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Derivatives Methodology Guide

Platts Forward Curve-Oil

LATEST UPDATE: January 2007

DERIVATIVES METHODOLOGY GUIDE – PFC-OIL

Updated January 2007

Platts Forward Curve-Oil (PFC-Oil) is a global benchmark for the forward oil 'Over-the-Counter' market, providing over 530 global assessments.This is the first globally comprehensive and independently-produced series of oil forward price curves.

Platts Forward Curve-Oil is a standard setter in terms of methodological rigor and the daily assessments provide market participants, regulators, risk managers and auditors with what they need in terms of an indepdendent source of pricing data for forward oil markets. The product perfectly chimes with the global regulatory rigor towards derivative accounting and reporting that has been reflected in the passing of the Sarbanes-Oxley Act in the United States, and the growth of a global accounting regime for derivatives via the Federal Accounting Standard Board's 133 ruling, in the wake of the collapse of companies such as Enron.

The data, making up over 60 individual forward curves globally, sourced from traded forward markets by a team of derivative specialists, supplies accurate and independent mark-to-market prices for oil derivatives trading entities.

Such data allows risk analysts to calibrate pricing models which measure the real and everyday risks that energy companies are running in today's volatile markets, allowing them to make better-informed hedging decisions and to avoid the worst effects of rapid changes in prices.

MARKET METHODOLOGY

ASIA-PACIFIC

In Asia, the same methodology is applied to both the PFC and to the swaps quoted in the Asia-Pacific Arab Gulf Marketscan. Bids/offers and transactions are quoted throughout the day on Platts electronic screen service Platts Global Alert page 3 and page 190. This information leads to a market close at 1630 Singapore time. The assessment reflects a market on close value at 1630 Singapore time. The assessment reflects the tradable level at this time.

To further enhance transparency in the Asian products assessment window, Platts adheres to the following timing standards for all physical light distillates, middle distillates and heavy distillates window, plus associated derivatives for publication on Platts Global Alert (PGA) page 190.

Initial spread bids and offers in the Singapore fuel oil/distillates swaps markets must be submitted no later than 16:15:00 local Singapore time. The cut-off is applicable to spreads including jet/gasoil regrade, east/west gasoil spreads, 180/380 CST viscosity and time spreads. Platts will consider incremental price changes made to spreads up to 16:30:00 local Singapore time.

Initial outright swaps bids and offers (eg. December paper) must be submitted no later than 16:20:00 local Singapore time. Platts will consider incremental price changes made to outright swaps positions up to 16:30:00 local Singapore time.

EUROPE

In Europe, all assessments reflect transactable values at 1630:00 London time. Participants may register an interest to trade swaps via Platts Global Alert page 5 or page 3 and if so, the information must be communicated no later than 16.15:00 London time.

Once a buyer or seller submits a bid or offer they may only raise or reduce their bid/offer on a incremental basis by $1/mt at a time to allow the market time to digest such values. Platts may amend these increments in periods of extreme volatility. Bids or offers are frozen after 16.28:00 London time, at which time no further fresh bids or offers may be submitted. All bids and offers expire at 1630:00 London time. All these timings are subject to change following proper communication by Platts.

US

In the US, the swaps curve is also quoted on a MOC basis based on values predominating at the close of business, 1515:00 local New York time for both the US Atlantic and Gulf Coast markets. Participants may register an interest to trade swaps via Platts Global Alert page 400 and if so, this must be done by no later than 1500 New York time. West Coast markets reflect values as of 1730 New York time. But all the timing are in the process of being synchronized to 1515:00 local New York time.

GENERAL REPORTING PRINCIPLES APPLICABLE TO ALL DERIVATIVES MARKETS

- Assessments reflect the value of market on close
- Assessments are a reflection of deals and bid/offers and are subject to careful review
- Information will be cross checked to ensure data integrity.
- Transactions done after the assessment closing time will be disregarded.
- Bids/offers on swaps received by Platts after the published cut-off times will also be disregarded and not published.

- Illiquid markets may be assessed relative to more active benchmarks and will still reflect market on close values
- Platts only evaluates information from sources considered credible and creditworthy. Stringent checks are carried out on NWE market participants.
- Bids or offers that are firm and posted onto PGA pages 3, 5 or 190 will be taken into consideration and must be executable by the counterparty involved.
- In most markets, the front swap will be quoted throughout the calendar month prior to the rollover.
- Rollovers are on the first working day of the month, quarter or year, when the first assessed swap period advances to the following month quarter or year. Brent weekly Contract for Difference swaps (CFDs) roll on the Thursday of each week.
- Balance month swaps will be quoted, provided there is sufficient liquidity on all European markets until about the 15th of the month. After such time, bids and offers will continue to be posted on PGA, but the information may not be used for assessment purposes.

