

Spreads Matter: Understanding the Role of WCS and WTI for Monetary Policy

- The Canadian economy is sensitive to the level of oil prices.
- WTI and WCS have different impacts on the Canadian economy, with domestic demand and exports sensitive to WCS, while total inflation and exchange rate are more affected by WTI.
- In terms of monetary policy, shocks to the WCS-WTI spread are over 60% more impactful compared to the combined WCS and WTI shocks.

INTRODUCTION

Over the last 5 years the Canadian economy has undergone a complex adjustment to the significant decline in crude oil prices since 2014–15, as measured for example by the WTI benchmark. The decline triggered a significant reallocation of resources in the Canadian economy, as a result of which the economic footprint of the oil and gas sector has fallen dramatically.

In addition to the external shock of 2014–15, the Canadian oil patch had to endure domestic transportation bottlenecks due to the lack of pipeline capacity, which cut the price received by Canadian oil producers in the US markets, as reflected in the Western Canada Select price benchmark. This was especially the case at the end of 2018, when the discount on Canadian crude reached all-time highs. The most recent episode demonstrated that, in addition to the impact of international crude price benchmarks, changes in the discount on Canadian crude have strong implications for the Canadian economy.

Even though the importance of crude oil price benchmarks for Canada is clear, the relative importance of WTI and WCS is not. In this note we quantify the relative importance of the two price measures for various aspects of the Canadian economy, disentangling the channels by which the two benchmarks impact the Canadian economy. In order to do that we re-estimate most of the equations of the [Scotiabank Global Macroeconomic Model \(SGMM\)](#) by including the price of WCS in addition to WTI (see chart 1).

IMPORTANCE OF WCS & WTI—UPDATING SGMM

The summary of the re-estimation results is shown in Table 1. For each of the equations in the table we document the relative weights of the two oil price benchmarks. For some variables there are two equations, one for the long-run level and one for short-term fluctuations around this long-run level. Most of the results agree with our a priori intuition.

- **Domestic demand:** given that domestic demand is composed of consumption and investment, it is intuitive that domestic demand is primarily tied to WCS in the long run. The oil sector's revenues are closely tied to WCS, hence the wealth effect of oil prices on consumption and business investment is best captured by this oil price.

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Chart 1

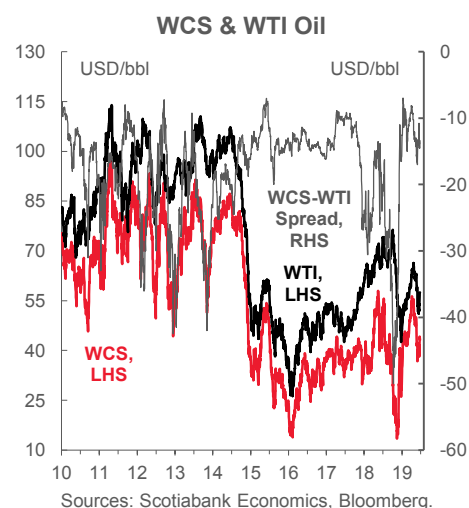
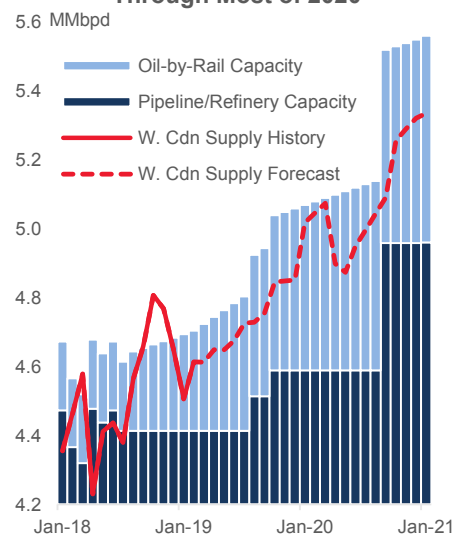


Chart 2

Line 3 Delay Extends Canadian Oil Patch's Reliance on Oil-by-Rail Through Most of 2020



- **Exports:** as expected, real exports are tied to WCS.
- **The Canadian dollar** is tied to prices of both WCS and WTI, although WTI is dominant, which is a robust observation across various estimation methods.
- On the price side, **core CPI** is driven mostly by WTI, although the pass-through is very small. Since gasoline tracks WTI prices as it is refined in and imported from the US, the difference between the **total CPI** and core CPI is exclusively driven by WTI.

Table 1

Equation	Weight on WCS	Weight on WTI
Domestic demand long-run	100%	0%
Domestic demand short-term	0%	100%
Real exports	100%	0%
Exchange rate long-run	25%	75%
Exchange rate short-term	0%	100%
Core CPI	33%	67%
GDP deflator	0%	100%
Unit labour cost, gap	100%	0%
Total CPI relative to core CPI	0%	100%

ECONOMIC IMPACT OF OIL PRICE SHOCKS

To quantify the economic impact of oil price shocks, we run two persistent 10% oil price shocks: first, a combined shock to WTI and WCS prices, and, second, a shock to WCS only (see chart 3 for the path of either variable in deviation from the baseline forecast). This covers the range of the most plausible scenarios, since most of the time either global developments move both oil prices together, or Canadian-specific factors move the WCS-WTI discount, without affecting the WTI.

