

Quick Hit – ‘Tis the season to be studying seasonality

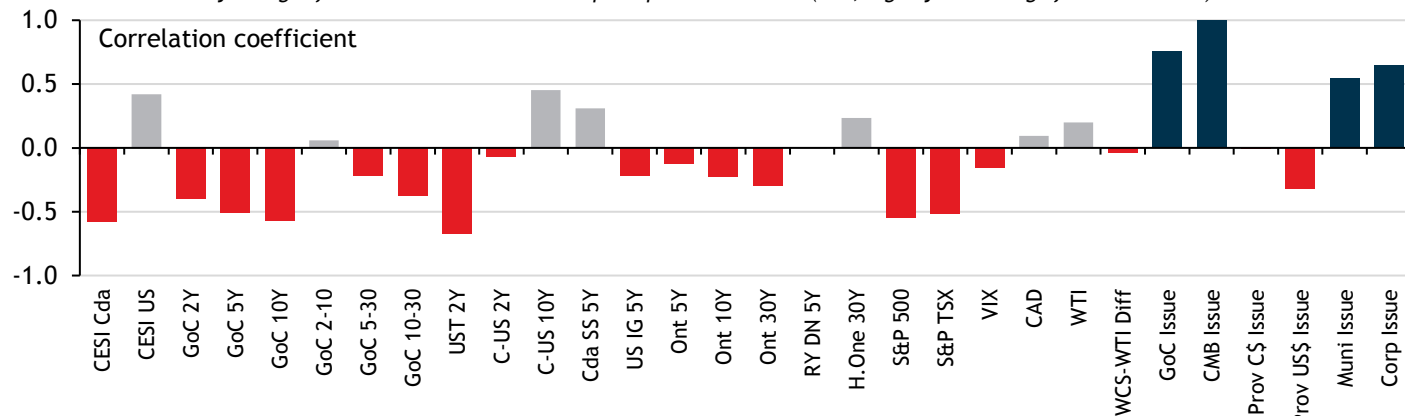
With 2018 now in the rear-view mirror, we decided to look back at the year that was to see how monthly asset performance, supply patterns and other financial market indicators held up versus trends/patterns of years past. As was the case when we undertook this exercise previously, we find little evidence to support a continued and consistent seasonal trend for the majority of variables. As it turns out, equities, rates, credit, currencies, etc. are rather difficult to predict based solely on the calendar month. In fact, the only seasonal trends that held in 2018 were supply patterns for issuers who are deliberately transparent and predictable (e.g. GoC and CHT). We’ve broken down the data from a number of angles and have presented our results in the tables and charts that follow. Charts 1-7 illustrate how this year’s monthly moves have aligned with the average monthly changes observed in the post-crisis period. Tables on pages 3-5 detail average monthly levels and changes for a sample of indicators. We’ve also given a short, high-level discussion for some select variables, indicating whether the prior trend held (✓) or not (✗):