The daily swap assessments reflect actual business, and prominence is given to confirmed trades and indications when producing an assessment. Platts believes that every commodity has a tradable value, however, and endeavors to produce an assessment of the value at which a commodity could trade, even if for any given day it has not done so. These assessments are arrived at through considering bids and offers, from all participants, as well as indirectly from timing spreads and trading patterns in related markets.

Platts is committed to bring transparency to the market. Platts is completely independent of the market, and does not produce its assessments in alliance or partnership with any other participant in the market.

DISCLOSURE

What Platts subscribers do with the information provided is entirely at their own discretion, and Platts accepts no liability for the results of their use. Assessments are provided for information purposes, and should not be construed as a solicitation or offer to buy or sell any commodity, securities or related financial instruments.

BRIEF EXPLANATIONS

Month: A calendar monthly swap is quoted for the full month calendar month, i.e. from the first to the last business working day in the month then the monthly swap is rolled over. A balance monthly swap is quoted until around the 15th of each month, but this is only stored in the database in the Asia PFC oil series.

Quarter: The quarters are defined as calendar quarters, for example Q3 refers to July, August and September. The quarters roll 4 times a year on the first business days of January, April, July and October.

Years: The calendar yearly swaps are quoted a year ahead in most cases with the yearly swap rolling on the first business day of each year.

EUROPEAN MARKETS

CRUDE OIL

Crude swaps are traded on a 24 hour basis in London, Singapore and New York. Brent is generally regarded as the most actively traded followed by West Texas Intermediate, Dubai and Tapis. Crude swaps are traded as much as 10 years forward, but the most liquid markets are traded up to four years forward.

Brent dated-to-frontline swaps:

An active swaps market exists in trading the difference between Platts dated Brent assessments and the IPE front line (i.e. first month) futures contract. This market, known as dated to frontline, has been supplemented by the dated to BWAVE market, the latter being the difference between dated Brent and the daily trade-weighted Brent average reported by the IPE for their futures monthly contracts. BWAVE pricing is therefore for each future delivery month, not necessarily the front month, whereas frontline is for whichever delivery month is the front month during the swap period. Dated to frontline implies the differential between the daily Platts "Dated Brent" assessment for dated or physical cargoes, and the IPE settlement for the front-month IPE future for that day. Although a value can be attributed to this after each day's assessment/calculation, the value then has to be aggregated for the period over which the dated to frontline swap has been written. This is so that the two parties to the swap can exchange a cash settlement at each of the stated pricing points in the bilateral swap contract. To give an example, a Q3 Brent dated-to-frontline swap hedges the differential between the two values throughout the calendar quarter, i.e. throughout July, August and September. This quarter will therefore include front-month daily settlements during that calendar quarter from the August, September, October and November futures delivery months. The dated-to-frontline swaps are quoted 6 forward months, 6 forward quarters and 3 calendar years.

CFDs: (contract for differences) CFD's are a type of swap that trades the difference between Platts assessments for dated Brent and first month forward Brent, and can be used to manage the risk arising from differential price moves between the dated and forward market. The CFD swap is between the uncertain or "floating" price of the dated Brent differential and a certain or "fixed" differential price, usually Platts daily dated Brent crude assessment. In addition to dated Brent, CFD's are also used to price crudes which are sold at a differential to dated Brent.eg. Norwegian Ekofisk and Oseberg, Iranian Heavy and Russian Urals. CFD's are priced using averages of a particular week's worth of daily price assessments as quoted by Platts, usually for the next four weeks forward. Each trade is an exchange of a fixed for a floating risk in the dated to 21 day Brent differential.

Quality spreads: Crudes such as West Texas Intermediate and Dubai are often traded at a differential to Brent, and swaps may be written against the future value of the spread between these two grades. Thus swaps will be written on the Brent-WTI and Brent-Dubai spreads.

Timing spreads: Each of the market crudes above (Brent, Dubai, WTI and Tapis) has its own timing structure, depending on how accentuated the backwardation or contango is in each of the markets. This timing structure changes constantly, and a fairly active swaps market has developed around it. Swaps may be traded on a month against month basis, as well as quarter-against-quarter and less commonly, year against year.

