

---

# OBSERVATION

## TD Economics

---



March 14, 2013

## DRILLING DOWN ON CRUDE OIL PRICE DIFFERENTIALS

### Highlights

- Since late last year, the widening differential between the Western Canadian Select (WCS) and West Texas Intermediate (WTI) benchmarks – commonly referred to as the bitumen bubble – has stolen the headlines as limited refinery capacity and pipeline constraints, combined with increased production by U.S. oil producers, have driven down the price Alberta's heavy oil commands. However, there is more to Canadian oil than just the heavy oil priced at WCS.
- Infrastructure constraints have also weighed on the prices received for other blends of oil from the western region. Eastern Canadian oil producers benefit from access to tidewater ports and receive higher Brent-benchmarked prices for its lighter oil.
- The economic impact from a depressed oil price environment has been more pronounced in nominal terms, as corporate profits and government revenues clearly took a hit in 2012. Real economic activity has been affected as well.
- Canadian crude price conditions have improved so far in 2013 and recent data on investment intentions show that the crude oil industry is not pulling in its horns. Still, price differentials remain abnormally wide, imposing a significant opportunity cost to Canada's economy.

While never far from the spotlight in Canada, the subject of crude oil pricing moved squarely onto centre stage late last year due to the growing price discount that Alberta oil producers were fetching for their bitumen relative to prices in international markets – the so-called “bitumen bubble”. In this report, we provide an update on crude oil pricing trends in Alberta and extend the analysis to include other oil-producing provinces, where the output mix of crude oil quality and grades differ. All oil produced in Western Canada – heavy or light – experienced widening differentials in 2012 with Alberta and Saskatchewan bearing the full force of the price declines, while Newfoundland and Labrador continues to enjoy robust price conditions. We also examine some of the potential economic impacts resulting from the lower pricing of Canadian crude.

### Composition of production across Canada

In terms of volumes of production, Canada remains the sixth largest oil producing nation in the world, and could vault to the world's fourth largest as early as 2015<sup>1</sup>, reflecting increased oil sands production. Indeed, Western Canadian oil production is projected to increasingly rely on production growth in the oil sands and favour heavy oil in the future. In 2012, output is estimated to have risen 7%, while the call for 2013 is even stronger (+12%) with both heavy and light oil production posting healthy increases (see Chart 1).

As Table 1 shows, three provinces account for the bulk of crude oil production in Canada, with Alberta's industry accounting for about 75% of total annual output. The breakdown between types of

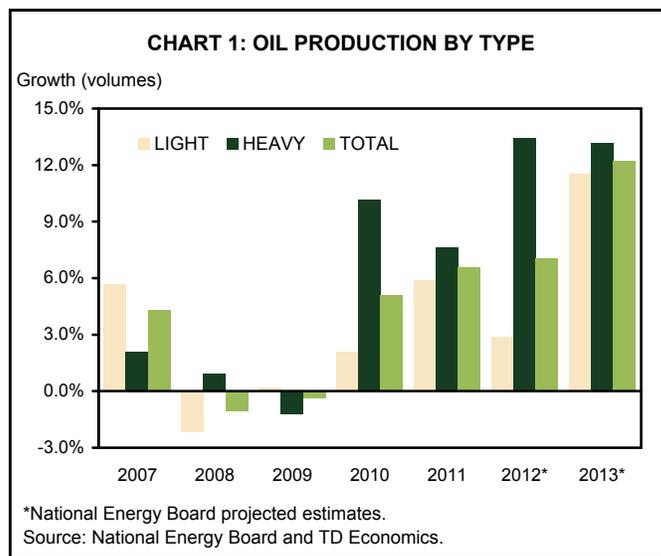
crude produced by region is also shown<sup>2</sup>. Put simply, not all crude oil is created equally. Heavy crude oil has a higher density, flows through pipelines more slowly and is typically more expensive to refine relative to lighter blends. As a result, the market price for heavier oil will be lower than lighter blends, all things equal. Table 1 also distinguishes between non-conventional and conventional crude oil, with the former developed by techniques other than the conventional oil well method<sup>3</sup>. Bitumen comprises all of Canada's non-conventional oil, and is either converted into heavy oil or upgraded to synthetic light crude.

Despite the rising share of heavy oil in Canada's overall production mix, about three-fifths of overall production remains of the light variety. According to National Energy Board data, Saskatchewan is a more oriented towards heavy oil production (two-thirds of its total) than Alberta (40%). Newfoundland and Labrador rounds out the "big three" in Canada and currently only produces light oil (this will change once the Hebron project comes on-line in 2017).

