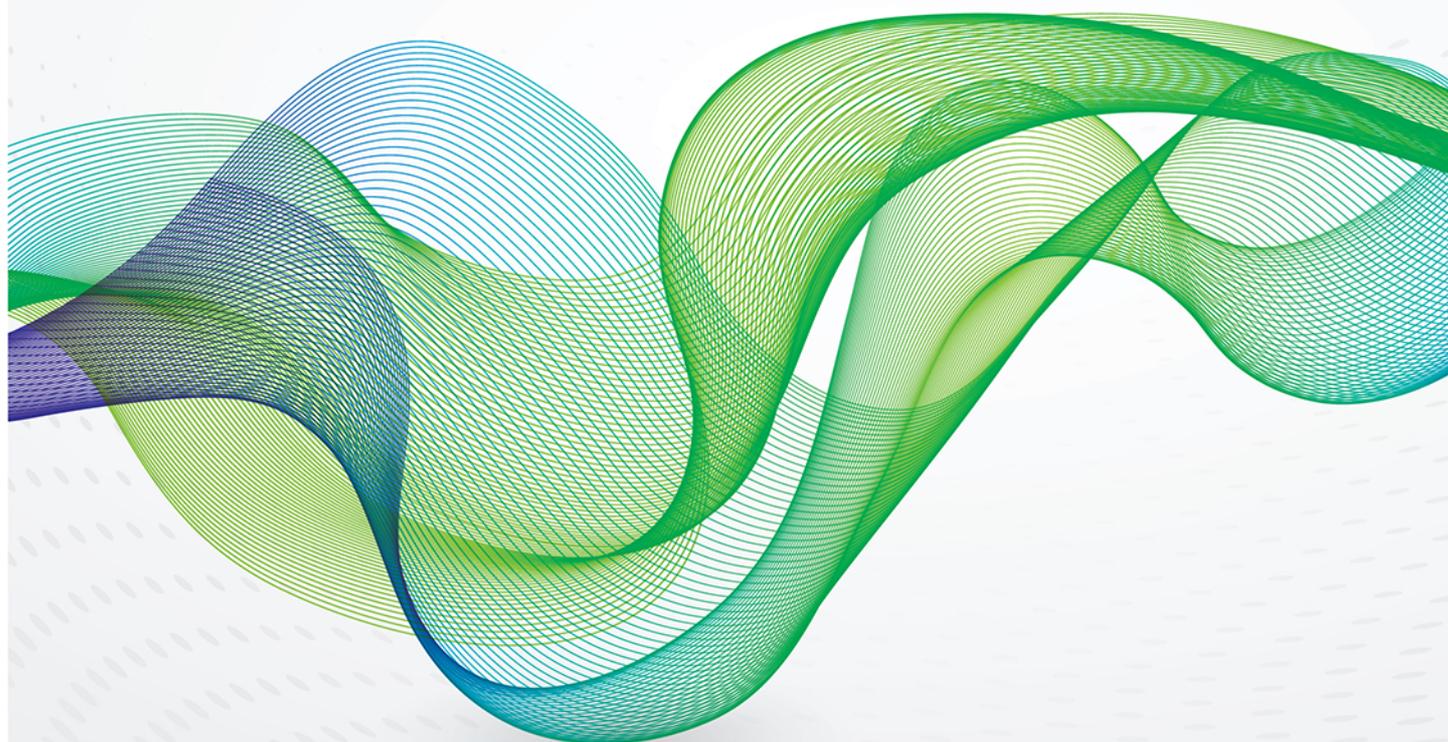




THE OXFORD  
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July 2020

# Yields vs. sulphur: What is driving crude benchmarks in 2020?





## Introduction

In 2019 the key topic in the international oil markets was “IMO 2020” – the impact of the approaching, stricter 0.5% cap on sulfur emissions in marine fuels. With a significant portion of global refined products demand moving to a much lower sulfur specification, it was clear to many that there would be a stark impact on the spread between higher sulfur, sour crudes and lower sulfur, sweet grades. Forecasters started what seemed like a running battle on who could provide a more dramatic outlook on the benchmark Brent-Dubai spread, which was seen as a measure of the sweet-sour spread. In the extreme, there was talk of a \$10/b premium for sweet crudes as measured by the Brent/Dubai spread, compared with a typical average of around \$2/b<sup>1</sup>.

A year later the debate has shifted dramatically. Instead, some analysts now argue that sweet barrels, far from pricing at a premium to Dubai and Oman, are in fact now depressing medium sour crude benchmarks<sup>2</sup>. Sulfur is out, and gasoline is in, as the supposed driver of crude oil relationships. The widespread and completely unforeseen impact of a global pandemic on demand for road fuels has been most clearly seen through a stark decline in gasoline prices. So, the hypothesis seems to be, no longer should the market focus on the sweet-sour spread, but instead the core question has become light versus heavy – or the spread between crudes that produce a lot of gasoline, and those that produce more diesel or other heavier products. In the ‘new normal’, sulfur is suddenly irrelevant, and benchmarks should be constructed to a particular yield instead.

The core question for crude benchmarks is really what a crude benchmark should represent, particularly the Asian crude benchmarks, Dubai and Oman. Should they be based on a defined yield, or the broad, traditional definitions that have been foundational to spot trading and term contracts sulfur and gravity?

To attempt an answer to this question we will start with benchmark definitions and a historical review of the Middle East crude benchmarks, and the crudes they represent. We will consider changes made over the decades, and their impact on the benchmarks. We will also review the core relationships between global crude benchmarks and exchange-traded contracts, including the latest addition to the field, China’s INE crude oil futures contract. We will consider the relationship between refinery values and spot crude prices. And finally we will provide a synthesis of these areas and some tentative conclusions.

## Benchmark definitions

First it is necessary to define terms, and to consider some general points, that together provide the framework for any discussion of benchmarks.

The word ‘benchmark’ is fairly loosely-employed by a range of commentators. In recent years, and particularly since the birth of ‘benchmark regulation’<sup>3</sup>, the word has commonly come to refer to a published value used for the financial settlement of derivative contracts, typically over a defined calendar period, though also for shorter tenors. This is the spirit of the internationally-agreed IOSCO principles<sup>4</sup>, which created a framework for considering the health of such benchmarks, with particular reference to transparency and process, and notably little focus on fundamental physical structure. A

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<sup>1</sup> Imsirovic, A. and B. Pryor (2018), ‘IMO 2020 and the Brent-Dubai Spread’, Oxford Energy Comment, Oxford: Oxford Institute for Energy Studies, though firm forecasts were around \$5/b, including Goldman Sachs Commodities Research (2018), IMO 2020:Challenging but Solvable.

<sup>2</sup> Mehdi, A. (2020), ‘Middle East Benchmark Pricing and the Oil Crisis’, Oxford Energy Comment, Oxford: Oxford Institute for Energy Studies.

<sup>3</sup> To date there are relatively limited example of legislative regulation of commodity markets, including US FERC regulation of gas and power indices, and Europe’s 2016 benchmark regulation that covers a wide range of commodities.

<sup>4</sup> Principles for Oil Price Reporting Agencies, The International Organization of Securities Commissions, October 2012; Principles for Financial Benchmarks, IOSCO, July 2013. Both of these documents lay out voluntary measures for benchmarks used in derivative contracts, with the former focused on oil price reporting agencies. They are not binding on any benchmark provider.



successful financial benchmark functions both as a hedging tool and as a financial trading instrument in its own right. It will be measured by its success for price risk management, as well as its liquidity and depth which is derived from a wide user base and application.

A definition of benchmark with more heritage in the physical commodity markets, and more relevant to the current discussion, is that it is a value used for the price settlement of a bilateral contract, particularly physical supply contracts. Benchmarks under this definition have far more varied tenors of use, whether by calendar period or relative to logistical events such as the moment of loading or discharge. A physical benchmark exists primarily to provide not a hedge against a price movement, but to ensure the market price is directly and appropriately reflected in a physical supply or offtake contract. Buyer and seller agree to use such a published value to reduce procurement and marketing costs by having a consistent link between the commodity exchanged and its current value. A physical benchmark therefore needs to be measured by its success in representing physical market economics – the broad-based value of the physical commodity bought and sold.

For the purposes of the current debate, we will consider the latter definition and measure of success for a benchmark: does the benchmark reflect broad and appropriate physical market economics? Specifically, given the focus of this paper, we will be looking at the economics of the buyers and sellers in the Middle East crude space. For producers, we will therefore look at competing crudes and market share. For refiners, we will look at refinery economics, based on cracking yields.

Both of these are slightly more complex considerations than a standard rational choice approach to a one-off exchange. Under a simple model of the latter, a seller should always prefer a higher price, a buyer a lower one, and the market clears where their utility curves meet. In the current focus, the transactions take place repeatedly over time, and therefore total utility over time is preferred. A seller recognizes that a higher price at a particular point in time might reduce their overall sales over time through a reduction in market share, and therefore ultimately reduce total income. A buyer seeks access to the most profitable crudes, but also those that provide the most consistent profits over time, and hence has a concern for reliability and consistency. Long-term stability trumps short-term gain for both sides.

A further point should be noted here. Aside from the direct use of benchmarks in contracts, particular benchmarks are often described as providing a broader market purpose in defining arbitrage economics, and therefore incentivizing balancing flows between market segments. These can include geographic as well as quality segments. The spread between the Dubai and Brent complexes serves exactly this purpose<sup>5</sup>. This is undoubtedly a key driver in the market, and it will be a focus of analysis in this paper. It is important to note that it is the successful embeddedness of each benchmark, Brent and Dubai, individually in physical contracting, that has been driving liquidity in the Brent-Dubai spread. Nevertheless, we will consider whether alternative benchmarks could provide this outcome more efficiently.

## History of Middle East benchmarks

S&P Global Platts began assessing the price of Dubai crude oil in the early 1980s as a single grade, starting with a weekly assessment in 1980 and moving to a daily assessment in 1984<sup>6</sup>. At the time, Dubai crude was steadily growing after a series of new fields were discovered in the 1960s and 1970s, and reached a peak of above 400,000 b/d in 1991. With a gravity of 30.4 and sulfur at 2.13%, the crude was roughly middle of the road in terms of quality. It broadly reflected the characteristics of crude being produced in the region, and had the added advantage of being sold on a spot basis in the open market, in contrast to most Middle East crude that was (and generally still is) sold under long-term contracts, often with restrictions on resale and destination. Along with other Middle East crudes, Dubai crude oil

<sup>5</sup> Imsirovic, A. and B. Pryor (2018), IMO 2020 and the Brent-Dubai Spread, Oxford Energy Comment, Oxford: Oxford Institute for Energy Studies.