WTI/Brent swaps :

WTI/Brent swaps are swaps contracts which hedge the differential between the two futures contracts in a swap form i.e. they are screen/screen swaps, and prices for these swaps are therefore considerably less volatile than the spreads which can equally be done between the two futures markets. The hedge is between the forward month's futures contract for each crude future during the stated period for the swap. During Q3 therefore the WTI/Brent swap will comprise settlements for both crude futures in the August, September, October and November delivery months (all of the months which come into play during the calendar third quarter). A WTI/Brent swap for calendar March will include settlements for both crude futures from the April and May delivery months during that calendar month. The WTI/Brent swaps are quoted for 4 calendar months, 6 forward quarters and 3 calendar years.

Dubai Inter-month swaps:

These are swaps written against the relative values of the two months forward calendar swaps for Dubai crude, and should not be confused with the cash spreads, which price at different levels. Dubai inter-month swaps are referred to as swap/swap, and as such reflect the differential between two calendar month swaps for Dubai swaps. Therefore, the price for a June/July swap is the differential between buying the June swaps and selling the July swaps, so when the two months swaps are in contango, the value will be negative. The Dubai swaps curve extends out 6 forward timing spreads.

Brent/Dubai EFS (Exchange of Futures for Swaps):

This enables holders of IPE Brent futures to exchange their Brent futures position for a forward month Dubai crude swap, similar to the Brent EFP (where parties convert a futures position into a Brent forward or "21-day"cargo). The difference here is that the IPE Brent position thus is converted into a Dubai monthly swap, plus they receive a premium for the quality spread. As Dubai is not an exchange-traded crude, unlike Brent or WTI it is possible to hear of April/March EFS, where April IPE is exchanged for March Dubai swaps, even though March Brent futures have expired by that point. The EFS is quoted for 2 calendar months forward.

Brent Frontline swaps

The Brent frontline swaps are calendar monthly swaps based on the ICE Brent futures contract (formerly the IPE). The swap is calculated by taking mean of the two futures months following the quoted swap contractual month.

Example

The September swap of $74.33/bbl is made up of 50% of October futures of $74.02/bbl and 50% of November futures at $74.64/bbl.

October Brent futures $74.02 * 0.5% = $37.01/bbl and the November futures at $74.64/bbl * 0.5% = $37.32/bbl. Add the two together to get the September Brent swap of $74.33/bbl.

This takes into account the roll between the first and second forward months around the 15th of each month. The Brent frontline swaps are quoted for 6 calendar months, 6 forward quarters and 3 calendar years.

PRODUCTS

The growth of the European product swaps market started as an alternative to basis risk trading, and the lack of actively traded future exchanges for particular products. Traders using crude as a basis for hedging product differentials often suffered huge losses. The case of volatile jet fuel prices during the Gulf War, and the breakup of the former Soviet Union contributed to the growing popularity of product swaps. European product swaps are often settled against the monthly average of oil products assessments published in the daily publication Platts European Marketscan.

Light ends:

Gasoline: The underlying physical basis for the gasoline swap in Europe is the 10ppm Rotterdam barge assessment as quoted in the European marketscan. It is estimated that around 300,000mt of gasoline paper or swaps is traded on a daily basis with refiners and banks the largest players. The current gasoline swaps curve is quoted four forward months and four forward quarters on a daily basis. The average clip size for a gasoline barge swap is around 1,000-20,000mt.

Gasoline crack swaps are a differential swap to Brent and quoted in $/bbl. Like the swaps, the crack spreads are quoted four months and four quarters ahead.

Naphtha: The underlying physical basis for the naphtha CIF Northwest European cargo swap is the CIF cargoes as quoted in Platts European Marketscan. Naphtha swaps typically trade up to 1 year forward with each trade typically being 5,000 to 20,000mt. The naphtha swap curve is quoted four forward months and four forward quarters on a daily basis.

Naphtha crack swaps are a differential swap to Brent and quoted in $/bbl. Like the outright naphtha swaps, the crack spreads are quoted four months and four quarters ahead.

Middle distillates:

The middle distillate swaps complex is made up of two elements; ICE gasoil futures and the product spread (gasoil, diesel, or Jet fuel) differential to the gasoil. To calculate flat price swaps, take the product differential and add it to the combined ICE gasoil futures or frontline swap (giving you a calendar month for both the swap and the gasoil future).

Example - Gasoil barge swaps for September

September gasoil frontline $650/mt, September gasoil barges at $-4.50 = $645.50/mt.

Jet fuel: Jet swaps trade at a differential to the IPE gasoil contract and are priced off the Platts CIF NWE cargo quotations as published in the European marketscan. The Jet swap is denominated in $/mt. The forward curve is quoted for 4 forward months, 4 forward quarters and 3 calendar years.

