

## Oil Price Benchmarks in International Trade

### MIKE DAVIS on Benchmark Pricing: a Co-dependent Matrix

#### The Background to Oil Pricing

Crude oil is not a homogenous commodity. Over 500 distinct global crude pricing hubs have been identified, but this large and varied group of crude grades relies heavily on just a handful of markers within them, on which the global crude price system is anchored. These marker grades, in order of global usage, include Brent, Dubai and WTI.

Brent crude is the world's most commonly used international crude oil benchmark, and is generally accepted as and referred to as the reference price for between 65 and 70 percent of international physical trade, regularly by Platts, the largest global oil Price Reporting Agency (Figure 1).

#### Crude Spread Trading and Price Relationships

Within the handful of markers, a degree of price hierarchy exists, with Dubai for

example (which is most heavily traded on an inter-month or quality spread basis) leaning on Brent with its widely traded and highly liquid derivative structure. Dubai also leans on Brent as a highly reactive price for global signals and therefore as a key flat price guide, at least at the front of its forward price curve.

Thus, Asian refiners may use the Brent/Dubai spread to establish the relative costs and yields for globally available (i.e. seaborne) light sweet versus medium sour (Arab Gulf) crudes, and perhaps also assess the relative pricing power of complex and hydro-skimmed refineries in those terms.

Another spread example is that of WTI/Brent, with WTI recently discounted to Brent (approaching \$30/b on occasions during 2011), and also to other US Gulf and international grades, both light and heavy, including LLS, Mars, ASCI, and Dubai. The WTI/Brent geographical spread was previously a

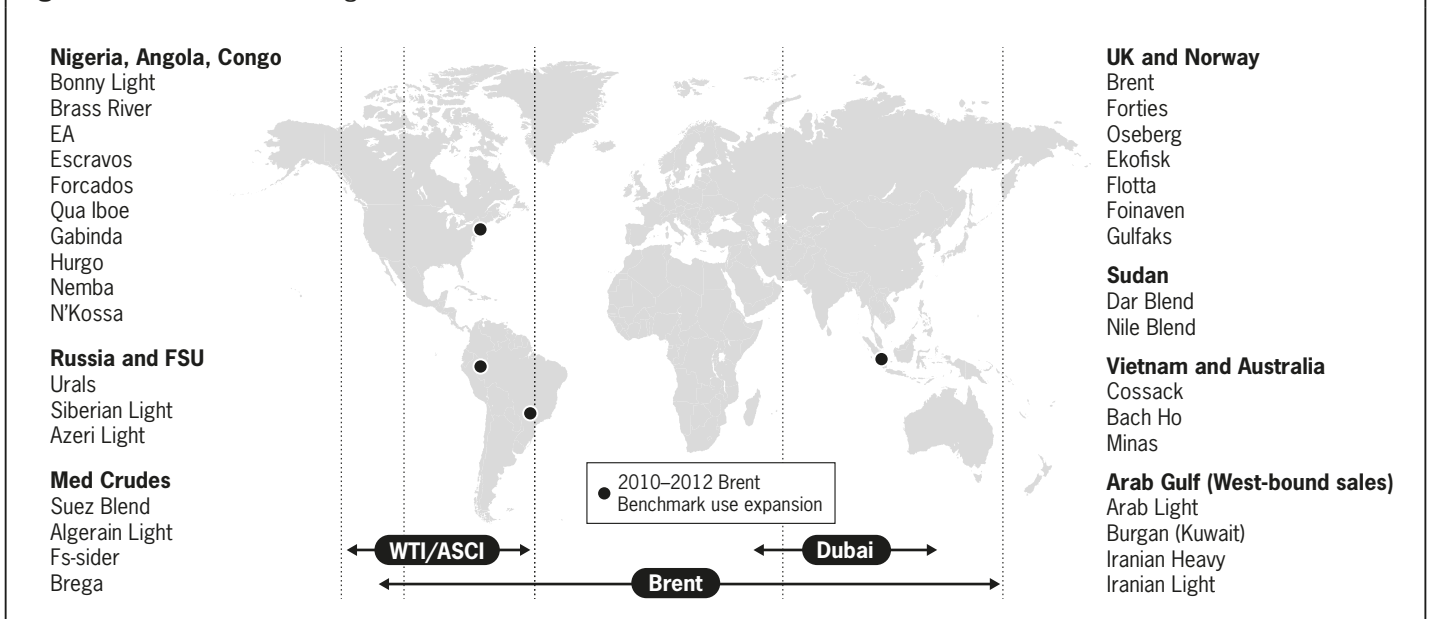
function of the inward freight differential of a few dollars from that of WTI, when Brent-referenced crudes from the eastern Atlantic seaboard readily moved across the Atlantic to meet seemingly ever-growing US gasoline demand. Nowadays, the spread mostly describes the cost of transporting WTI from its storage locations in PADD II southwards towards the primary refining centre of the Gulf of Mexico, against the prevailing direction of US pipeline capacity.