<sup>6</sup> [https://www.spglobal.com/platts/plattscontent/assets/files/en/symbol-directories/active-symbol-directories/petroleum\\_assmts\\_sym.xls](https://www.spglobal.com/platts/plattscontent/assets/files/en/symbol-directories/active-symbol-directories/petroleum_assmts_sym.xls) - timings of Platts assessment launches are sourced throughout from this document

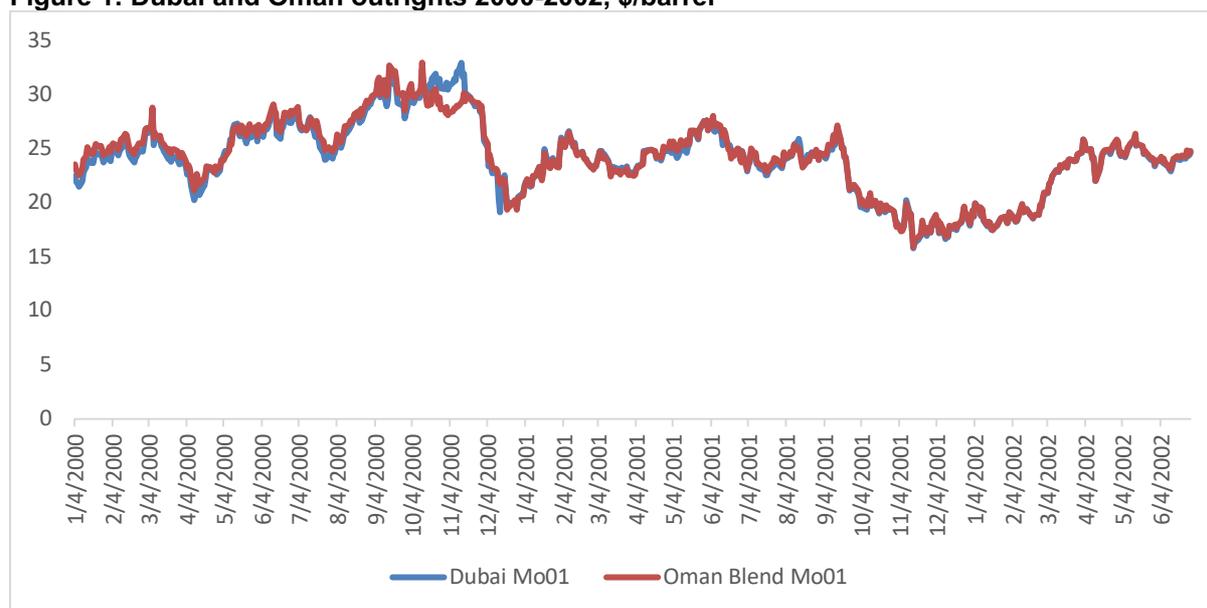
became a mainstay for Asia refiners, particularly those in Singapore, which in turn fed into the spot oil products market for South East Asia.

At a time when oil markets generally were opening up to spot physical pricing, and moving away from product netback pricing, the Dubai benchmark met the needs of both buyers and sellers. By the late 1990s, a Singapore refinery could buy a series of Middle East crudes, priced against Dubai, with confidence that the price would reflect an open market value, and that competing refiners in the region would be pricing similarly. They could sell products into the active Singapore spot market, and so the whole chain from producer to consumer functioned to connect prices paid to physical fundamentals.

Like any raw material from a specific source, all crudes follow a natural process of decline. As Dubai production dipped coming into the new millennium, new systems were required to ensure the benchmark still represented a consistent and broad spot value. It became apparent that the benchmark required more crude in order to persistently represent physical fundamentals, with fewer than 10 cargoes a month of Dubai trading in the open market. Without higher volumes of crude, there was a risk that a small group could control the one grade and potentially distort spot values. This is a core consideration around any raw material benchmark – that the underlying market starts to represent the unique fundamentals of just a single flow of oil, rather than the broader market of crudes that are priced against it. The smaller the flow and the smaller the group of participants, the greater also the risk of distortion.

Looking around for crude to bolster the benchmark, there was a relatively clear contender. Oman had a similar production history to Dubai, and Platts had begun weekly assessments of the grade in 1983, moving to daily in 1985. It was also of a similar quality, with an API of 30.5 and sulfur of 1.38%, notably of lower sulfur, or sweeter, compared with Dubai. And it was sold into the open market on a spot basis. The sulfur level of Oman typically meant that it was valued at a slight premium to Dubai. But at several points around the turn of the millennium, as the Dubai physical market shrank, the Dubai price rose above Oman (see Figure 1). At first sporadically, and then more dramatically. In October 2000, Dubai inverted with Oman, building a premium through to the month of more than a dollar a barrel. The following month, the premium grew further, finally reaching a peak of \$3.69/b on November 13, 2000. By this point, Dubai production had fallen to around 160 thousand b/d (kbd), compared with Oman at above 800 kbd. Active participants in the market were able to buy the entire Dubai monthly program through just 10 cargo purchases.

**Figure 1: Dubai and Oman outright 2000-2002, \$/barrel**



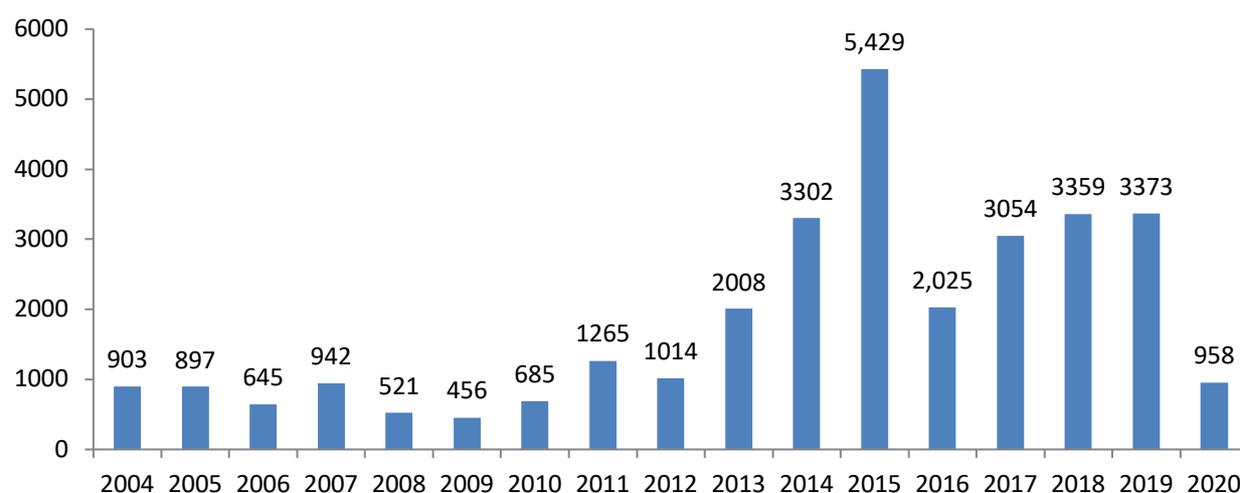
Source: S&P Global Platts

This demonstrated that the Dubai grade alone no longer represented sufficient volumes for a crude benchmark. As a direct result, in January 2002<sup>7</sup>, Platts incorporated Oman crude as an alternative for delivery to the Dubai benchmark. This approach mirrored what was happening in the North Sea, where in the same year Forties and Oseberg were added as alternative deliveries in the Brent complex.

The addition of Oman was seen at the time as relatively benign: the grade generally priced at a premium to Dubai due to lower sulfur, and at close to one million b/d of production, it provided ample supply to ensure consistent pricing. At the same time, there was a broader shift in the Asian crude market. Refiners across the region had been using a combination of benchmarks for crude, including Indonesia's Minas and Malaysia's Tapis crudes. These grades were in steady decline, and the benchmarks based on them started to falter. During the 2000s, benchmarking across Asia shifted gradually, with Dubai prevalent in contracts for heavier, sourer crudes, and the steady march of Dated Brent continuing in the global sweet complex. The decade also saw the rise of over-the-counter Dubai swaps, initially purely bilateral and often trading as spreads to the Brent complex through exchange of futures for swaps (EFS) instruments.

As exposure to Dubai grew, even the additional physical volume available through the alternative delivery mechanism was deemed insufficient to provide consistent transparency on value. Rather than adding more physical volume into the basket of Dubai and Oman, Platts instituted a system that had already proven itself in the North Sea – 'partial' contracts in February 2004<sup>8</sup>. This was a shift from contracts that represented a full cargo of crude oil (at the time of 475 thousand barrels (kb), later raised to 500kb<sup>9</sup>), to partial contracts that broke these lumps of liquidity into smaller parcels of 25 kb, creating the opportunity for more flat price transactions to shape the value of a full cargo of crude, and feed into benchmark pricing. Thus, instead of having visibility of just, say, 15 cargoes of crude oil through a trading month, a buyer and a seller in the spot market could trade 285 parcels through the same period, covering the same volume of physical oil – and with the potential for many buyers and sellers to bid and offer, the multiplier effect created a substantial and important surge in potential flat price trades, and observability of market value. If a single company traded 19 partials with another counterparty, then the seller would declare 'convergence' and the contracts would convert into a full cargo trade, priced at the average of the 19 individual partial trades. At the end of the month, any unconverted partial contracts would settle at the final Platts Dubai assessment of the month. This ensured that market participants had an incentive to demonstrate value right up until the end of the assessment period.

**Figure 2: Number of trades reported in the Platts Middle East MOC assessment process**



Source: S&P Global Platts

<sup>7</sup> Subscriber note: *Platts Dubai methodology*, Platts Global Alert, September 27, 2001

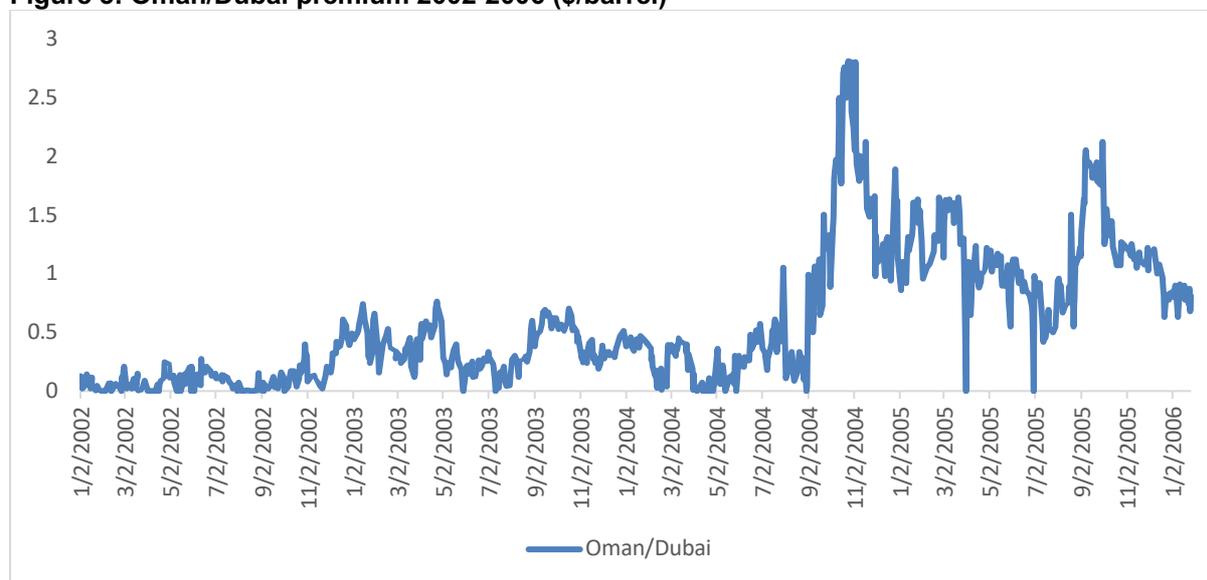
<sup>8</sup> Subscriber note: *Platts to begin assessing partial Dubai, Oman*, Platts Global Alert, January 12, 2004

<sup>9</sup> Subscriber note: *Platts Middle East crude cargo size update on Nov 1*, Platts Global Alert, October 2013

The change had an immediate effect, increasing the number of trades reported to Platts each day, and providing a more continuous flow of transparent information underlying the benchmark (see Figure 2). In 2004, a total of 903 partial trades were reported to Platts through the Market on Close process, representing around 22 million barrels of crude. Over the following few years, the system functioned well, and Dubai continued to grow in use as a benchmark. The volume of partials reported through the process remained relatively stable, and it took several years before these started to increase significantly.