#### A closer look at prices

Historically, there are two crude prices that have received the lion's share of attention in Canada – the international Brent benchmark (sourced at the North Sea) and West Texas Intermediate (WTI) at Cushing Oklahoma, the latter of which forms the basis of crude pricing in North America. However, in light of a growing dichotomy in pricing between Brent and WTI, as well as domestically produced crudes, interest in this country has steadily expanded to a broader list of Canadian benchmark prices. As shown in Table 2, this list includes Western Canadian Select (WCS), which is a heavy crude benchmark blend, Edmonton Par and Syncrude Sweet.

The growing discounting of Canadian crude oil is high-



lighted in Table 2. This development boils down to two essential elements. The first revolves around a supply glut in the U.S. Midwest, which is reflected in the growing spread between North American (as measured by WTI) and international (Brent) crude. Traditionally, WTI and Brent prices have traded within US\$5 per barrel of each other. However, over the past few years, the crude oil landscape in the U.S. has changed dramatically due to a combination of rapidly growing crude oil supply, as well as a mismatch between pipeline infrastructure and available refinery capacity in the U.S. and the rest of the world. As a result, this differential has since widened to more than US\$20 per barrel.

The situation facing Canadian producers has been accentuated by another element, which is a growing supply glut of domestic production within an over-supplied North American market. Rising Canadian volumes have been forced to compete for limited takeaway capacity with growing U.S. production along the same pipeline routes. These

	% SHARE OF NATIONAL					% SHARE OF PROVINCE			
	CANADA	AB	SK	NL	OTHER	AB	SK	NL	OTHER
<b>Total Light</b>	<b>61</b>	<b>44</b>	<b>5</b>	<b>9</b>	<b>3</b>	<b>60</b>	<b>33</b>	<b>100</b>	<b>100</b>
Conventional Light	27	12	5	9	2	16	33	100	77
Upgraded/Synthetic	29	29	0	0	0	39	0	0	0
Other	5	4	0	0	1	5	0	0	23
<b>Total Heavy</b>	<b>39</b>	<b>30</b>	<b>9</b>	<b>0</b>	<b>0</b>	<b>40</b>	<b>67</b>	<b>0</b>	<b>0</b>
Conventional Heavy	14	5	9	0	0	6	67	0	0
Non-conventional Heavy	25	25	0	0	0	34	0	0	0
<b>Total</b>	<b>100</b>	<b>74</b>	<b>14</b>	<b>9</b>	<b>3</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Note: Totals may not add due to rounding.

Source: National Energy Board and TD Economics.

**TABLE 2: MAJOR PRICE BENCHMARK INDEXES, PRICES USD**

		2005	2006	2007	2008	2009	2010	2011	2012	Dec-12	Feb-13	Average 2005-12
Brent	International	55	66	73	98	62	80	112	113	111	118	82
West Texas Intermediate (WTI)	North America	57	66	72	100	62	80	95	94	88	95	78
Western Canadian Select (WCS)	Heavy - Western Canada	--	--	--	80	52	65	78	72	55	69	69
Syncrude Sweet	Synthetic Crude - Western Canada	--	66	75	102	62	78	104	93	89	97	83
Edmonton Par	Light - Western Canada	57	65	72	96	58	75	96	86	75	87	76

PRICE SPREAD DIFFERENTIAL USD - BRENT												
West Texas Intermediate (WTI)	North America	2	1	-1	2	0	-1	-17	-19	-23	-22	-4

PRICE SPREAD DIFFERENTIAL USD - WTI												
Western Canadian Select (WCS)	Heavy - Western Canada	--	--	--	-20	-10	-15	-17	-22	-34	-26	-17
Syncrude Sweet	Synthetic Crude - Western Canada	--	0	2	2	0	-1	9	-2	1	1	2
Edmonton Par	Light - Western Canada	1	-2	-1	-4	-4	-4	1	-8	-13	-8	-2

Note: Figures are based on annual and monthly averages.

Benchmark prices shown are meant to act as a proxy for the region and type of oil produced.