- **Canadian rates (✗)** – Across the curve, Canadian interest rate movements in 2018 were negatively correlated with the average monthly trend since 2010. In the post-crisis landscape, rates had tended to rally early in the year and sell off late. Of course, 2018 couldn’t be any different—rates marched higher through Jan/Feb and fell off a cliff in Nov/Dec as global risk sentiment eroded (Chart 2).
- **Canada-US yield differentials (mostly ✗)** – While there’s no correlation in the 2-year sector, the correlation coefficient between 2018 movements in Canada-US 10-year yield differentials and its historical averages is relatively small, though it is positive (0.45). While we’re hesitant to say that there’s consistent seasonality throughout the year in Canada-US differentials, we’ll admit that December saw outperformance of Canada vs the US in most of the curve, a trend observable in December’s past. We chalk this up in part to seasonal cash flows and related index adjustments and to the Bank of Canada’s somewhat abrupt change of tone. Nonetheless, a correlation of 0.45 translates to an R^2 of just 0.2—not a statistically significant year-long relationship (Chart 3).
- **Canada swap spreads (mostly ✗)** – Looking at the heat map of average monthly changes (Table 2), you’ll notice swap spreads have tended to widen in Q2 and Q4, and contract in Q3. While the second half of the year looked like past-year averages, the first half of 2018 bucked the trend, resulting in a full year correlation coefficient of just 0.3. Still, we concede some seasonality does exist in Canadian swap spreads due to the concentration of housing/mortgage activity and related hedging during certain times of the year, though blind devotion to these trends is a dangerous game (Chart 4). *[For more on seasonality in the interest rate/swap spread space, we’d refer you to our colleagues in IRD Trading who regularly undertake this analysis.]*
- **US investment grade credit spreads & equities (✗)** –The risk-off sentiment that we observed in the back end of 2018 for both IG and equities has bucked the typical pattern of risk assets performing towards the end of the year. As a result, the correlation between 2018 performance and the post-crisis average performance turned negative for both stocks and corporate credit (Chart 5).
- **Provincial credit spreads (✗)** – Much like with US credit and stock indices, provincial credit stumbling into the finish line of 2018 goes against what we’d typically observed in years past. Over the prior 8 years, we’d seen the Ontario 10Y spread tighten by an average of 1.7 and 1.5 bps in November and December. This year we saw no such thing. *Widening* of roughly 2 bps in November and 14 bps in December helped drive the correlation between this year and past years’ spread movements into negative territory (Chart 6, Table 3).
- **Canadian dollar (✗)** – The Canadian dollar’s monthly performance (vs. the USD) this year shows just about zero correlation with the rest of the post-crisis period—not a big surprise, given the volatile nature and unpredictability of exchange rates, in general (Chart 7).
- **Bond supply (✓ and ✗)** – Well, we did find seasonality somewhere. GoC, CMB, muni and corporate issuance in 2018 was at least modestly positively correlated with that of years past. However, provincial issuance wasn’t, with a few major elections partly to blame.

In many ways, 2018 was a unique year. The violent and volatile manner in which we saw the year draw to a close was something we hadn’t experienced in quite a while. Asset prices saw extreme moves, often times in stark contrast with price behavior for the same month from prior years. This only reinforced our long-held view there are few, if any, *consistent and reliable* seasonal trends in financial markets. As you position for the year ahead, be mindful that relying solely on perceived seasonals to achieve performance remains a risky endeavour.

Chart 1: The seasonality story was mostly non-existent in 2018

Correlation in monthly changes for select variables: 2018 vs prior post-crisis trend (i.e., eight-year average from 2010-2017)

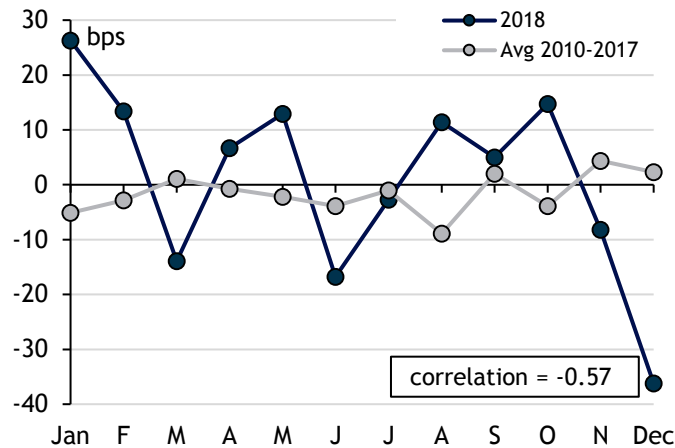


Source: NBF, Bloomberg | Notes: Re shading, negative correlations shaded red, materially positive correlations (R>0.5) shaded blue, all others shaded grey; correlations based on month-to-month changes (either in level or percentage terms)

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Chart 2: Canada 10-year interest rate (*)