Within each of these price streams, trading flows up and down the various forward price curves, and of course across them to test relative values in 'box' trade. Each change in one area of the microstructure creates the possibility of change in another part of the same or a related price curve.

#### Types of Benchmark and Instruments

Any benchmark invariably contains a range of potential instruments, some

Figure 1: Brent Related Pricing Worldwide



of which may even serve as alternative benchmarks in their own right. There is much discussion over the relative parts of price streams within, as well as the merits of the overarching benchmarks themselves. In terms of Brent, for example, we can point to spot physical (Dated Brent), Cash BFOE (Forward physical Brent-Forties-Oseberg-Ekofisk cargo contracts), ICE Brent futures, and so on. Some may say that Dated Brent is the ‘benchmark’, and choose to assess it from that point onward independently of the rest of its related structure.

### The Brent Benchmark Structure as a Matrix of Co-dependent Pricing

The short answer to the question about which part of the complex is the benchmark is to say that in a sense all parts are and none are, at least singly or separately. Dated Brent and ICE Brent are both favoured as global reference prices across multiple continents, whilst Cash or Forward (BFOE) Brent is both the immediate underlier for the ICE Brent futures contract, and the parent of Dated Brent until it acquires a vessel, loading dates and cargo number. Brent weekly or monthly CFDs, inter-month spreads (in futures, cash and swaps), EFPs (Exchange of Futures for Physical), the Dated to Frontline swap, ICE Brent First line swaps and so on, are more examples of instruments used to explore spread values

and add up to a price matrix of real power, utility and robustness in establishing value for the core markers in Brent (Figure 2).

Collectively they are ‘the benchmark’, wherein genuine and diversified market depth and robustness lies. The structure has the liquidity to support the generation of a long forward curve for outright prices and to test all the relevant spread relationships that support pricing, hedging and trading. No other benchmark has so many related spread instruments capable of testing value across time, quality or geography.

### Examples of Benchmark and Relative/spread Pricing

Brent is unique in retaining both a forward physical and genuine spot market in parallel with an active futures contract. In contrast, other crude markets have either not evolved into an exchange-based contract, or have seen their forward physical markets replaced by a derivative paper variant. The importance of Brent CFDs (Contracts for Difference, a swap which prices the differential between individual weeks or months of Dated Brent cargo assessments against Cash forward cargo months) for physical price assessments, and hedging between forwards and the prompt spot physical, or ‘Dated’ Brent, is also highly significant.

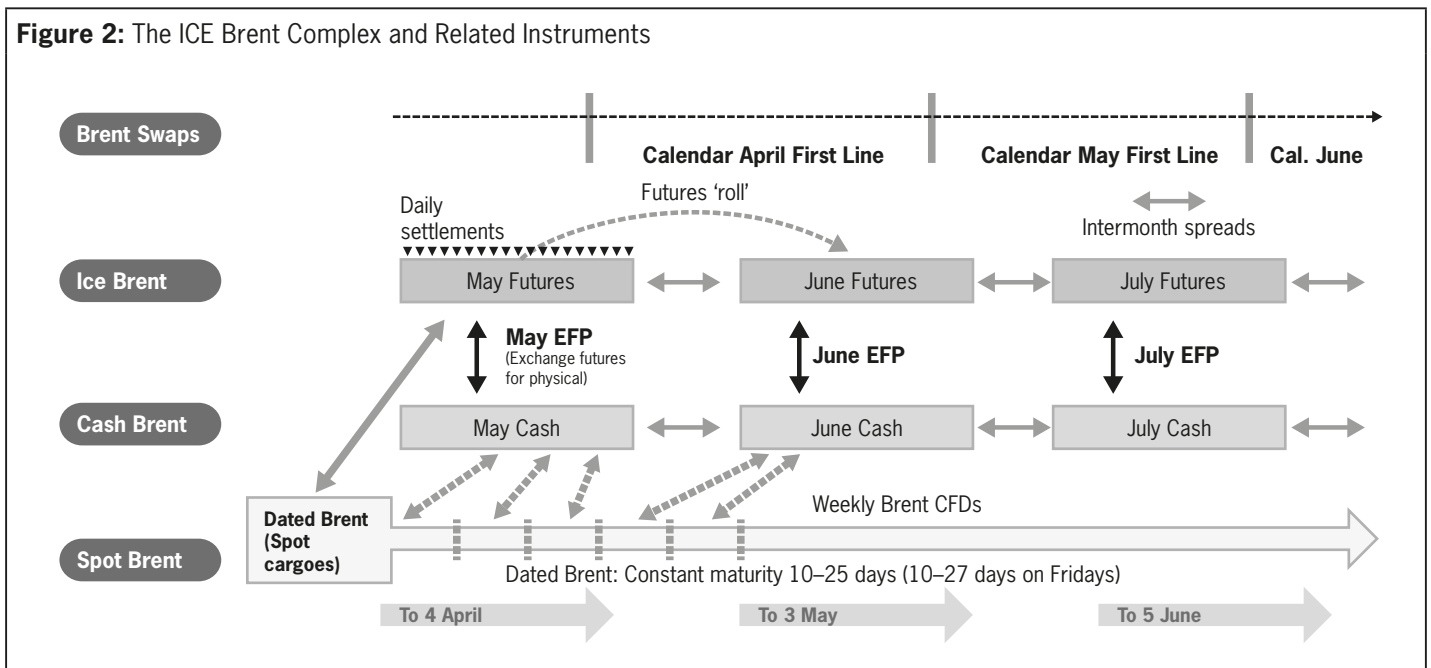
Platts for example, uses Brent CFDs and Dated cargoes and partials in the alternative, to establish value at different

