting cap and changes limit for data retention

A 50% cap was added to any one contributor's weighting in the index. Storage of price data was changed from five to seven years. The methodology guide was changed accordingly.

June 2019 – Changes timing of publication and adds detail of additional accuracy checks

Following consultation with stakeholders, FOEX changed the timing of publication of US pulp indices to noon Finnish time, in line with other PIX index publications. FOEX also introduced additional accuracy checks. All indices are now undergoing a peer review and final sign-off by a senior team member.

The methodologies were not changed materially during this process.

January 2019 – Fastmarkets rebranding

Fastmarkets FOEX revamped all methodology and specifications guides, including PIX US Pulp, in January 2019 as part of a company-wide rebranding. This was done to improve the consistency of content across all Fastmarkets methodology guides and to give them a common look and feel.

The methodologies were not changed materially during this process.

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Your investment actions should be solely based upon your own decisions and research and appropriate independent advice should be obtained from a suitably qualified independent adviser before any such decision is made.

Appendix 1

PIX weighting scale for price points

June 2019

USA

NBSK SELLERS

	Tonnes/a	Price points
over	1 000 000	9
up to	1 000 000	8
up to	800 000	7
up to	600 000	6
up to	400 000	5
up to	200 000	4
up to	100 000	3

NBSK BUYERS

	Tonnes/a	Price points
over	800 000	9
up to	800 000	8
up to	600 000	7
up to	400 000	6
up to	200 000	5
up to	100 000	3