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WTI Benchmark Temporarily Breaks Down: Is It Really a Big Deal?

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Since the adoption of formula pricing in 1986, West Texas Intermediate (WTI) has served as one of the main international benchmarks along with Brent and Dubai against which other types of crude oil are priced. While Brent remains the dominant benchmark for oil pricing outside the US, oil imports to the US are usually priced off WTI. In principle, the movement in WTI prices is supposed to reflect supply-demand conditions in the US, the largest consumer in the world burning more than 20.5 million b/d of the 84.5 million b/d consumed worldwide in 2006. But the recent disconnection of WTI from the other benchmarks, which resulted in WTI trading at large discounts to Brent, revived the debate on whether the WTI benchmark has been 'broken' and whether oil market participants should adopt an alternative benchmark that better reflects the supply-demand balance in the oil market.

It has long been recognized that the link of WTI prices to other international benchmarks and to oil prices in other US regions is partly dictated by infrastructure logistics.¹ The recent behaviour of WTI prices is a clear example of how pipeline logistics can dislocate WTI not only from the rest of the world, but also from other US regions.

The WTI market is characterized by a large number of independent producers who sell their crude oil to gatherers based on posted price. The oil is then brought into Midland which is then directed either towards the Gulf Coast refining areas or towards Cushing, Oklahoma. Cushing is an oil-trading hub and the delivery point for NYMEX light sweet crude oil futures contracts. Due to pipeline logistics, once the oil flows outwards from Midland towards Cushing, WTI can only go in one direction: North, towards Chicago. Thus, if there is a shortfall in demand from refineries in the

¹ Horsnell, P. and R. Mabro (1993), *Oil Markets and Prices: The Brent Market and the Formation of World Oil Prices*, Oxford: Oxford University Press.

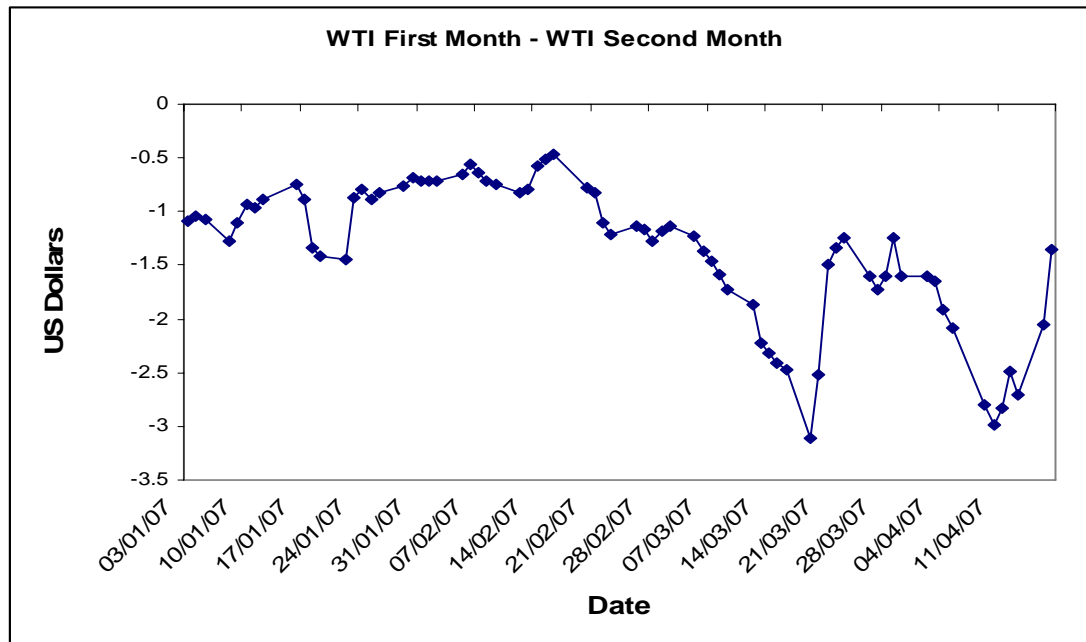
Chicago area, there are no opportunities to re-direct oil flows out of Cushing towards other refining centres where there might be more demand for crude oil.

In the last two months, a combination of factors has resulted in relatively large supplies of oil flowing into Cushing. This occurred at times when demand was flattening due to refining outages and maintenance. In February, a fire at Valero's McKee Texas plant resulted in the loss of 170,000 b/d which led to build-up in crude oil inventories and depressed the price of WTI. The reversal of pipeline flows and rising oil output in Western Canada meant more oil flowed into Cushing. In this respect, the reversal of Enbridge's Spreadhead pipeline, with a capacity of 190,000 b/d, from Chicago towards Cushing is quite significant as it provided a new route for oil from Western Canada to US markets.