While Oman had functioned well to cap Dubai as a benchmark in the most volatile periods, its premium to Dubai as a grade created a different challenge. At times, the premium was relatively low. During those periods, a seller that could easily access Oman would be happy to offer in the benchmark process, with knowledge that they could declare the grade against any convergences. But when the premium was stronger, the step up in value from Dubai to Oman meant that a seller would generally prefer to have Dubai available before selling in. This created a space for volatility, and the wider the Oman premium, the wider the space (see Figure 3). During 2004 the premium grew, rising above \$2/b by November, and remaining above a \$1/b throughout the following year.

**Figure 3: Oman/Dubai premium 2002-2006 (\$/barrel)**



Source: S&P Global Platts

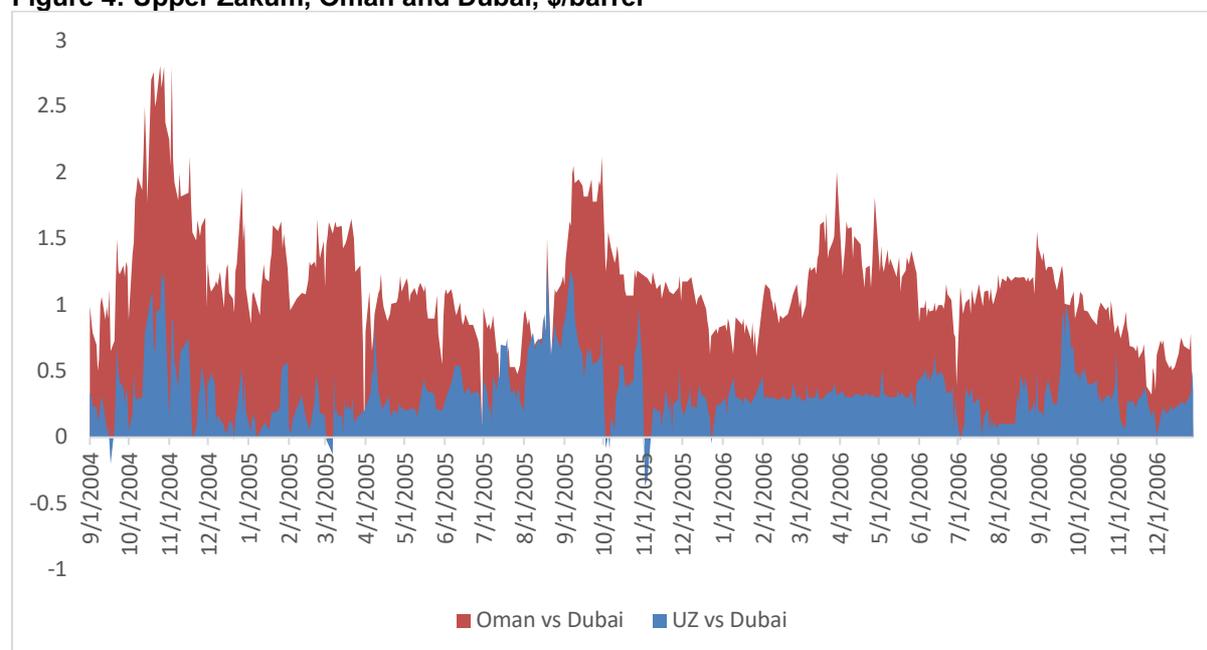
While Dubai as a benchmark remained protected from the potentially greater volatility of Dubai as a single stream of crude oil, the volatility space became a concern. Once again, there was a need for change in the underlying basis for the benchmark to ensure a more consistent representation of market fundamentals. This time, the focus was less on a grade that would cap the benchmark during shortages, and more on a grade that would provide a day-to-day match on value, and be a more readily delivered grade for alternative delivery.

The answer was in Abu Dhabi's Upper Zakum, introduced in February 2006<sup>10</sup> as the third grade in the Dubai basket. Upper Zakum had historically been sold purely through long-term contracts, and hence was less available in the spot market. It was only in 2004 that Platts started assessing the spot value of the grade, after a shift in marketing policy from the Abu Dhabi National Oil Co. (ADNOC) made it more accessible in the open market. Though it was lighter than both Oman and Dubai, with an API of around 33, it had a sulfur level closer to Dubai, at about 1.7%. It was typically valued between the two, and on the whole closer to Dubai (see Figure 4). Where Oman had a premium of about \$1/b to Dubai,

<sup>10</sup> *Platts Crude Oil Marketwire*, December 30, 2005

the Upper Zakum premium was largely below 50 cents. This reduced the volatility space around the benchmark, and ultimately produced a more stable benchmark. Upper Zakum production has been stable at around 650 kbd, below Oman, but well above where Dubai had reached by this time, at only just over 100 kbd.

**Figure 4: Upper Zakum, Oman and Dubai, \$/barrel**



Source: S&P Global Platts

For the best part of a decade following on from this, changes to the Dubai and Oman benchmarks were more incremental. The volume of oil reflected in Dubai, at well over 1.5 million b/d, was viewed as sufficient to ensure a stable, reflective physical benchmark. Middle East crude remained tied to this benchmark, and the associated derivatives continued to grow in volumes traded.

But the global market was going through significant changes during this time. The rise of Asian oil demand has been well-documented elsewhere. Its effect on benchmarks was not fully appreciated, however, until August 2015, when two Chinese majors, Chinaoil and Unipecc, publicly traded more than 40 million barrels of spot crude oil in a single month<sup>11</sup>. This dwarfed not just any previous month in Middle East spot trade, but any spot crude market, anywhere. And it pushed the limits of the crude oil reflected in Platts Dubai – almost all Dubai, Oman and Upper Zakum spot crude cargoes loading in October were either sold by Unipecc, or bought by Chinaoil<sup>12</sup>.

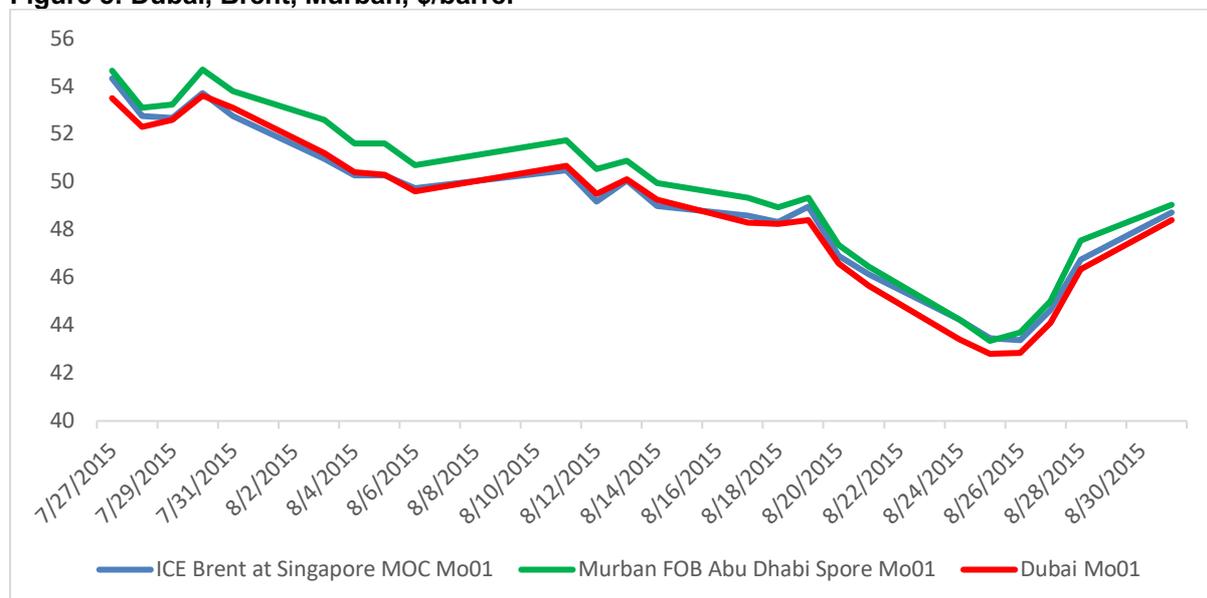
With so much of a commodity being traded, the key consideration was whether the benchmark would remain stable and representative for the market as a whole, reflecting regional crude supply economics, and end-user refining demand. During the whole month, the relationship of Dubai to regional crudes was volatile (see Figure 5). In the last week of July, Dubai was roughly \$1/b below Abu Dhabi's Murban, a lighter, sweeter crude. At the start of August, this discount increased to \$1.41/b, but moved steadily lower, reaching just 70 cents/b on August 14, and moving between these two poles over the remainder of the month. Perhaps more notably, Dubai was at an average 14-cent premium to ICE Brent futures during the first half of August, at a time when it was unusual for medium, sour crudes to be close in

<sup>11</sup> ASIA CRUDE MOC: Loading details for October-loading Dubai trades, Platts Global Alert, November 8, 2005

<sup>12</sup> Platts data show 78 cargoes were declared during the month -- 51 of those cargoes were Oman Blend, 24 were Upper Zakum crude and 3 were Dubai crude. According to Platts Analytics data monthly Oman production was about 55 cargoes, and Dubai about 3 cargoes in August 2015. Upper Zakum spot cargo availability was unknown at the time given that some volumes were released from destination restrictions on an ad hoc basis, though total production stood at about 40 cargoes.

value to lighter, sweeter barrels. Typically Dubai would be at a discount to Brent, reflecting the fact that the Middle East benchmark is a heavier, sourer grade. This discount returned in the second half of the month, despite the heavy trading, and was relatively stable at around 50 cents/b in the last few weeks of August.