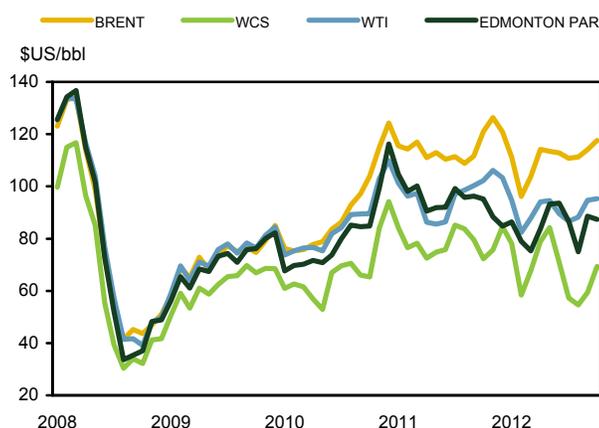
Source: Bloomberg and TD Economics.

impacts were compounded even further late last year by some temporary pipeline and refinery maintenance problems. Discounting of Canadian prices relative to the North American benchmark, WTI, has been especially evident for heavy crudes which accounts for about two-thirds of annual Canadian crude oil exports, despite representing less than half of current overall production. Still, even Canadian light blends have experienced larger differentials compared to the past few years; in fact, both lighter blends were trading at prices higher than WTI in 2011, but fell below WTI in 2012.

Other key highlights to take away from Table 2 include:

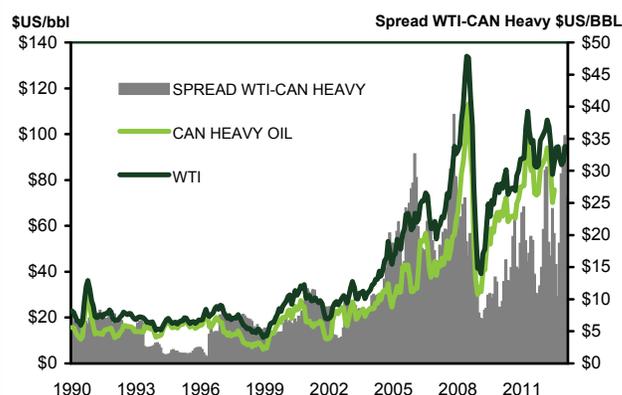
- The extent of price discounting for most Canadian blends relative to WTI has eased since December. For example, the WTI-WCS spread fell from a peak of US\$34 per barrel in December to about US\$25 per barrel in February. The WTI-Edmonton Par spread has been roughly cut in half.

- The prevailing discount of heavy oil relative to WTI remains lofty, but not as significant as is commonly believed. In the media, the period following 2008 tends to be used as a point of comparison. However, from a historical perspective that represented a time of relatively high Canadian heavy oil prices. Relative to a longer-term average, the extent of the heavy oil differential is less stark (see Chart 3). The lingering concern from a Canadian point of view centres on the potential long-term sustainability of current spreads given the lack of immediate infrastructure relief on the horizon combined with the projected increase in heavy oil production in the near future.
- On a more negative note, the differential between Brent and WTI has not only failed to narrow since December 2012, but remains substantially wider than its average since the mid-2000s. Thus, average pricing for Canadian

**CHART 2: SELECTED BENCHMARK PRICE INDEXES**


Note: Prices are expressed as monthly averages.

Source: Bloomberg and TD Economics.

**CHART 3: HISTORICAL HEAVY OIL PRICE INDEXES**


Note: Prices and spreads are expressed as monthly averages. The CAN HEAVY oil index uses the Edmonton Lloyd blend index for the January 1990 - April 2008 period and WCS thereafter.

Source: Bloomberg and TD Economics.

crudes relative to that globally remains quite low.

- A closer examination shows that much of the widening in the overall differential between Canadian crude benchmarks and the international benchmark reflects higher Brent prices rather than lower Canadian prices. Indeed, Canadian light crude continues to trade above average since 2005 while heavy crude is roughly in line.

On a regional basis, the price discounting challenge has played out differently based on the output mix<sup>4</sup>. Both Saskatchewan and Alberta have faced steep discounts in the wake of the current pricing environment. On the bright side, production from Newfoundland and Labrador is benchmarked off of elevated Brent prices since the region has ready access to ports and tankers and, hence, is not land-locked.

#### Price differentials: to see only gradual narrowing

Reflecting some of the unwinding in temporary factors, the easing in price discounts since late last year has raised some hopes that the worst might be over for Canadian crude pricing. However, given that excess crude production has been the chief culprit behind the challenge of discounted prices, only reduced supply, increased refining capacity or a reduction in transportation infrastructure bottlenecks would address the situation on a more permanent basis. With no signs of Canadian and U.S. production letting up significantly and refinery additions limited, most analysts are looking to enhanced pipeline and other transportation capacity to ultimately relieve the pressure.

There has been some easing in infrastructure constraints out of Cushing, Oklahoma with the recent reversal and expansion of the Seaway pipeline, which will allow some of the surplus oil to flow south towards the Gulf. This indirectly provides Canadian producers with a temporary boost, however, it is not enough to address the structural challenges associated with the volumes of oil come out of Canada.