Diesel: There are two grades of diesel swaps to reflect the changing specifications across many European countries. 50ppm sulfur diesel came into effect by 2005 with several countries having implemented the changes before that.

The 50ppm CIF NWE swap is a differential swap to the underlying gasoil future and is quoted in $/mt. The swap is priced against the Platts CIF NWE 50ppm cargo quotation as published in the European marketscan. The forward curve is quoted for 6 forward months and 4 forward quarters.

To reflect the change to low sulfur specifications across much of Europe, the 10ppm barge swap became more heavily traded. The European Union has stipulated that sulfur free diesel fuels must be available from 2005 with the full introduction being mandatory in 2009. Several countries such as Germany, Benelux and the Netherlands have already switched to 10ppm diesel and this has helped to boost liquidity on the 10ppm barge quotes. The 10ppm diesel swap is priced against Platts 10ppm diesel barge assessment as published in the European marketscan. The forward curve is quoted 6 forward months and 4 forward quarters.

Gasoil: There are a number of different location swaps for gasoil including barges and cargoes in northwest Europe. Platts assesses cargo swaps in the Mediterranean to recognize the increasing number of exports coming out of the Black Sea ports. The barge swap in the Antwerp/Rotterdam/Amsterdam market is priced against the Platts ARA barge assessment as published in the European marketscan, the 0.2 CIF swap against the Platts 0.2 CIF NWE cargo assessment and the Mediterranean against the 0.2 fob Med cargo assessment.

The gasoil barge forward curve is quoted 4 forward months and 4 forward quarters, the cargoes for 6 forward months and 4 forward quarters and the Med cargoes for 4 forward months and 4 forward quarters.

Gasoil frontline swap

These are calendar monthly gasoil swaps based on the ICE gasoil futures contract (formerly the IPE gasoil futures). The swaps are calculated by adjusting the value for the proportion of days that each futures contracts trades as the front month (For example, in calendar May, approximately 33% will the May gasoil futures contract and 66% will be the June month contract. The gasoil frontline swaps are quoted 6 forward months, 6 forward quarters and 1 calendar year.

A September gasoil frontline swap of $655/mt takes 33.333% of September ICE gasoil futures ($649.50/mt) and 66.666% of October ICE gasoil futures (657.50/mt).

September gasoil futures 649.50 * 0.3333% = 216.47mt and October futures 657.50/mt * 0.6666 = 438.29/mt. Add the two together to get the September gasoil swap.

The caculation takes into account the gasoil futures expiry on or around the 10th of each month.

N.B From 2008, the ICE will be changing the basis for its gasoil futures contract to reflect the lower sulfur levels. As a result, the basis will change from 0.2%, the current level, to 0.1% from January 2008.

Heavy ends:

Fuel Oil: High sulfur 3.5 pct swaps are used for hedging bunker (ship fuel) supply and demand. The 3.5 pct ARA barge swaps and 3.5% Mediterranean cargo swaps price on Platts FOB Rotterdam barge and FOB MED cargo quotations. The 1 PCT swaps are actively traded as a hedging tool against the strong European utility demand, and are priced off the Platts FOB NWE Cargo quotations. The 1 PCT barge swaps are also actively traded as a hedging tool against strong utility demand, but tends to be dominated by the inland European refiners. The swaps are priced against the 1 PCT Platts FOB ARA barge swaps.

All of the forward curves for fuel oil are quoted 4 forward months, 4 forward quarters and 1 calendar year.

US MARKETS

CRUDE OIL

WTI-Brent swaps: Used to measure the possible arbitrage of North Sea crude to the US, these swaps compare the two largest benchmark crude prices. The WTI-Brent swaps settle against the difference between front-line NYMEX WTI and ICE Brent futures over a calendar period. Platts assesses first 6 months, first 6 quarters and first 3 years.

WTI Frontline Swaps: These swaps reflect the daily value of frontline NYMEX WTI futures contract over a specified calendar period. Platts assesses first 6 months, first 6 quarters and first 3 years.

Light Ends: Gulf Coast conventional 87 grade differential swaps are used to hedge US refiner production and supplier purchases for shipment up the Colonial Pipeline to the US northeast. West Coast CARBOB unleaded differential swaps are used to hedge West Coast gasoline prices, which can swing widely away from NYMEX unleaded gasoline values due to quality, distance and shipping constraints. Both swaps are settled against the difference between Platts' physical assessments and the NYMEX front-month unleaded settlement price over a specified period. Gasoline swaps trading is moving to an RBOB basis as the previously-dominant RFG contract on the NYMEX is phased out. Platts assessments reflected this change beginning in June 2006. The curve extends to four forward months and four forward quarters.