It is interesting to note that in the past, the main logistical bottleneck was how to get enough oil into Cushing, this bottleneck in many instances resulted in serious dislocations and WTI rising to very high levels compared to other benchmarks. The problem is now reversed: while the ability to get oil into Cushing has increased, the ability to shift this oil out of the region and to provide a relief valve for Cushing has been very limited. This situation has led to a larger than expected build-up of crude oil inventories in Cushing. According to the EIA data, in the first week of April 2007, crude oil inventories reached 333.4 million barrels (mb) an increase of around 8.1 mb compared to the previous four weeks. According to the EIA, more than half of this increase (4.7 mb) occurred in Cushing where inventories had reached 27 mb in the first week of April 2007.

As a result of this large build-up, the WTI price has been decoupled not only from the rest of the world, but also from other US regions, particularly from the US Gulf. Given the importance of WTI as a benchmark, the effects of these localized logistic problems were widespread and affected the oil price structure in three major ways. First, faced with large stockpiles, oil traders were forced to crush the spot and front month prices. As a result the oil for first month delivery was being sold at a large discount to oil for second month delivery, deepening the size of the near term contango in the WTI price term structure. Figure 1 below shows the size differential between the first-month WTI futures contract to the second-month WTI futures contract (deliverable at Cushing, Oklahoma) between January 3, 2007 and April 17, 2007. As can be seen from this figure, the size of the differential increased in the month of March exceeding \$3 in March 19. The month of April witnessed a similar trend with the differential reaching \$3 in April 10. The shortage of storage facilities at Cushing contributed further to the deepening of the contango.

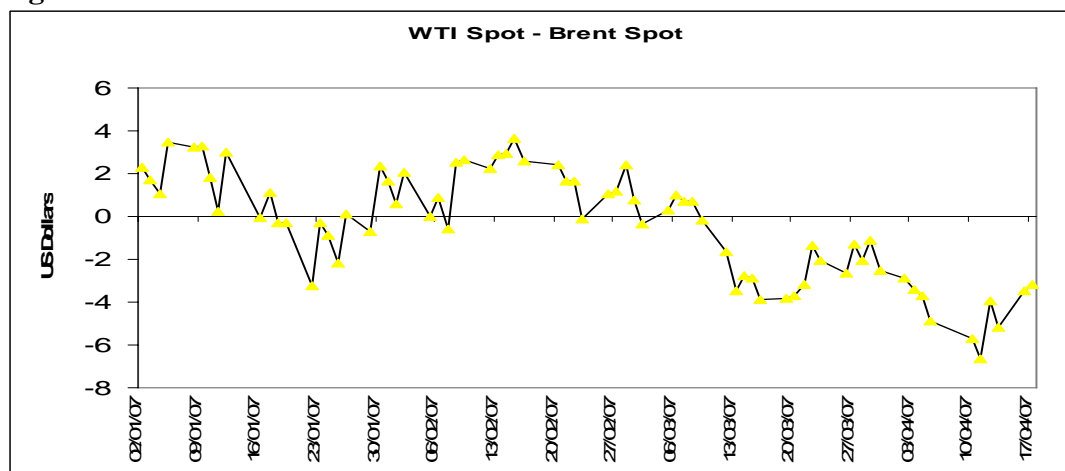
Figure 1



Source: EIA

Second, since Brent is a waterborne crude oil and does not suffer from pipeline bottleneck, the WTI decoupled from Brent, as reflected in the large differential between the prices of the two international benchmarks. Although WTI and Brent are of similar quality (both are light and sweet), WTI has been trading at large discounts to Brent. Figure 2 shows the differential between spot WTI (at Cushing) and spot Brent between January 2, 2007 and April 17, 2007. As can be seen from this figure, since the end of March the differential has been widening reaching \$6.62 on April 11. It is worth noting that WTI has been trading at a discount to Brent since March 9, 2007.

Figure 2



Source: EIA

In the last two years or so, Brent has increasingly traded at a premium to WTI. Platts notes that for the year 2006, WTI front month futures traded at a discount to Brent front month futures 156 times, so for 52% of the year. This represents a significant transformation as historically WTI has almost always traded at a premium to Brent. This raises the issue of whether Brent is also beginning to show signs of dislocation as oil production in the North Sea continues to decline. If this turns out to be the case, then it can be expected that the WTI-Brent differential will exhibit more volatility in the future.