One potential game changer is the Keystone XL pipeline, which is awaiting U.S. Presidential approval, but is by no means guaranteed to move forward. Companies also continue to mull over a number of other pipeline options as well as increasing use of rail and barge to transport oil to North American markets. The consensus currently is that the gap between Brent and WTI will close noticeably over the next 1-2 years but will remain above the typical \$5 per barrel spread as is implied by the futures market. As of March 9, 2013, the call as per the futures curve was for the differential between Brent and WTI to be around \$11

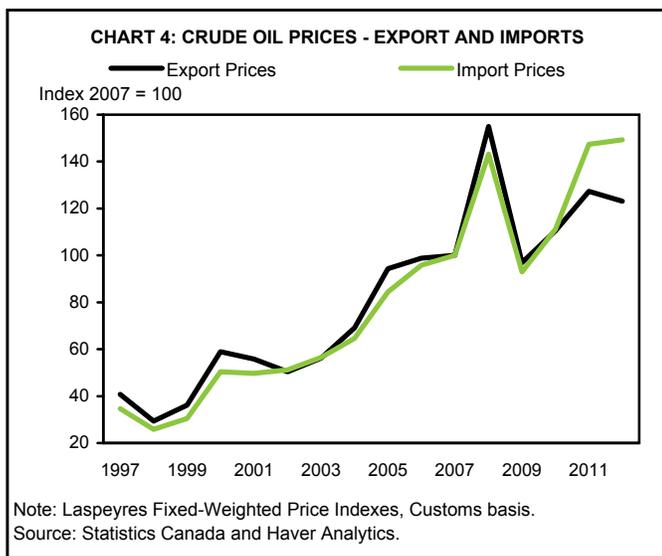
per barrel by December 2015. The spread within North America – between WTI and WCS – is anticipated to creep down to hover around the \$23 per barrel range by that same date. However, this spread has been notoriously volatile and there remains the risk that differentials could widen again.

#### Economic impacts of price discounting

The Canadian oil sector is a major contributor to the Canadian economy. Not only do the revenues fuel corporate profits and foster investment in Canada, but royalties help contribute to government revenues while employment growth tied directly or indirectly to the sector provide a boost to labour incomes.

Recent data and other information highlight the fact that declines in Canadian crude oil prices and the sharp widening in price differentials in 2012 took an economic and fiscal toll on the national and western economies:

- In the most recent Monetary Policy Report, the Bank of Canada quantified the impact of the underperforming oil sector on the Canadian economy in the second half of 2012 – estimating that it shaved roughly half a percentage point off annualized real GDP growth. The hit reflects not only lower oil prices, but a reduction in investment, exports and production.
- While the central bank didn't provide provincial estimates, this impact was almost certainly concentrated in the economies of Alberta and Saskatchewan, which is consistent with recent moderate downgrades to 2012 real GDP growth estimates for these provinces. Saskatchewan's exposure to weaker conditions in heavy oil pricing is slightly more muted compared to Alberta as the industry accounts for a smaller 15% real GDP share compared to about 25% in Alberta.
- Still, the impact on nominal exports and income has been more notable. Corporate profits in the in oil and gas extraction sector declined by more than 50% in 2012 to \$7.1 billion, the lowest annual turnout since 1999. Canada's terms of trade has also weakened considerably. While Canada production is more tilted towards light crude, the majority of exports are heavy crude, resulting in a disproportionately bigger hit to export earnings. Yet, due to market access issues, Canadian refineries in Quebec and the Maritime provinces rely on imported crude at Brent prices. This result has led to a deterioration of Canada's terms of trade of crude oil (see Chart 4).



- Government coffers have also been significantly impacted by the widening differentials. Lower royalties and lower income taxes arising from weaker-than-expected crude oil prices has been instrumental in the Alberta government revising up its estimated 2012-13 deficit projection to \$4 billion. In Saskatchewan, resource royalties have fallen short by some \$300 million in the current fiscal year. Finance Minister Flaherty has also warned of the negative impact on the federal books from the trends in crude prices.
- In contrast, Newfoundland and Labrador continues to enjoy a healthier pricing environment since its production can access Brent-linked pricing. However, from a volumes perspective, Newfoundland's offshore production has underperformed in recent years due to a natural decline in production from reserves (Hibernia and Terra Nova) and scheduled maintenance disruptions<sup>5</sup>. As such, royalty revenues are projected to come in \$460 million below budget forecasts, reflecting both the flatter performance of Brent relative to the budget forecast as well as lower output.