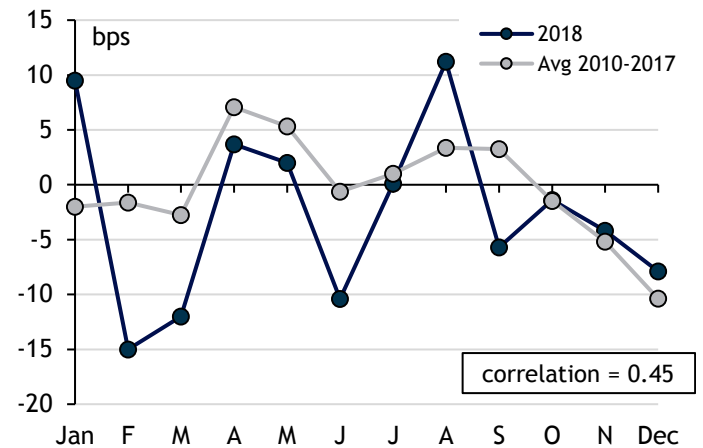
Monthly change in 10-year Canada yield



Source: NBF, Bloomberg | Note: Changes based on monthly average levels

Chart 3: Canada-US yield differential (mostly *)

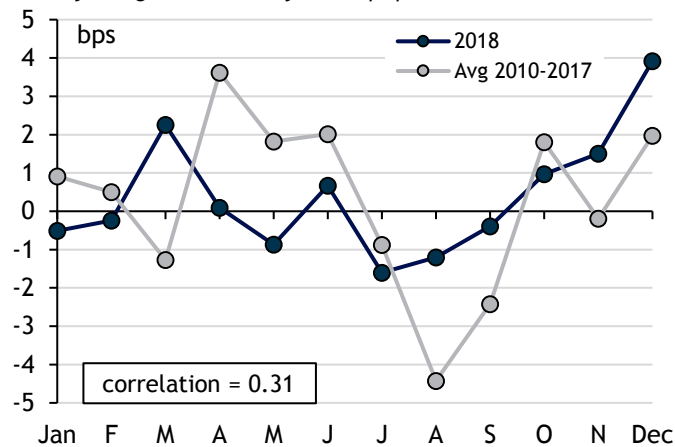
Monthly change in Canada-US 10-year yield differential



Source: NBF, Bloomberg | Note: Changes based on monthly average levels

Chart 4: Canada swap spreads (mostly *)

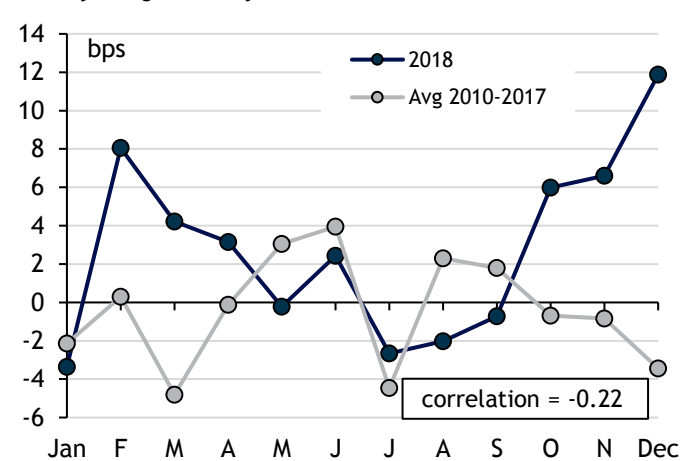
Monthly change in Canada 5-year swap spreads



Source: NBF, Bloomberg | Note: Changes based on monthly average levels

Chart 5: US IG credit spreads (*)

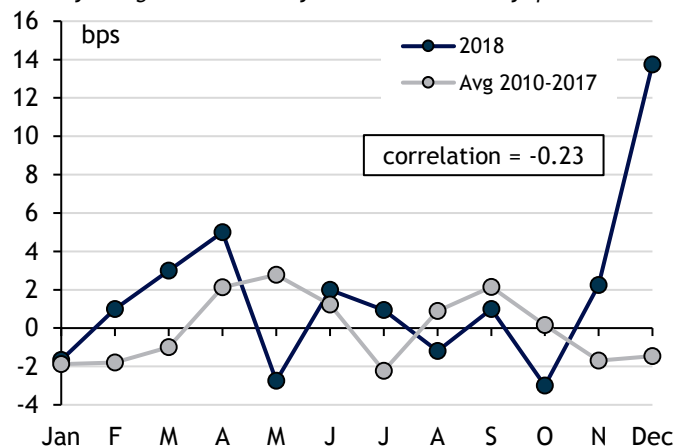
Monthly change in US 5-year IG CDX



Source: NBF, Bloomberg | Note: Changes based on monthly average levels

Chart 6: Provincial credit spreads (*)