Distillate: Gulf Coast No. 2 oil differential swaps settle against the difference between Platts USGC heating oil physical pipeline assessment and the front-month NYMEX heating oil contract during a specified period. Gulf Coast, Atlantic Coast and West Coast jet swaps settle against the difference between Platts jet 54 physical assessments in those regions and the front-month NYMEX heating oil contract during a specified period. Platts also publishes fixed-price equivalents for the distillate differential swaps. The curve extends to four forward months and four forward quarters. Gulf Coast Ultra-Low Sulfur Diesel swaps settle against the difference between Platts Gulf Coast ULSD physical pipeline assessment and the front-month NYMEX heating oil contract during a specified period.

Heavy ends:

Fuel Oil: High sulfur 3.0% flat price swaps in the US Gulf Coast are often used for hedging utility grade fuel exported to Central America and Mexico, as well as to Singapore when the arbitrage is open. As the most liquid HSFO swaps market in the region, it is also used to hedge bunker resupply in the Houston and New Orleans markets. Low sulfur 1.0% flat price swaps are used to hedge utility grade low sulfur fuel imported from Latin America and Europe. Swaps on other grades, such as 0.3%S high-pour, 0.7%S and 2.2%S, are much less liquid, and tend to trade at a differential to the 1%S swaps. The USGC 3% swaps settle against the Platts 3%S physical barge assessment FOB US Gulf Coast. The USAC 1%S swaps settle against the Platts USAC 1%S CIF cargo physical assessment. The forward curves are quoted 4 forward months, 4 forward quarters.

ASIA-PACIFIC

CRUDE OIL

Tapis swaps: The Tapis swaps market is sometimes used to hedge physical Tapis cargoes and other regional light grades that are priced against the APPI index. The Tapis paper assessment reflects a minimum of 50,000 barrels paper transactions. The forward curves are quoted 3 forward months and 4 forward quarters.

Dubai swaps: The Dubai swaps market is often used to hedge Dubai physical cargoes and are settled against the Platts Spot Crude assessments as published in the Platts Crude Oil Marketwire. The Dubai paper assessment reflects a minimum of 50,000 barrels paper transactions. The forward curves are quoted 3 forward months, 6 forward quarters and 2 calendar years out.

Brent-Dubai swaps: Swaps contracts which hedge the differential between the two contracts in a swap form and is settled against the spread between benchmark North Sea light sweet crude with the sour crude benchmark. The West Africa-Asia and North Sea-Asia arbitrage opens (for spot volumes above the typical Asian base load requirement) for sweet crudes when Brent worsens against Dubai. Platts assesses first 3 months and first 4 quarters.

Tapis-Brent swaps: Tapis is a Malaysian crude oil and a light sweet benchmark in Asia-Pacific although production has been declining over the past few years. This spread is settled against the differential between Tapis and Brent swaps and is often used by refiners as a hedge for Atlantic basin crudes from Nigeria or the North Sea. The forward curve extends to 3 months and 4 quarters.

PRODUCTS

Distillates: Singapore 0.5% sulfur gasoil and jet swaps settle against the FOB Singapore 0.5% sulfur gasoil and Singapore jet/kerosene assessments as published in the Platts Asia-Pacific/Arab Gulf Marketscan. Both products typically trade in 5-10 cents/barrel increments. The Singapore gasoil and jet paper assessment reflects a minimum of 50,000 barrels paper transactions. The forward curves are quoted 4 forward months and 3 forward quarters.

Naphtha swaps: Naphtha swaps are hedged settled against the FOB Singapore naphtha assessments as published in the Platts Asia-Pacific/Arab Gulf Marketscan. Naphtha swaps typically trade in 5 cents/barrel increments. The Singapore naphtha paper assessment reflects a minimum of 50,000 barrels paper transactions. The forward curves are quoted 3 forward months and 3 forward quarters.

Fuel oil swaps: High sulfur 180 centistokes fuel oil swaps are hedged against the FOB Singapore 180 CST fuel oil assessments as published in the Platts Asia-Pacific/Arab Gulf Marketscan. 180 CST fuel oil swaps typically trade in 25 cents/barrel increments. The forward curves are quoted 4 forward months and 3 forward quarters.

CRACK SPREADS

PFC oil quotes a series of crack spreads relative to the major Asian crude benchmarks. These are calendar monthly crack spreads which are swap-swap markets. We quote the following forward curves

Dubai-Naphtha
Dubai-Gasoil
Dubai-Kero

Tapis-Naphtha
Tapis-Gasoil
Tapis-Kero

All of these forward curves are quoted for 3 forward months and 3 forward quarters

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