**Figure 5: Dubai, Brent, Murban, \$/barrel**



Source: S&P Global Platts

Looking at end-user, refining economics, there was ample evidence of volatility as well. The Dubai cracking netback was at \$2.46/b above Dubai spot value at the start of August, but the spread widened out as far as \$3.39/b by the second half of the month, before falling back in at month-end.

The month of August proved, beyond a doubt, that 1.5 million b/d of oil was no longer a sufficient base for any Middle East crude oil benchmark. The ability of the new Chinese majors to trade such a volume was transparently demonstrated, and demanded further revision of the benchmark. The problem was not just one of volume, however. The issue was more nuanced. Within the Dubai basket, Dubai itself had dwindled to just a few cargoes a month of production. Upper Zakum was sizeable, and a solid core, though a portion of it was sold under restrictive contracts, leaving its availability in the open market somewhat lower than production levels. And while Oman was all freely traded, and relatively easily available, it had become the favoured grade of Chinese refiners, giants and independents alike, which have regularly demonstrated a willingness to pay a unique premium to get a hold of the grade. The broad consensus in the market was that Dubai needed not just the addition of more crude volumes, but also breadth of accessibility.

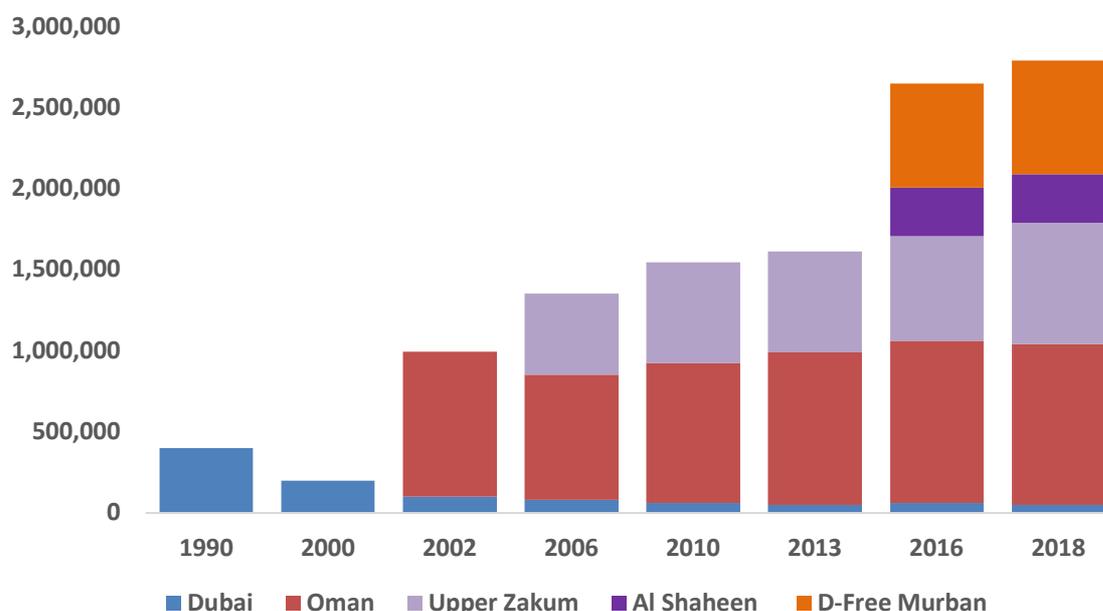
The solution that Platts arrived at was to add in two new grades for Dubai, and one new grade for Oman itself, to ensure that the volume of deliverable crude in the Oman benchmark would be well positioned to withstand demand surges, or indeed short-term production declines from maintenance<sup>13</sup>. One would meet the need to reflect a broad market. Qatar's Al Shaheen, though of modest production at 350 kbd, was available to a wide number of market participants in a monthly tender process, and was regularly delivered to a comprehensive range of refiners across Asia. It has a typical gravity of 28.1 and sulfur at 2.37% - though with a notably strong middle distillates cut. The second grade would meet the need for volume in both the Dubai and Oman benchmarks. Abu Dhabi's Murban had significant volume, at 1.6 million b/d. Murban is lighter and sweeter than most other Middle East crudes, with an API of 40.5 and

<sup>13</sup> SUBSCRIBER NOTE: Platts to include Al Shaheen, Murban in Mid East crude benchmarks, Platts Global Alert, November 18, 2015

sulfur at 0.79%. Eventually this necessitated the addition of a quality premium (QP) mechanism, by which sellers would be compensated for delivering Murban against Dubai convergences.

Both grades were added to the Dubai basket, and Murban was added to the newly created Oman basket, in January 2016. That year saw a decline in partials reported through the Platts Market on Close process, from 2015's 5,429 to a more modest 2,025. Most importantly, the additions meant that there was now comfortably more than 2.5 million b/d of freely tradeable crude oil reflected in the Dubai benchmark – a bigger benchmark, well positioned to serve global benchmarking needs, and the price referencing needs of the fast-growing Asian oil markets in particular (see Figure 6).

**Figure 6: Spot crude volumes reflected in the Dubai basket (b/d)**



Source: S&P Global Platts

The change cemented the idea that Platts Dubai was no longer focused on a single grade, but had become a benchmark brand, in the same way as Brent had done<sup>14</sup>. But if it no longer represented a particular crude, what did it represent? Often described as “the Middle East sour crude benchmark”, it was frequently used to represent the locational and qualitative differences in crude. Its spread to Brent, through the Brent/Dubai EFS, was used both as a measure of the sweet/sour spread<sup>15</sup> and for arbitrage economics between the Atlantic and Pacific basins. For it to function in this way, it had to continue to match the regional economics of Middle East crude, as well as the quality economics of sour crudes. On the whole, these two factors were synonymous. Most Middle East crude production is medium sour, and production is such a great portion of the global sour pie that it tends to be representative of the whole.

## The Dubai Mercantile Exchange

As Platts was shepherding the evolution of Dubai and Oman, others were considering alternative approaches to Middle East benchmarking. As derivatives against Dubai grew in liquidity, a group came together to build a new futures exchange, based in the Middle East, to provide a different approach.

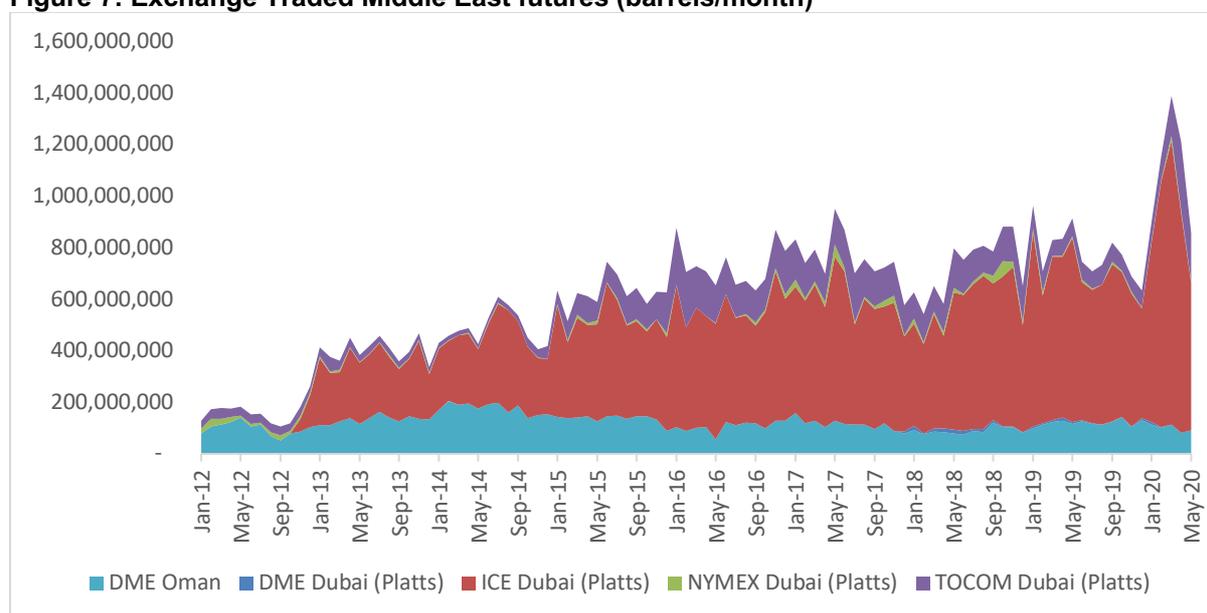
<sup>14</sup> Bassam Fattouh (2012), ‘The Dubai Benchmark and Its Role in the International Oil Pricing System’, Oxford Energy Comment, Oxford: Oxford Institute for Energy Studies.

<sup>15</sup> The addition of Murban added a sweet element to the Dubai leg of the spread, though it remained frequently referenced as reflecting sour crude – notably in the run up to IMO implementation.

There had been previous attempts to launch futures involving Middle East crude. But launching a new futures contract is far from simple. There are regulatory, financial and credit hurdles to be overcome. And there is the core question of settlement: how should the contract arrive at a final value.

The world's commodity futures contracts roughly fall into two groups, those that settle through physical delivery, and those that settle financially against a reference price tied into the physical market. The former includes the NYMEX WTI futures contract, the latter the ICE Brent futures contract. Dubai had derivatives starting off trading as over-the-counter bilateral swaps, which through the 2000s were increasingly cleared via exchanges, and ultimately became classed as futures in 2013<sup>16</sup> (see Figure 7). Through that whole period, the derivatives settled against the Platts Dubai benchmark assessment, meaning that the responsibility of ensuring the health of the underlying physical benchmark reference price lay with Platts.

**Figure 7: Exchange Traded Middle East futures (barrels/month)**



Source: Source: ICE, CME, DME, TOCOM

In 2007, a new venture was launched, the Dubai Mercantile Exchange (DME), to create a physically-settled derivative contract. The DME was created as a joint venture between Dubai Holding, Oman Investment Fund and CME Group. Over the years, others have taken equity stakes in the exchange, including Goldman Sachs, J.P. Morgan, Morgan Stanley, Shell, Vitol and Concord Energy. The specifications of the DME futures contract they launched - reflecting a 1,000 barrel lot of Oman crude for loading two calendar months forward for its most prompt trading month, for FOB loading at Mina Al Fahal -- have stayed largely unchanged over the past 10 years.

Since the contract was launched, there have been several signs of success, underpinned by a relatively steady growth in Oman production. Some measure of success seemed certain once Oman's Ministry of Oil and Gas agreed to set the Official Selling Price (OSP) of Oman crude export blend using the DME price at the start of the contract's life<sup>17</sup>. Oman remains the largest non-OPEC producer in the Middle East and the move to allow its crude to be freely traded on a futures exchange which allows physical delivery has led to the grade being one of the most actively traded of all Middle Eastern crudes. The

<sup>16</sup> *IntercontinentalExchange to Transition Cleared Energy Swaps to Futures in January 2013*, ICE, July 30, 2012 (<https://ir.theice.com/press/news-details/2012/IntercontinentalExchange-to-Transition-Cleared-Energy-Swaps-to-Futures-in-January-2013/default.aspx>). This change, broadly implemented across pre-existing cleared swaps among commodities exchanges, meant that many of these swaps, including Dubai, were reclassified as futures.