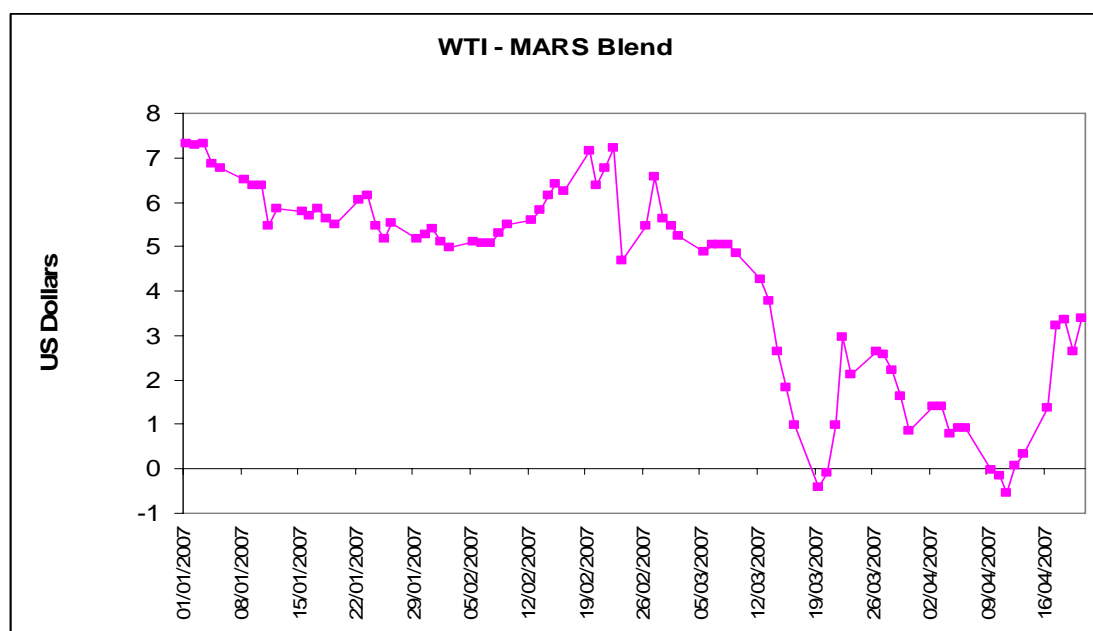
In principle, arbitrage between markets should help narrow the WTI-Brent differentials. It is true that WTI cannot be exported outside the US, but this does not constitute an obstacle as it is enough for one of the two crude oils to be tradable across markets for arbitrage to work. Specifically, after accounting for quality differences, if the price of Brent (plus transportation costs) is below the price of WTI, this would open the Trans-Atlantic window and US refineries would import Brent or crude oils priced off Brent thus pushing the price of Brent upward and narrowing the WTI-Brent differential. If WTI were a cheaper relative to Brent, then the Trans-Atlantic window would close and US demand for Brent or those crude oils priced off Brent would go down lowering the price of the Brent and helping narrow the Brent-WTI differential. The relative strength of Brent in the last year or so has had some impact on the US import structure as indicated by the monthly data on the origins of crude oil imports for the last few months (See Table 1). For example, crude oil imports from the UK after reaching 229 thousands b/d in July 2006 declined to 61 thousand b/d in January 2007. Similarly, imports from Norway declined from 160 thousand b/d in July to 48 thousand b/d in January 2007. This was not caused by a decline in total US imports. As the second part of the table shows the share of crude oil imports from the UK and Norway, out of total imports, have been fluctuating but have shown a general downward trend in the last few months. This shows that although the structure of US imports has been responsive to the WTI-Brent differential, the effect of arbitrage on narrowing the differential has been quite limited due to the low share of Brent in US imports and the major dislocation of WTI. Table 1 shows that between March 2006 and January 2007 OPEC has managed to increase its share from 46% to almost 54% of total US imports. This could, in part, be due to the fact that OPEC crudes have become more competitive as many OPEC countries use WTI to price their oil exports to the US.

Table 1- US Crude Oil Imports

	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan
Total US Crude Oil Imports (thousands of barrels per day)	9828	9832	10247	10681	10153	10537	10703	10132	9837	9584	10192
OPEC	4537	4855	4978	4868	4766	4910	5076	4784	4612	4623	5478
UK	145	169	174	185	229	107	121	74	119	93	61
Norway	121	74	98	92	160	108	76	120	81	110	48
Canada	1716	1710	1868	1799	1624	1850	1747	1704	2064	1829	1856
Mexico	1697	1601	1576	1734	1561	1652	1441	1481	1462	1245	1435
ROW	1612	1423	1553	2003	1813	1910	2242	1969	1499	1684	1314
Share of Total US Imports											
OPEC	46.2%	49.4%	48.6%	45.6%	46.9%	46.6%	47.4%	47.2%	46.9%	48.2%	53.7%
UK	1.5%	1.7%	1.7%	1.7%	2.3%	1.0%	1.1%	0.7%	1.2%	1.0%	0.6%
Norway	1.2%	0.8%	1.0%	0.9%	1.6%	1.0%	0.7%	1.2%	0.8%	1.1%	0.5%
Canada	17.5%	17.4%	18.2%	16.8%	16.0%	17.6%	16.3%	16.8%	21.0%	19.1%	18.2%
Mexico	17.3%	16.3%	15.4%	16.2%	15.4%	15.7%	13.5%	14.6%	14.9%	13.0%	14.1%