points in its physical assessment window (currently 10–25 days forward) for Dated Brent.

Price assessors often recognise this co-dependency in trading and hedging related crude instruments. Assessed physical forward or spot physical assessments encompass references in price terms to paper markets such as swaps and futures as well as physical bids, offers and trades. They also frequently use a matrix of related prices between flat price and spread physical and swaps such as CFDs. This is common across crude and physical product published assessments. Platts, the North Sea assessor uses both a mean in chronological terms (lifting dates; for example for dates 10–25 days forward) and across paper and physical. Each day’s value in a ‘window’ of lifting or delivery points seeing either physical, or derivative, or both, is used to calculate the value within their relevant term structure. The range of values around the middle day of that ‘window’ is used to derive the eventual price designed to reflect an exact point in time, for example 16.30 GMT London time for European refined products and crude markets.

The final assessed ‘price’ is therefore the result of many related prices, both ‘physical’ and ‘derivative’, indicative or traded. In a market where very few nodes of that complex structure will have the kind of liquidity that one sees in modern on-screen futures markets, this is highly

Figure 2: The ICE Brent Complex and Related Instruments



desirable, rational, and reflects the way that value is tested by the traders in spot physical markets.

## The Price Mechanism and Futures' increasing Contribution to Price Discovery

Exchange-listed futures are seeing an enhanced role in price discovery, as well as for risk measurement.

In a highly interconnected, data-driven world, they can give an instant response in magnitude and in time to any change in global fundamentals. The on-screen WTI/Brent spread tells you for how long the market is discounting certain potential outcomes in aggregate, pipeline builds and capacity, alternative potential outflows of Canadian crude, or the potential for even more storage in Cushing, Oklahoma. Traders may not want to wait until later in the Singapore, London or US afternoon to see what values physical prices will proclaim in terms of a reaction to global macro breaking news. Physical prices, when expressed or observable, of course discount any impacts at the same speed as futures, but the visible transmission of price is inevitably slower and more fragmented, compared with the speed and wide reaching access of on-screen futures markets. This is not to dismiss the physical, it is to recognise the characteristics and value of each market, which are co-dependent and correlated.

Futures contracts are often described as a price discovery tool, but a derivative one. Although true, because at final settlement the price is derived from the physical product, however, in the years running up to that point, and for 99 percent+ of volume, there is also genuine, real-time value in conveying an implied value of the physical market. Through spread trading, the value architecture can be tested for the most developed benchmarks i.e. benchmarks with multiple instruments over time and instruments that encompass spot physical, forward physical, futures, swaps and options, and spreads between these. In this sense, no benchmark has a more developed and co-dependent pricing structure than Brent.

Brent has versions of all these different instruments, and different parts of its structure may provide the actual physical pricing reference (for example the BWAVE or ICE Brent Futures

Volume-Weighted Average price for Arab Gulf pricing into Europe), or alternatively, via spread trade, support and thus underpin the value used for a reference price from elsewhere in the structure, such as Dated or BFOE cash Brent.