<sup>17</sup> *Oman implements Historic change to Pricing of Crude Oil*, Dubai Mercantile Exchange, November 14, 2006



OSP for Oman crude oil is the monthly average of the DME settlement price, with Dubai's OSP in turn set at a differential to the Oman OSP - this move by Dubai to shift its OSP to a differential to the Oman OSP came in 2009<sup>18</sup>. And in 2018, others finally followed suit, with Saudi Aramco moving its OSP for sales to customers in Asia from reflecting a differential to Platts Dubai and Platts Oman to the average of Platts Dubai and DME Oman<sup>19</sup>, followed by Bahrain and Kuwait in 2019. Iraq and Iran continue to use Platts Dubai and Platts Oman as the basis for their OSPs, and they were joined in doing so by Qatar in 2020<sup>20</sup> – and Abu Dhabi completed the picture by using Platts Dubai alone as the basis for OSPs from early 2020<sup>21</sup>, as the emirate continued work on its own aspirations to launch a Murban futures contract later in 2020.

Alongside the growth in DME Oman's use as a physical benchmark, liquidity in the futures contract has grown. The front-month contract has risen from an average of around 455 front-month contracts trading each day in 2008 to breach 1000 lots a day in 2010, and 5,000 lots in 2017. But since that time, volume has been largely static, with a daily average of around 5,000 lots throughout the last few years.

The contract benefits from the adjacent, highly liquid Dubai futures market, which provides a liquid forward curve and removes the necessity of hedging Oman itself well in advance. An entity can hedge through Dubai futures up until the settlement month approaches, and then exchange the Dubai position for a DME Oman position. This has been further facilitated by DME's launch of Dubai derivatives, settling against Platts Dubai, similar to Dubai futures contracts operated by ICE, Tocom of Japan and CME's Nymex.

The ease of using Dubai futures to hedge DME physical contract exposure has arguably also hampered the growth of forward trading on DME Oman. The vast bulk of liquidity on the contract remains focused on the front month, essentially making it a physical procurement and contract settlement mechanism, rather than a futures contract. Notably, the DME Oman contract in a sense looks a lot like the early days of Dubai, but with the added benefit of a decade of Middle East benchmark evolution. So it includes what is in effect a partials system, wherein cargoes are traded in smaller contracts. Physical resolution of these contracts happens at settlement, and involves the same process of matching buyers and sellers that have traded sufficient volumes, albeit matching via the exchange as counterparty rather than through the Market on Close process directly with individual entities. However, it significantly differs in terms of what is deliverable against the contract. On convergence of Dubai partials, a seller may choose to deliver Dubai, Oman, Upper Zakum, Al Shaheen or Murban (with a quality premium). For DME, a seller can only provide Oman.

The DME Oman contract has also faced what has by now become a familiar challenge in crude benchmarking: the inherent risk of volatility that emanates from being based on a single grade of crude oil. Just as Dubai faced the challenge of the grade disconnecting from the rest of the region's crude economics due to shortages at the turn of the century, Oman has faced similar disconnects as this decade got underway. This has been particularly notable at month-end on several occasions. On August 29, 2013, DME Oman settled at \$115.23/b<sup>22</sup>, compared with a Dubai price of \$112.91/b (see Figure 8). That spread, of \$2.32/b, was not dissimilar to previous premia of the Oman grade over Dubai. But it was \$2.27/b above the Platts Oman assessment on that date. And at the same time, it placed Oman only 28 cents below Abu Dhabi's Murban, and only 31 cents below equivalent ICE Brent futures<sup>23</sup>. Moreover, it was a jump of \$3.05/b from the DME Oman settle on the previous day, when no other crude values swung so heavily overnight. And it swung back down on the following day, settling 59 cents below Platts Oman on August 30.

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<sup>18</sup> *Dubai to Set Crude Oil Selling Price Based on DME Oman Contract*, Dubai Mercantile Exchange, June 23, 2009

<sup>19</sup> *Saudi Aramco rebalances its Asia crude oil benchmark*, Dubai Mercantile Exchange, July 4, 2018. Fattouh, B. (2018), 'What Next for Asian Benchmarks?' Oxford Energy Comment, Oxford: Oxford Institute for Energy Studies.

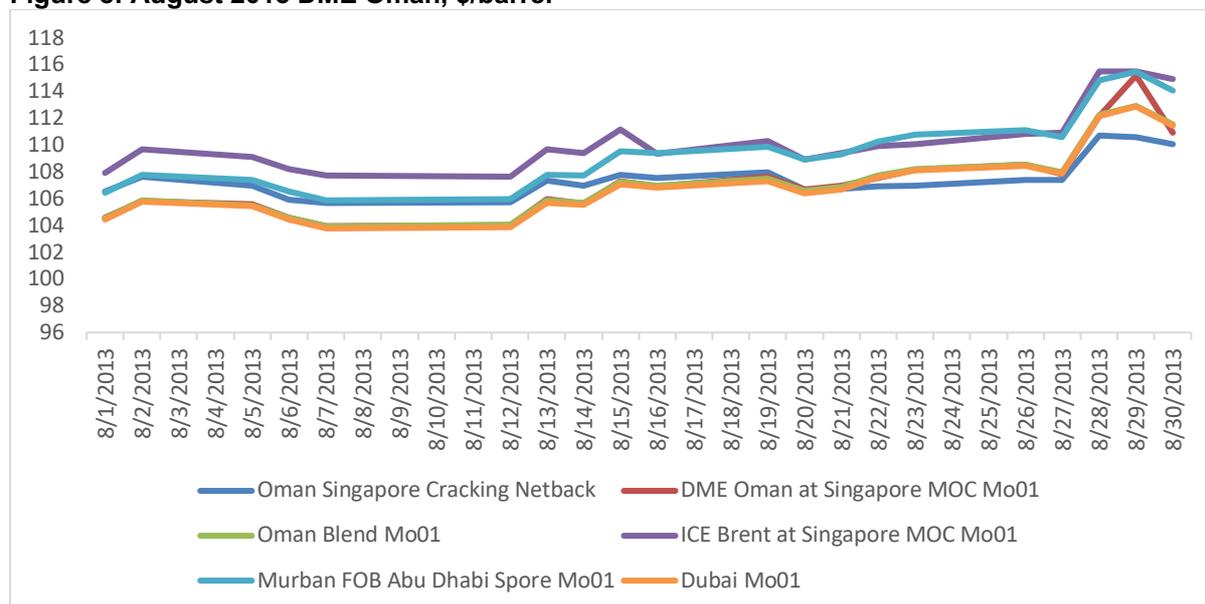
<sup>20</sup> Qatar revamps oil pricing mechanism; sets forward OSPs vs Platts Oman/Dubai, Platts Global Alert, February 10, 2020

<sup>21</sup> *ADNOC sets Murban March OSP at Platts Dubai 1st Line month average plus \$1.88/b*, Platts Global Alert, March, 13 2020

<sup>22</sup> Dubai Mercantile Exchange, <https://dubaimerc.com/Daily-Marker-Price>, accessed historically on each date referenced following

<sup>23</sup> All values here and following are compared at the 1630 Singapore close

**Figure 8: August 2013 DME Oman, \$/barrel**



S&P Global Platts, DME and ICE

This was not just a peculiar move compared with other crudes. It was also in stark contrast to the refinery value of Oman. On August 29, 2013, the cracking netback value<sup>24</sup> of Oman was \$110.64/b, \$4.59/b below the DME Oman settlement value. The day before, the netback was \$1.44/b, and the day after it was \$0.88/b below. Clearly DME Oman had, for a relatively brief period, broken away both from regional crude economics, and end-user refinery economics.

Had this been a one-off, it might have been dismissed as a curious aberration. But the pattern was to be repeated on several occasions, always at month-end over the years ahead. On July 31, 2014, DME Oman settled at \$106.70/b, up 70 cents from the day before at a time when Platts Dubai, Platts Oman, Murban and ICE Brent all moved down (see Figure 9). The DME settle was \$2.14/b above Platts Oman on that day, and \$3.73/b above the Oman cracking netback value.

The swings happened the other way too. On January 30, 2015, DME Oman settled at \$45.98/b, down \$1.34/b, when Dubai, Murban and Brent had all moved higher, and ending at \$1.32/b below Platts Oman. At the end of July 2015, DME Oman settled 65 cents below Platts Oman, and at the end of August 2015 as much as \$2.55/b below Platts Oman (again after dropping overnight when Dubai, Murban and Brent all moved higher).

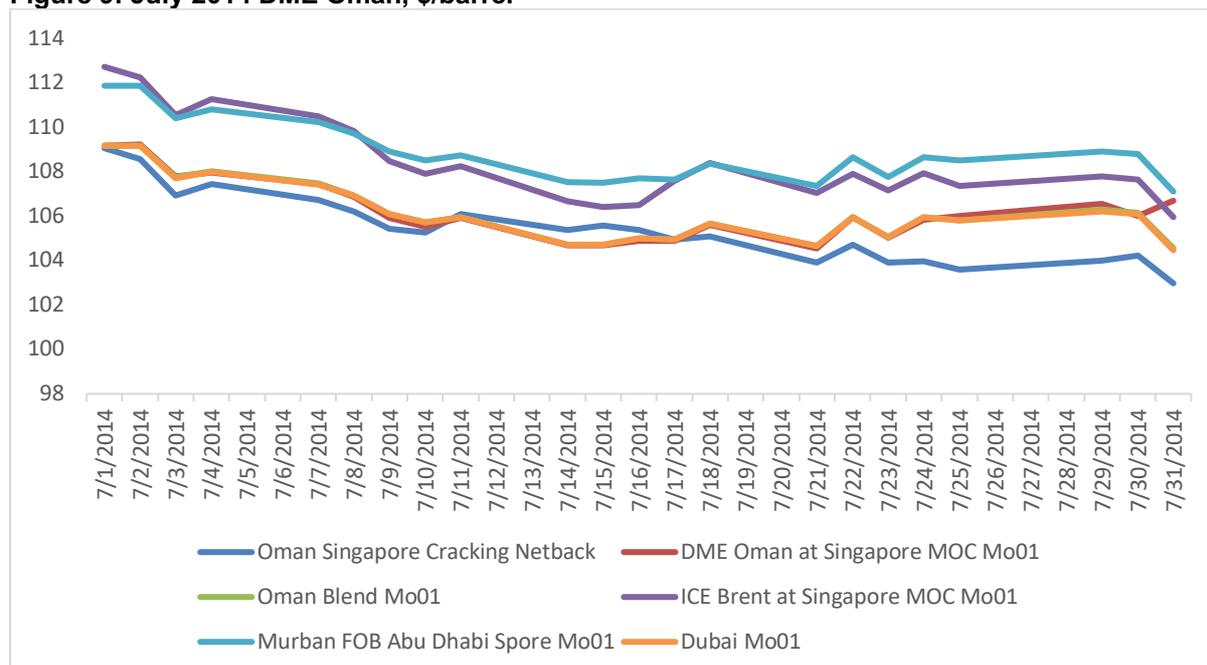
There is no public statement as to what exactly happened on each of these occasions, but there are widespread theories. Instead of being rooted in supply shortages this has been seen as reflecting peculiarly intense demand from a single source: China. Three quarters of Oman Blend exports currently go to China<sup>25</sup>, with the rest typically sent to a smattering of countries across Asia. Oman export blend's characteristics as a medium heavy sour crude make it ideal for the Chinese refining system. And the attraction goes deeper than that. Oman has become branded in its own right in China, at least in part because it has a yield fairly close to domestic Chinese grades. That means that for independent refiners

<sup>24</sup> Platts publishes cracking netback value of a range of global crudes, using refinery models from Turner & Mason, and relevant benchmark oil products prices. The calculation sums yield values for each product as a % of a \$/b price, giving the value of the refined crude, discounted by freight costs. For Middle East crude, this uses a typical Singapore hydrocracking refinery, physical assays of the crude, the Singapore oil products prices and the cost of freight from crude terminal to refinery. The output of this calculation gives a good basis for the plausible economics of a refinery buying that crude on an FOB basis, comparable to the FOB spot price. With a netback value above the spot price, the refinery would make a profit, and vice versa.