Source: EIA

Third, the build-up of stock piles around the area of Cushing has also resulted in the sour-sweet crude oil price differential narrowing to very low levels. Figure 3 below shows that while WTI was trading at a premium of more than \$7 to Mars Blend at the beginning of the year, since March 2007 the differential has narrowed considerably and on more than one occasion Mars was trading at a premium to WTI.



Source: EIA

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In short, WTI's dislocation has had serious implications across the various crude oil markets and has resulted in some unusual price differentials. These effects however do not imply that the local market is not functioning well. On the contrary, price movements are efficiently reflecting the local supply-demand conditions in Cushing. The main problem is that when localized conditions become dominant, WTI can no longer reflect the supply-demand balance in the US nor can it act as an international benchmark for pricing the millions of barrels of oil imported into the US. This raises the issue of the suitability of WTI as an international benchmark.

In the wake of recent events, many analysts have been calling for alleviation of the infrastructure bottlenecks in Cushing by reversing pipelines and investing in new pipeline projects. These calls appear to have received some attention. For instance, TEPPCO is considering the reversal of its 350,000 b/d Seaway pipeline which currently brings imported crude oil into Cushing from the Gulf Coast. There are some reports that EnBridge may also invest in new infrastructure to allow oil to flow beyond Cushing towards the Gulf Coast. However, it is important to note that these projects take a long time to implement and it is still not clear whether there is enough demand to make them viable.

WTI dislocation poses challenges for oil producing countries exporting their oil to the US. These oil exporters are faced with three choices. First, they can shift to a new benchmark other than WTI for the period of the dislocation. For instance they could have switched temporarily to Louisiana Light Sweet (LLS) for pricing their crude oil to the US. LLS prices have been in line with prices of other imported crude oils. Between April 9 and April 13, LLS at St James was trading at a premium of more than \$7 to WTI. Second, oil exporters can keep using WTI as a benchmark but adjust the differential to WTI downward to compensate for any losses. This has already been happening with the adjustment factor in the formula of Arabian Light being put at a discount of \$1.50/barrel in May compared to a discount of \$5.10 in April and \$7.50 in February. Third, oil exporters can take more radical action and decide to abandon using WTI as an international benchmark. The IEA has been advocating this position arguing that the "persistence of WTI's unusual weakness to other domestic and international crudes has raised questions about its viability as a regional benchmark" and that if large swings persist then "volumes may shift to more stable alternatives" as volatility "increases hedging risks". The IEA recognizes that one episode of volatility is unlikely to change the status of WTI, "but repetitions of such events could spark a search for alternatives."²

Despite its drawbacks, it is most likely that WTI will continue to serve as one of the main international benchmarks for pricing crude oil. Those who highlight the deficiency of WTI as a benchmark do not propose a viable alternative. Furthermore, many view these episodes of dislocation as one of the features of the current international pricing regime that market participants can deal with quite effectively. Although dislocations may occur, they usually do not last for long and the market finds its 'equilibrium' again. At the time of writing, the WTI price has already strengthened relative to the prices of other crude oils as Gulf Coast and Midwest

² Eduard Gismatullin, WTI Price Discount May Shift Benchmark, IEA Says", Bloomberg April 12, 2007.

refineries come back from maintenance and the physical demand for WTI increases. On April 17, the Brent-WTI differential had already narrowed to less than \$1.50 but then increased to \$3.48 on April 24. In fact, this situation has for sometime been reflected in the forward price curves where WTI spreads to Brent remained narrow for longer dated contracts. As to market participants, the periods of dislocation may create some inconveniences but do not pose serious problems to the current system. Exporters can overcome pricing issues by adjusting their price differentials while traders can hedge the resulting risks from dislocations by resorting to various financial instruments. In short, the current pricing system has created mechanisms to deal with its own weaknesses.

The fact that market participants are not concerned about the current situation where a couple of hundred thousand barrels of oil are flowing into a location full of logistical bottlenecks sets the price for millions of barrels is quite remarkable and puzzling. Players in financial markets consider this as an uninteresting detail that should be ignored, while in the current environment of high oil prices exporters seem to be happy selling their oil using inappropriate benchmarks. This recent episode demonstrates once more that an imperfect pricing system can survive unchallenged as long as market players have an interest in its survival.