Charts 4–10 show the results of our simulations. Relative to the baseline, a 10% persistent increase in both the WTI and WCS implies:

- A higher total CPI inflation, which immediately rises by 0.25ppts on the back of rising prices for WTI-linked refined products;
- Spurred on by a positive wealth effect, the domestic demand rises by just over 0.5% after a few quarters;
- Exports are slightly lower following the shock, as the Canadian dollar appreciates by 1.4% curtailing non-energy exports, which offsets the positive impact of higher WCS prices on energy exports;
- As a result of a boost to domestic demand, the overall GDP rises by 0.14%;
- Stronger GDP helps increase core inflation by just over 0.04ppts;
- The Bank of Canada responds to the oil price shock by hiking the policy rate by 5bps.

Thus, a combined shock has offsetting impacts on GDP from higher domestic demand and slightly weaker exports, the latter due to the rising Canadian dollar.

In contrast, when WCS moves while WTI does not, the appreciation of the Canadian dollar is much more muted, which leads to a slightly stronger response of inflation, and thus interest rates. If the price of WCS rises by 10% relative to the baseline, the response of the economy differs from the prior simulation:

- Total inflation rises only slightly, given that WTI is unchanged and thus the components of total inflation linked to refined products remain relatively unchanged in the simulation;

- The response of the Canadian dollar is much more muted. Absent the strong USDCAD offset exports rise on impact, which, along with stronger domestic demand helps boost GDP persistently above the baseline;
- Higher GDP nudges core inflation up by roughly 5bps above the baseline and much more persistently.
- To respond to inflationary pressures the policy rate rises by 9bps.

The estimated impact of the movement of WCS on the Canadian economy is more persistently positive, compared to the combined WCS and WTI shock. This also implies that the inflationary impact and the monetary policy response are stronger following a WCS shock, compared to a combined rise in WTI and WCS.

We also simulate a positive shock to WTI without a corresponding response of WCS. In this case, the WCS-WTI spread falls as a result of the increase of WTI. Since the bulk of the wealth effect on domestic demand is not driven by WTI but by WCS and most of the effect on the exchange rate is function of WTI; domestic demand only increases slightly and exports fall as a result of the appreciation of the Canadian dollar. Therefore, real GDP and the output gap somewhat increase and the appreciation of the Canadian currency dominates the behaviour of core inflation which eventually falls moderately. The fall of core inflation eventually pushes the policy rate slightly downward. It is worth noting that since total CPI reacts mostly to WTI fluctuation, the shock noticeably increases total CPI.

CONCLUSION

In this note we have quantified the impact of oil price changes on the Canadian economy: we re-estimated the Scotiabank Global Macroeconomic Model, introducing the WCS price in addition to the already included WTI price. The inclusion of two different prices of oil is motivated by the intuition that the two benchmarks impact the Canadian economy through different channels.

We found that:

- The wealth effect on domestic demand is driven primarily by changes to the WCS oil price;
- The volume of exports responds to the Canadian-specific oil price as well;
- Total CPI inflation is predominantly affected by movements in the WTI, which captures the movements in prices of refined products imported from the US;
- The Canadian dollar, somewhat curiously, is mostly driven by the WTI. It is possibly explained by the fact that the Canadian dollar is mostly traded based on WTI as opposed to WCS.
- Given the role of the Canadian dollar in equilibrating the economy, the empirically-attested dependence of the dollar on the WTI leads to lower inflationary pressures from the combined WTI and WCS shock, compared to a WCS-only shock.
- This also helps explain a need for stronger response from the Bank of Canada to WCS-only shocks.