<sup>25</sup> National Centre for Statistics & Information, <https://www.ncsi.gov.om/Pages/NCSI.aspx>

in China, they can import and use Oman directly without much change to their configuration. And much of that procurement has gone through two Chinese majors: Petrochina and Unipec. Both majors have seen a marked growth in spot market involvement over the history of Middle East benchmarks, as noted above during August 2015 in the Dubai Market on Close process. China remains the biggest importer of Middle East crude, and having a consistent, strong end-user might be seen as a boon for any commodity seller. But in benchmarking, concentration of market share (on either buy or sell side) usually sets off alarm bells. It raises fears of outsize impact on value, which in the extreme could lead to disconnection from the all-important broader market fundamentals.

**Figure 9: July 2014 DME Oman, \$/barrel**



Source: S&P Global Platts, DME, ICE

Another explanation for the price swings is rooted in the structure of the DME Oman contract itself. The price patterns seem to indicate that one or more participants in the exchange had approached the settlement period with a financial position that they could not match; they either did not have the supply to deliver against an exchange short position, or they had nowhere to place their excess crude from a financial long. With a grade that has such a concentrated end-use market, such mismatches are not easily resolved.

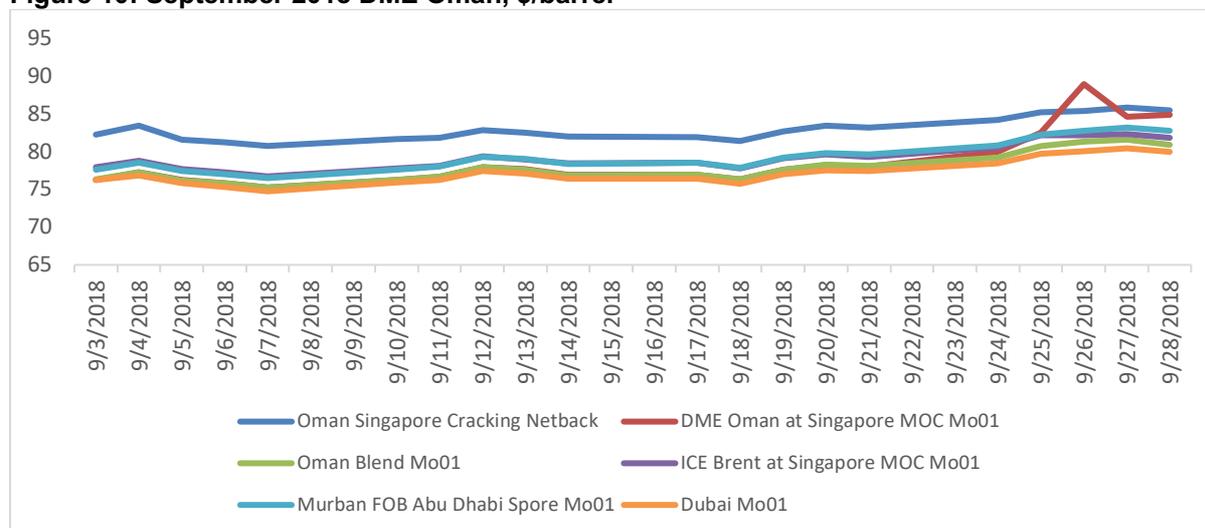
In an effort to allay the effects of these month-end swings, the DME made a change to its settlement process in February 2016<sup>26</sup>, when the calculation of the marker price on expiry day was changed to remove volatility seen towards the end of the month on the contract as it neared settlement. This combined values from the front and second months over a three day period, muting the effect of any position mismanagement by participants. But it did not remove the issue entirely. On September 25, 2018 DME Oman settled at \$82.53/b, \$1.83/b above Platts Oman, and 36 cents above ICE Brent (see Figure 10). The following day, it settled an astounding \$6.79/b above ICE Brent, and \$7.61/b above Platts Oman. This new spike, coming after DME had already made changes to the settlement process raised considerable questions as to the success of the new settlement process<sup>27</sup>.

<sup>26</sup> Change to DME Oman Expiry Day, Dubai Mercantile Exchange, January 2016

<sup>27</sup> Adi Imsirovic (2018), 'What Next for Asian Benchmarks? – A Footnote' Oxford Energy Comment, Oxford: Oxford Institute for Energy Studies.



Figure 10: September 2018 DME Oman, \$/barrel



Source: S&P Global Platts, DME, ICE

## New contenders in the Middle East crude space

As 2020 commenced, the Middle East crude benchmark space was well established. Platts Dubai represented the most competitive value of five grades: Dubai, Oman, Upper Zakum, Al Shaheen and Murban, with a Quality Premium as needed. Platts Oman similarly reflected a basket of two crudes, Oman and Murban with a QP as needed. And DME Oman represented the value of Oman as a single grade, through a physically-settled futures mechanism. These three benchmarks were the only Middle East crude values used in Official Selling Prices (OSPs) for Asian buyers, though not the only crude benchmarks used in the Middle East. Regional producers also reference Atlantic benchmarks in their sales west, including Platts Dated Brent, ICE Brent futures and Argus' ASCI.

And there were new contenders in the Middle East space. The most notable of these were China's INE, part of the Shanghai Futures Exchange and launched in March 2018<sup>28</sup>, and the planned ICE Murban contract, to be based out of a new exchange in Abu Dhabi<sup>29</sup>. The INE contract reflects the potential delivery of seven different grades of crude oil: Basrah Light, Dubai, Masila, Oman Blend, Qatar Marine, Shengli and Upper Zakum, stored in tank close to refining locations on the coast of China<sup>30</sup>. ICE Murban, in contrast, is planned as single grade contract, loading in Abu Dhabi's port of Jebel Dhanna or the emirate of Fujairah. The INE contract, while based on Middle East crude grades, reflects the value of oil without tax or duty paid delivered into bonded storage in China, and includes a domestic Chinese grade, Shengli. Trading in 1,000-barrel lots, it is also unique in that it is denominated in Chinese Renminbi. As well as physical grade delivery, the contract is defined by a notional quality specification with gravity of 32 API and sulfur content of 1.5% by weight. INE sets price differentials for the various deliverable grades against the contract's settlement price – similar to the Quality Premium system used in the Brent complex and in Platts Dubai and Oman for Murban.

The ICE Murban contract, reflecting Murban loading on an FOB Fujairah basis, was to be listed by ICE Abu Dhabi, a new exchange planned as a joint venture between the Intercontinental Exchange and the

<sup>28</sup><http://www.ine.cn/en/about/events/> Shanghai International Energy Exchange Co.

<sup>29</sup> Mehdi, A., E. Muneeb, A. Imsirovic, B. Fattouh (2019), 'Murban: A benchmark for the Middle East?' Oxford Energy Comment, Oxford: Oxford Institute for Energy Studies.

<sup>30</sup> Notice Regarding the Delivery of Crude Oil Futures, Circular [2018]11, Shanghai International Energy Exchange Co, March 20, 2018

Abu Dhabi National Oil Co. Details of the contract remain unknown in general, though it is expected to follow the DME model in terms of physical delivery and contract size.

After decades operating in a relatively stable pricing environment, buyers and sellers of crude oil in Asia and the Middle East – along with risk managers and paper traders -- suddenly find themselves with a bewildering variety of options, including long-standing references like Platts Dubai and Platts Oman, new pricing from China’s INE, the DME’s Oman contract, and a potentially new futures contract on the horizon, in Abu Dhabi. Making sense of the choices available, and understanding how these values relate to each other, involves an appreciation of the different definitions at the heart of each, and the sometimes complex interplay across the space.

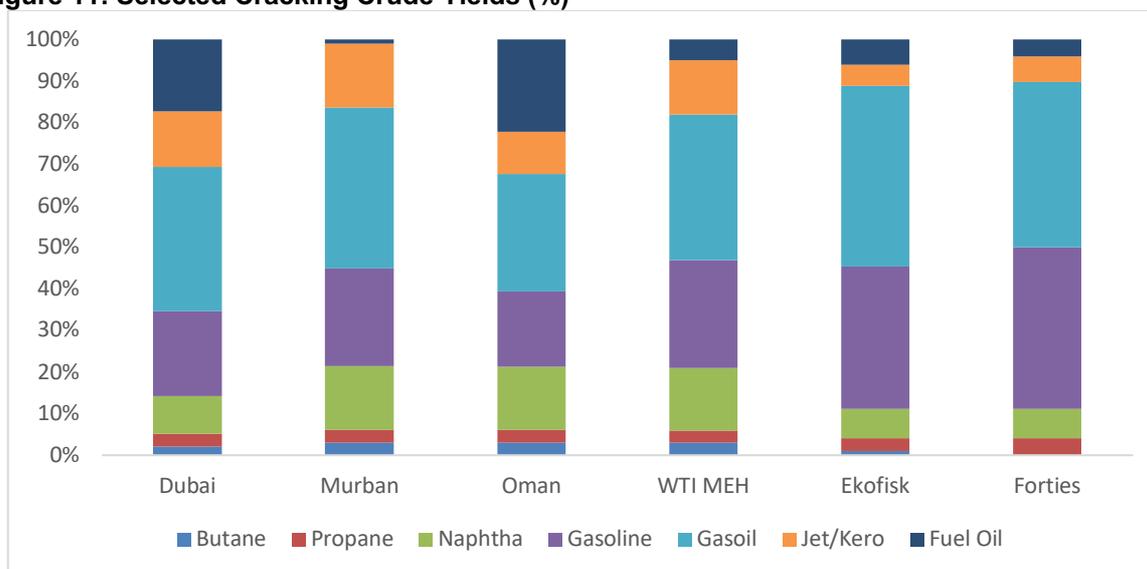
### From IMO to the COVID Crisis

All through 2019, there was a broad expectation among analysts that the introduction of a 0.5% cap on sulfur emissions from global shipping from the International Maritime Organization would provide the key price determinant for the relationships between global benchmarks. This was based on an expectation that with a move from a 3.5% to 0.5% sulfur cap on marine fuels, there would be a sharp discontinuity between crudes that produce a residual fuel that meets this requirement and the remainder for which much of the residual output with either need further refinery processing, at a cost, or be sold into adjacent (and cheaper) utility markets.