Looking ahead to 2013, there have been questions about how crude oil price developments will impact investment trends. The recent release of Statistics Canada's Survey on Private and Public Investment Intentions did not provide the smoking gun that overall investment will weaken significantly in Alberta, where investment intentions in the oil and gas sector are projected to remain flat. However, a sustained higher price differential can impact the long-run relative attractiveness of the oil sands as a place to invest. Data for

Saskatchewan were undeniably weaker for 2013 (-10%) on the heels of 2012's decline of almost 30%. On the flip side, Newfoundland and Labrador is expected to see a continued surge in investment activity in 2013 (+83%) following a similar gain in 2012 (+77%). At the national level, a closer look at investment intentions at a higher level of detail shows that non-conventional oil extraction investment is expected to increase a healthy 10% in 2013, while conventional oil and gas extraction is expected to decline 6%.

The moderate rebound in pricing conditions so far this year – combined with expectation of some further gradual improvement – imply the likelihood that the drag exerted by crude oil on Canada's economy could reverse to some extent as 2013 unfolds. As such, we're not inclined to significantly cut our 2013 economic growth projections for Alberta and Saskatchewan in the upcoming March forecast. Recall that our December 2012 quarterly forecast had growth in both provinces at close to 3%. We may revise up Newfoundland and Labrador's growth rate from the 1.8% rate shown in the December outlook.

These economic impacts should be distinguished from prevailing estimates on the "opportunity cost" resulting from lower Canadian pricing relative to WTI and/or Brent. For example, if one were to focus on Canada's trade position, if all crude oil from Western Canada was able to access port markets and received a benchmarked Brent price less a "normal" differential to reflect the quality difference between heavy and light oil and embedded transportation costs<sup>6</sup>, Canadian oil exports would have been an estimated \$6 billion higher in value in 2012, all else equal, which is roughly the size of the country's trade deficit. If one takes aggregate income into account, some estimates have the overall hit to the Canadian economy from lower prices at more than three to four times larger that figure<sup>7</sup>.

### Bottom Line

The economic hit from last year's decline in Canadian oil prices, both in absolute and relative terms, has been reinforced by recent data on economic activity, trade and government fiscal performances. While price conditions have improved moderately since the tail end of 2012 – and some further improvement could be in the offing – Canada's heavy and light crude oil are still likely to trade at discounts that are wider than has historically been the case. Focus will thus remain on the opportunity cost to Canada of the price differentials.

## End Notes

1. <http://www.nrcan.gc.ca/energy/publications/sources/crude/issues-prices/1223>.
2. Oil can vary in terms of its density (measured in API gravity) and is categorized as heavy, medium and light. Production data for this study was based on National Energy Board (NEB) estimated production of Canadian crude oil and equivalent tables. These tables categorize oil as either heavy or light and break out production by region. The NEB includes the majority of the medium oil in Canada in the light category, with the exception being an area of Saskatchewan that can be considered medium but is categorized as heavy by the NEB.
3. Statistics Canada defines non-conventional oil extraction as producing crude oil from surface shales or tar sands or from reservoirs in which the hydrocarbons are semisolids and conventional production methods are not possible. This includes bitumen production as well as synthetic crude oil production.
4. Aligning oil prices with regional production is a very micro oriented process as prices producers receive can vary depending on conditions specific to each project (e.g., geography, transportation costs, pipeline capacity, access to markets etc.). For the purposes of this report, benchmark prices were selected to reflect broad factors inherent to the type of region and oil produced and are meant to act as a proxy for the overall pricing environment in Canada.
5. “Crude Oil: Forecasts, Markets and Pipelines”, Canadian Association of Petroleum Producers, June 2012.
6. This estimated average price differential between Canadian heavy and light oil with Brent is derived by taking the average monthly price differential between WCS from Brent (heavy) and Edmonton par from Brent (light) over the May 2008-January 2013 period. These prices are then applied to the NEB estimates of heavy and light oil volume exports as of November 2012.
7. “Tackling the Top 10 Barriers to Competitiveness”, The Canadian Chamber of Commerce.

This report is provided by TD Economics. It is for information purposes only and may not be appropriate for other purposes. The report does not provide material information about the business and affairs of TD Bank Group and the members of TD Economics are not spokespersons for TD Bank Group with respect to its business and affairs. The information contained in this report has been drawn from sources believed to be reliable, but is not guaranteed to be accurate or complete. The report contains economic analysis and views, including about future economic and financial markets performance. These are based on certain assumptions and other factors, and are subject to inherent risks and uncertainties. The actual outcome may be materially different. The Toronto-Dominion Bank and its affiliates and related entities that comprise TD Bank Group are not liable for any errors or omissions in the information, analysis or views contained in this report, or for any loss or damage suffered.