## The Brent Exchange for Physical (EFP)

The EFP mechanism provides an electable delivery system, but in a practical sense one that simply operates at a different point in time from a directly physically delivered future, in crossing over from a 'paper' environment to a 'physical' one. In Brent the divide is between ICE Brent futures and its cash BFOE underlier, through the medium of the EFP mechanism.

A physically delivered contract creates a different outcome by default only. In practical terms, for either, if you buy the position back, you don't go to delivery.

For ICE Brent, if you want to go to delivery, you transact an additional instrument with a small premium/discount (an EFP) and your futures position thus will become a physical one, rather than simply being cash-settled.

Effectively, both are elective mechanisms. In the majority of futures trading, whether cash settled or physically delivered contracts, the result is the same, and the quantity of volume that goes to cash-settlement or past that point to become physical is a small fraction of 1 percent of traded futures volume. It is a theoretical possibility that each lot traded could form part of a physical transaction that creates the convergence mechanism.

## Crude Price Drivers and International Matrix Pricing

Some crude commentaries seem to suggest that 'the' crude price is determined either independently of refined products or somehow determined top-down by macro events. In fact refined product prices determine the price that any refiner is prepared to pay for crude feedstock. Thus crude prices are driven by end-user demand for refined products, and in aggregate for crudes based on their yield, a function of refining, which is competitive, and then in turn the available quantity and supply of crude, a supply which is relatively inelastic. Crude prices at the margin, and when fundamentals begin to turn, just a few distressed cargoes looking

for a home can quickly deflate spreads and in turn the flat price.

In previous decades the most important product for refinery margins was that for US gasoline. That mantle has now passed to European distillate prices (like diesel and heating oil). These are the most consistently positive part of the barrel in global margin terms and what refiners are trying to make most of. Brent can command a higher price if it is available locally in Europe for higher distillate prices.

If a crude price is 'too high', relative to its given product yield over any period beyond the very short term, refinery run cuts will ensue, stocks build, spreads tend to weaken, and the flat price falls unless there is an arbitrage out of the region to one where alternative refining economics exist. Refined products are international, even when a given crude is not.

Physical crude prices are connected to prompt maturity derivatives at the front of the forward curve. There are numerous instruments such as EFPs (Exchange of Futures for Physical), weekly CFDs (Contracts for Difference) or DFLs (Brent Dated to Frontline swaps) that allow traders to observe or value the matrix of price relationships between physical and derivative markets and the ever-changing volatile evolution in prompt parts of the forward curve where supply and demand are relatively inelastic.

This connectivity between product and crude prices is just one more facet of the larger co-dependency of oil pricing. A major and valuable feature of this system, when infrastructure bottlenecks do not subvert the arbitrage process, is that any perceived distortion between these prices is subject to arbitrageable trade, which will always tend to mean-revert unsustainable price relationships in physical supply/demand terms as the direction of least resistance.

The analogy might be that of a flexible three-dimensional net of related prices, with a complex of co-dependent prices across the multiple instruments, in type, time, and geography, pulling upon one another, but with varying elasticities.

In conclusion, I believe that Brent has become a global benchmark in its various forms, delivering efficient, reliable and progressive price signals through the medium of a complex of interrelated physical and derivative, crude and product prices.

The physical Brent system would be of far less value and arguably incomplete without the reactivity to global macro adjustments, transparency and near 24/7 visibility of the ICE Brent on-screen futures market, let alone the value in such a liquid forward hedging tool. The latter would be of much less value without its related physical instruments and all the price spreads that establish relative values between those constituent parts. The futures and other derivative market instruments enable risk to be addressed in multiple forms.

The United States is now home to a number of crude benchmarks. WTI is a valued watchword for Wall Street, US

Mid-continental refiners and storage operators or users. LLS (Louisiana Light Sweet) was the reference price of choice for the emergency release of IEA crude stocks during Libya's extended supply outage, whilst ASCI (the Argus Sour Crude Index) is a key reference price for imports of sour crudes into the US Gulf.

Any US crude will likely suffer from a strong regional price bias until any mooted benchmark can flow to where the overwhelming majority of new global demand is coming from, i.e. in the East. Increasing US crude supply from formations such as Eagle Ford, and in North Dakota, allied to increasing Canadian

flow southwards are already backing out the previous huge flows of inward global seaborne crude imports which ensured that prices were ultimately set where supply and demand cleared, within the USA. Equally, exports from the Arab Gulf are declining as domestic consumption accelerates there, and the pull from Asia further east is undeniable.

These shifts in international pricing and oil flows are nearer their beginning than their end, and seaborne benchmarks like ICE Brent or Gasoil (for refined products) are best equipped to respond to such considerable upheavals and change in the international trading patterns of crude and products. ■