#### The projected impact of IMO on the Dubai basket

According to Platts Analytics, Dubai, Oman and Murban all produce a yield with fuel oil at well above 0.5%, so in theory sit on one side of this discontinuity. But for Dubai the volume of fuel oil produced is 17% of the barrel, for Oman it is 22%, and for Murban a mere 1% (see Figure 11). This should affect the refining value of these crudes, as around a fifth of the output from Dubai and Oman would be problematic in the IMO world. In comparison, Atlantic benchmarks have been driven by crudes with a fairly different yield. Forties, Oseberg and WTI all produce fuel oil with sulfur at or above 0.5%, but at just 4%, 6% and 5% respectively of the refinery barrel. Moreover, the yields of all these crudes also differ in the middle of the barrel. The distillate yield (diesel and jet fuel) for both Forties and WTI is 48%, compared with just 38% for Oman. To meet the IMO cap it was expected that the marine market would need to pull in an increased volume of low sulfur marine gasoil, to make up for fuel oil that did not meet the emission control. So this should have supported the distillate-rich grades.

**Figure 11: Selected Cracking Crude Yields (%)**



Source: S&P Global Platts Analytics



## The COVID-19 shock

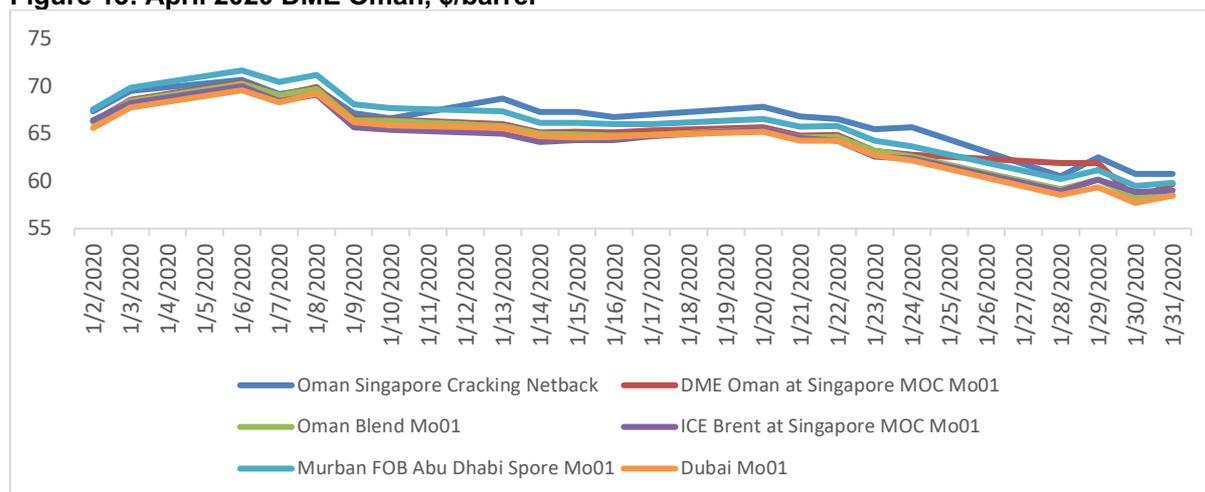
Far from being solely synonymous with a sulfur-driven crude complex, 2020 will be remembered primarily for another completely unforeseen, overarching factor: the COVID-19 pandemic. The effects of the pandemic started to be seen during the first quarter of the year, and became pronounced as the year wore on. Scenarios that had been deemed exceptional in March, became for some observers the base reference case by May.

From the perspective of crude oil, the salient points were as follows: a global decline in GDP of 2.7%; a drop in global crude oil demand of 8.4 million b/d to 94.1 million b/d for the full year (and just 83.8 million b/d during the second quarter); and a decline in global gasoline demand of 2.56 million b/d, in diesel demand of 1.99 million b/d, in jet demand of 1.91 million b/d and in fuel oil of 0.56 million b/d<sup>33</sup>. Such numbers are unprecedented in history. The scale of the impact on the oil markets meant that every market was affected, every benchmark tested.

In the benchmarking space, three areas have been under particular scrutiny: the April 20 negative price shock in NYMEX WTI; the massive contango spread between Dated Brent and ICE Brent futures; and the pronounced and persistent spread between DME Oman and Platts Dubai and Oman. It is the last of these that we are focussing on here, but it should be well noted that all global benchmarks have come under scrutiny in this time. All have produced relatively extreme outcomes that require analysis, and invite questions as to whether they remain fit for purpose.

Over the course of January and February the DME Oman settled on average 27 cents/b above Platts Oman, a fairly small difference in the context of history.<sup>34</sup> But in April 2020, with global lockdown in full progress, DME Oman settled *on average* \$3.17/b above Platts Oman across the whole month, with a peak of \$6.56/b on April 22 on the same day it settled \$2.64/b above ICE Brent and \$5.76/b above the Oman cracking netback (see Figure 13). In comparison, Platts Oman through the month averaged \$5.97/b below ICE Brent, a significant difference, but in line with the relevant physical markets. This was on average \$1.33/b below the Oman cracking netback, compared with DME Oman settling on average \$1.83/b above the Oman cracking netback. If a refiner bought Oman grade basis Platts Oman during this period, they would have made a modest income of \$1.33/b. If they had bought the same grade basis DME Oman, they would have lost more than that amount.

**Figure 13: April 2020 DME Oman, \$/barrel**



Source: S&P Global Platts, DME, ICE

<sup>33</sup> Platts Analytics World Oil Forecast, May 29, 2020

<sup>34</sup> There were moments of stark disconnect, however. On January 28, DME Oman settled at \$61.92/b, \$2.77/b above Platts Oman, \$2.94/b above ICE Brent and \$1.40/b above the Oman cracking netback. The following month, the swing was in the other direction, as on February 27 DME Oman settled at \$50.47/b, 53 cents below Platts Oman. And again at the end of March, it swung to \$2.84/b above Platts Oman. And then came April.



## Murban, gasoline and the Dubai benchmark

This persistent level of disconnection cannot be due to a particular company caught short of physical crude ahead of the month-end settlement process. So what happened?

One hypothesis put forward in recent months is that the disconnect was not due to a peculiarity of the DME Oman contract, but rather due to the structure of Platts physical assessments<sup>35</sup>. Under this explanation, the driving factor in Middle East benchmarks was not sulfur content, but rather the yields involved, particularly that of Murban. In Platts Oman, Murban serves as an alternative delivery crude, with a quality premium, as it does in Platts Dubai. Murban as a grade has a higher gasoline yield, at 23%, compared with Dubai or Oman, at 20% and 18% respectively. With gasoline demand so sharply lower in April, gasoline values in Asia came under immense pressure. The front-month Singapore gasoline Dubai crack spread derivative fell below the equivalent for fuel oil in March, reaching a low of minus \$8.80/b. This would mean that for every barrel of gasoline produced by a refiner, they would lose that amount vs the input crude price. Jet fuel was, as might be expected, almost as weak, generating negative crack values for most of April and into May.

This weakness on the products translated into a pronounced effect on the cracking netback values of the Middle East grades. The Murban cracking netback typically is at least a few dollars above the Oman equivalent; in the fourth quarter of 2019, it averaged \$3.01/b higher. It retained this premium through January and February, though at a declining level, and came to parity and then below in late March. During April, it was persistently below the Oman cracking netback, on average 27 cents below, and reaching a low of 74 cents under on April 8.

Based on this evidence, the refining value of Murban should have made Murban more competitive than Oman during April. As per Platts Oman, this would have meant that a seller in the process would prefer to provide Murban cargoes rather than Oman, and in effect Murban would define the value of Platts Oman through this period. And what about Platts Dubai? Within the larger basket, Murban was also the most competitively valued crude in terms of refining economics, below the cracking netbacks of all other grades through the month. Notably, however, it averaged only 13 cents/b below Upper Zakum through this period, another grade with a large gasoline cut, though during the second half of the month this difference was only 3 cents/b.

What about comparisons with competing crude values? Spot Murban was assessed well below ICE Brent throughout April, at a discount of on average \$5.33/b. Comparing with other regional crudes is more difficult however. In Platts assessment process, Murban is an alternative delivery against each crude in the basket, meaning that it caps each of these, after accounting for the Murban Quality Premium (QP). For April, the QP was set at 64 cents, and therefore Murban was not assessed lower than this premium against any of the other grades in the basket. A different approach is to compare Murban to Qatar Marine, a grade that has a similar yield to the medium sour crudes, but is not capped by Murban in the Platts assessment process. Murban started April at a \$1.03/b premium to Qatar Marine, but this fell to negative 31 cents by April 20 before recovering by month-end, with a whole month average of a 35 cent premium. In fact there were only five days when Murban was assessed below Qatar Marine.

The fact that from a refining perspective Murban was the lowest value grade in these baskets should have meant that sellers chose to declare the grade against any convergences during the period. Indeed, during April there were two convergences in the Oman Market on Close process, against which Murban was declared for both, and there were five convergences in the Dubai process, of which two were Murban, one was Dubai and two were Al Shaheen. All this does demonstrate that indeed Murban was pressured by low gasoline values during April, and that it was the most competitive grade in the Dubai and Oman baskets at points during the month. Its effect on the benchmarks as a result of the falling cracking value may have been somewhere between 15 cents/b in the case of Dubai and 30 cents in

<sup>35</sup> Fattouh, B. and A. Imsirovic (2020), 'Oil Benchmarks Under Stress', Oxford Energy Comment, Oxford: Oxford Institute for Energy Studies; Mehdi, A. (2020), Mehdi, A. (2020), 'Middle East Benchmark Pricing and the Oil Crisis', Oxford Energy Comment, Oxford: Oxford Institute for Energy Studies.

the case of Oman. Compared to other regional crudes, this range seems representative of its spot impact. But this value is an order of magnitude below the disconnect seen between DME Oman and Platts Oman, and between DME Oman and the Oman cracking netback. So while it is undoubtedly the case that Murban (and its gasoline yield) was a defining feature of the Middle East benchmarks in April, it cannot have been the overriding one in the Oman complex.