Chart 3

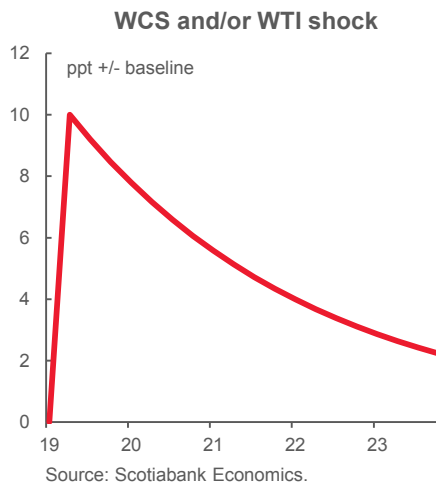


Chart 4

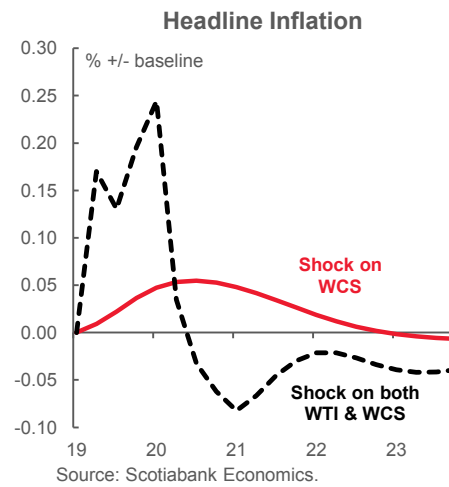


Chart 5

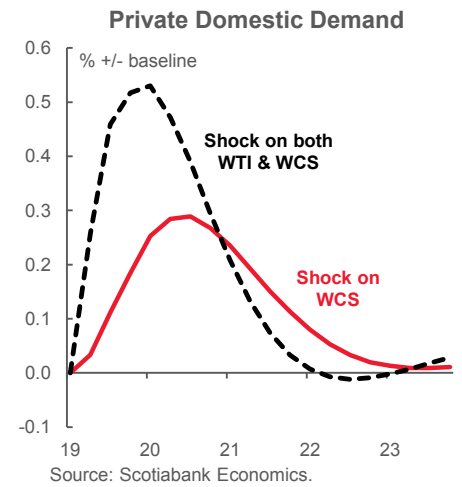


Chart 6

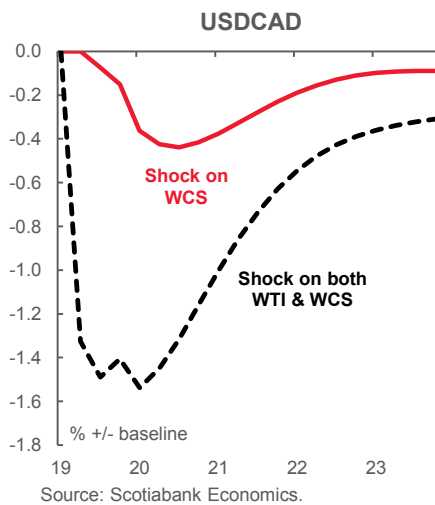


Chart 7

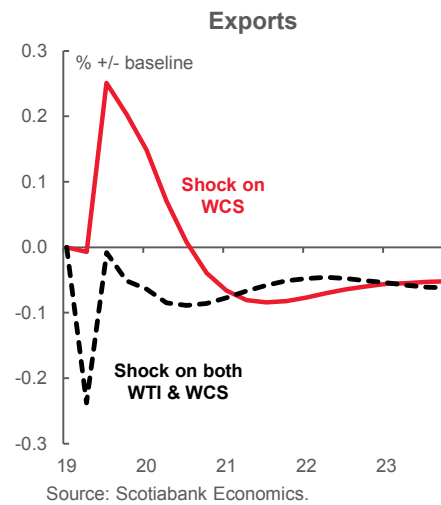


Chart 8

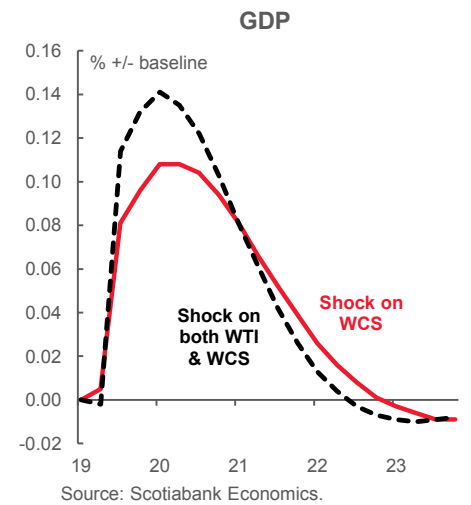


Chart 9

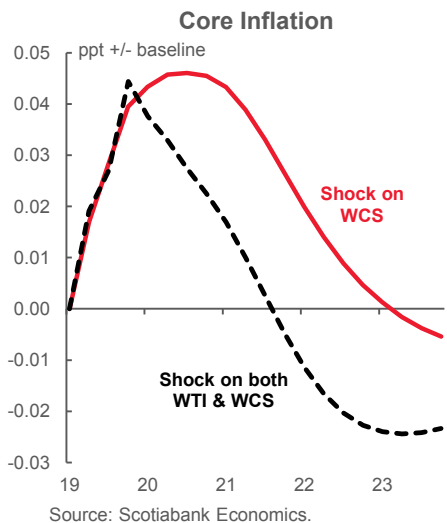
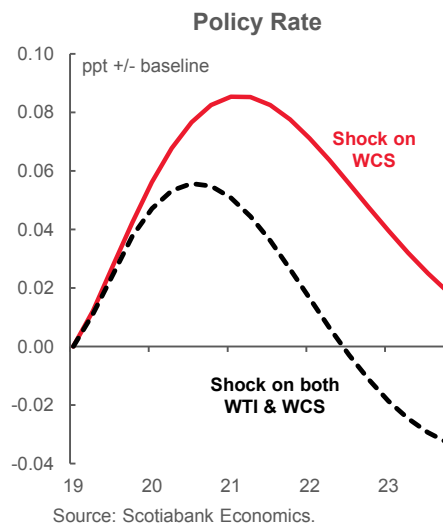


Chart 10



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