### Murban's place in the systems

Before we move on to what other factors may have been at play in Oman, we should consider the question of Murban itself. As noted above, Murban was added to the Dubai and Oman baskets to ensure consistent pricing during periods of high spot market liquidity, a surge in demand or unexpected shortfalls in supply. The Quality Premium mechanism was created to ensure that Murban would be relevant in these processes quickly, and to reduce the volatility space between grades. The QP mechanism also needed improvement in 2020, since it prevented the free float of Murban against Dubai and Oman during a period of Murban weakness. As a result of this, Platts amended the mechanism in late March, with effect from May to ensure a zero QP if it would fall below 50 cents<sup>36</sup>.

Even with this in place, however, Murban was still a relevant part of the Dubai complex in May. It was assessed flat to Oman throughout the month, and flat to Dubai during a five-day period towards the end of the month. Its cracking netback continued to retain only a relatively small premium to the other grades in the baskets through the month, and this will likely persist until a broad gasoline recovery raises Singapore spot gasoline prices.

Should Murban have such an influence on Middle East benchmarks? Both ADNOC and ICE have stated that they hope their planned Murban futures contract would be more than just an influence, but would indeed be the defining benchmark for the region. This implies that they, at least, believe the grade is representative of the region's physical crude oil fundamentals. However, it has significantly different qualities from other Middle East crude. Perhaps more pertinent, however, is the fact that Murban only became so relevant in the Middle East crude market as a result of the renewed focus on yields. That Murban, and by extension Platts Dubai and Oman, was weaker as a result of low refinery margins is exactly what one would expect in an efficient crude market. The traditional focus on sulfur in crudes was simply not relevant during April, pushed to an almost niche concern. Indeed, had refiners been using a benchmark that ignored their own fundamental economics, including the demand destruction in gasoline and jet fuel, they would have faced immense pain, unless they were able to pass through these higher costs on to the product markets. That is not to say that any crude benchmark should guarantee a positive margin for refiners, but rather that they should reflect the physical realities of the crude markets, both in terms of comparative crudes and also in terms of refining economics.

### INE, DME and Oman

There are markets where crude costs are directly fed through into oil products markets. China's domestic refining sector involves regulated refinery gate product prices. These prices are calculated as a formula based on the input crude price. But they also include a floor at around \$40/b for this crude price. If crude prices fall below this level, refiners can continue to sell oil products as if they were paying \$40/b for their supply, and any difference becomes a profit<sup>37</sup>.

Middle East crude prices, including DME Oman, fell below \$40/b on March 9, and continued to fall through the month and into April. From that date, any refiner buying imported crude faced a windfall in profits. As noted earlier, Oman is favoured by Chinese refiners due to its similarity to domestic crudes, so any extra buying interest from those refiners would naturally focus on Oman primarily.

There is also a second mechanism in the Chinese crude market, Shanghai's INE crude oil contract. While not prevalent as a benchmark in international crude markets, the contract has seen significant volumes traded since its inception in March 2018. Reflecting a delivered crude price, INE tends to price quite differently from the existing Middle East benchmarks that reflect crudes loading from a terminal.

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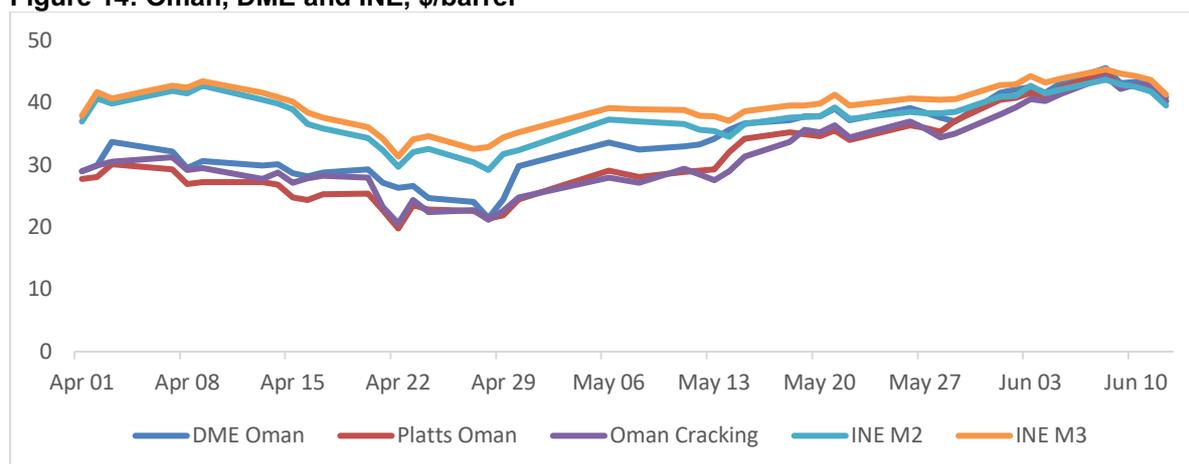
<sup>36</sup> Platts to raise minimum threshold for Murban Quality Premium to \$0.50/b, Platts Global Alert, March 24, 2020

<sup>37</sup> Or rather, revenues for the state, though the ultimate effect on buying behaviour remains the same.

The front month contract on INE is also fairly prompt – reflecting crude delivered in storage in the next calendar month from trade, so May deliveries for April trade, for example.

In order to compare Platts Oman, DME Oman and other grades with the INE contract it is therefore necessary to account for freight and timing differences. Comparing these values, it is apparent that INE M2 fairly consistently tracked DME Oman plus freight though January and February. But after crude prices fell below \$40/b, the INE contract developed a premium over the Middle East prices (see Figure 14). By the end of March, INE M2 was trading around \$3.32/b above DME Oman<sup>38</sup>, and around \$6.47/b over Platts Oman. Over the following month, as oil prices around the world tumbled, the INE crude price held relatively stable, averaging \$36.04/b through the whole of April. As a result, during April, its premium to Platts Oman grew significantly, rising to a peak of \$15.44/b on April 9. On the same date, however, the premium to DME Oman was significantly lower, at \$12.13/b. In other words, as the INE's premium to world crude prices built, so did DME Oman's premium to Middle East crude prices, and to the Oman cracking netback. By the end of April, DME Oman had a narrower discount to INE, at \$2.63/b, than its premium to Platts Oman, at \$5.36/b, and than its premium to the Oman cracking value, at \$4.98/b. In other words, DME Oman no longer functioned to represent the physical fundamentals of Middle East crude, or the broad range of Asian refiners that buy that crude. Rather, it had become netback to INE.

**Figure 14: Oman, DME and INE, \$/barrel**



Source: S&P Global Platts, DME, INE

In May, far from reversing, this trend increased. DME Oman settled at levels of \$5-7/b above the Oman cracking netback \$1-3/b above ICE Brent through the first few weeks of May. In contrast, its discount to INE shrank, falling from \$3.65/b on April 30 down to \$1.17/b on May 13. By the end of May, however, the DME Oman premium to the Oman cracking netback had narrowed considerably, though it remained around a dollar above this, and likewise around a dollar above ICE Brent.

Why did the premium shrink? During the latter half of May DME Oman moved in virtual lockstep with INE. But global crude prices had risen, with INE moving back towards \$40/b. The INE price struggled to move beyond this level until the global complex had done so. But at or around the \$40/b floor, the INE price, DME Oman, Platts Oman and the Oman cracking netback moved back into close correlation. By mid-June, they were all within a one-dollar range of each other.

In trading terms, a company could buy Oman through the DME during April, for loading in June, and ship the cargo to China. At the same time, they could sell the INE June contract, locking in a profit

<sup>38</sup> The relevant freight is the Persian Gulf to China VLCC rate, while to account for timing the second monthly INE contract represents the equivalent to the front month Oman contracts. The RMB/USD rate also needs to be applied, given that INE trades in yuan.

through the spread to the \$40/b floor after deducting shipping costs. Ahead of loading, they buy back the June INE contract and sell July, locking in a further profit through the roll, and ultimately delivering Oman against their July position.

So what of Murban in this? Notably, Murban is not a deliverable grade in the INE contract. But it is alternative delivery for all the Platts Dubai and Oman basket grades. A buyer looking purely for Oman to trade into the INE contract takes a risk by bidding for Dubai or Oman partials that they might get Murban. Historically this was unlikely, since Murban tended to trade at considerable premium to Dubai. But at low crude prices, Murban, unaffected by the Chinese refinery floor price, trades based on regional crude and refining economics. In such a structure, Murban takes on a new role in Middle East benchmarking. It ensures a persistent demonstration of value in the Middle East crude complex and in the wider regional refining base in Asia and prevents an injection of volatility during periods of exceptional demand from a single end-user country only, that is itself driven not by market forces, but by price controls, as in this case China.

## Conclusion

In this paper, we have examined the core question of what a crude benchmark, and in particular the Asian benchmarks Dubai and Oman should represent. The dramatic demand destruction in transport fuels has put the spotlight on gasoline-heavy crude grades and has raised the question whether current benchmark definitions focused on sweet-sour spreads are outdated and whether a particular yield should instead form the basis for a regionally representative benchmark price.

What the research in this paper has shown is that the traditional definitions of the Dubai and Oman benchmarks around sulfur and gravity have withstood the test of time over the last 40 years. They did so because they evolved and adapted to the changing market fundamentals and thereby maintained all the key attributes that ensured their robustness and relevance to the wider market they represented: an extensive and diverse user base, solid underlying physical volume and specifications that have adapted on a timely basis as necessary.

This does not render the question of product yields irrelevant. These remain a key driver of refinery economics, and by extension the value of the crudes that feed them. When the products behind those yields change, it rightly affects the value of crude benchmarks. The COVID-19 pandemic has shown that this can come in radically unforeseen ways, but it would be foolhardy to try to construct mechanisms to exclude the impact of such shifts.

Was Murban a key part of Middle East crude benchmarks in April 2020? Undoubtedly. But was this problematic for the benchmark? The weak gasoline market was a core part of the broader oil world during that period, and it should have been reflected in those benchmarks. More importantly, Murban proved itself relatively protected from the impact of price controls in China, and hence provided an important level of protection for refiners across Asia. Without that protection, refiners outside of China would have faced crude prices well above the economics of the oil they were processing.

When it comes to the careful stewardship of crude oil benchmarks, major market shifts may also trigger adjustments in specifications, such as for the quality premium in Murban, in order to ensure that a benchmark price remains stable and widely representative.

In the increasingly complex world of demand/supply fundamentals and refinery yields, the major global oil benchmarks, Brent, WTI and Dubai/Oman, have to evolve in order to provide consistent and stable price indications to the broader market segments they represent. A diverse active range of market participants and sufficient underlying spot volumes are critical attributes of a robust benchmark. The market's ability to price free of regulatory interference is equally important. Price markers that are beholden to buy or sell-side imbalances or regulatory interference risk becoming disconnected from the wider market complex and can at best serve a narrower purpose of a reference price for single crude grade.