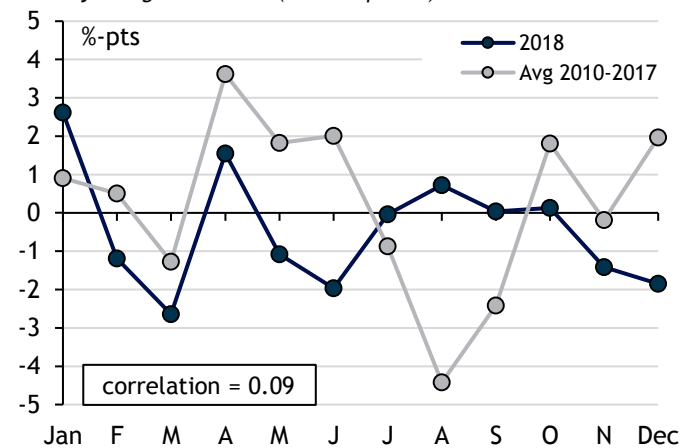
Monthly change in Ontario 10-year constant maturity spread vs GoC



Source: NBF | Note: Changes based on monthly average levels

Chart 7: Canadian dollar vs. US dollar (*)

Monthly change in CADUSD (i.e. US\$ per C\$)



Source: NBF, Bloomberg | Note: Changes based on monthly average levels

Table 1: Seasonal heat map (level)

Average level by month: 2010-2018 (i.e., 9 years)

Variable		Unit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg	Std dev	High	Low
Eco	US Economic Surprise	Index	28	19	16	2	-19	-35	-29	-17	-1	8	20	28	2	22	Jan	Jun
	Cda Economic Surprise	Index	-1	-7	-11	14	28	22	12	0	-2	0	2	6	5	12	May	Mar
	Cda-US Eco Surprise	Index	-29	-26	-28	12	46	57	41	17	0	-9	-18	-22	3	31	Jun	Jan
Rates Swaps	US Bond Yield (2Y)	%	0.78	0.80	0.85	0.84	0.83	0.83	0.82	0.80	0.83	0.84	0.91	0.98	0.84	0.05	Dec	Jan
	US Bond Yield (10Y)	%	2.52	2.54	2.58	2.51	2.46	2.42	2.40	2.29	2.29	2.29	2.37	2.45	2.43	0.10	Mar	Oct
	Cda Bond Yield (2Y)	%	1.10	1.09	1.14	1.20	1.18	1.14	1.16	1.12	1.18	1.18	1.19	1.19	1.16	0.04	Apr	Feb
	Cda Bond Yield (10Y)	%	2.21	2.20	2.20	2.20	2.19	2.14	2.13	2.06	2.08	2.07	2.10	2.08	2.14	0.06	Jan	Aug
	Cda-US Yield Spread (2Y)	Bps	31.8	29.2	28.1	35.8	35.1	31.6	34.3	32.0	34.2	33.8	27.8	21.0	31.2	4.2	Apr	Dec
	Cda-US Yield Spread (10Y)	Bps	-31.0	-34.1	-37.9	-31.2	-26.2	-28.0	-27.1	-22.8	-20.6	-22.0	-27.1	-37.2	-28.8	5.7	Sep	Mar
	US Swap Spread (5Y)	Bps	14.1	15.4	14.2	14.3	15.4	16.3	15.6	15.4	14.0	14.6	13.3	11.7	14.5	1.2	Jun	Dec
	Cda Swap Spread (5Y)	Bps	29.6	30.0	29.1	32.3	33.9	35.7	34.8	30.7	28.5	30.2	30.2	32.4	31.5	2.3	Jun	Sep
	Cda-US Swap Sprd/Sprd (5Y)	Bps	15.5	14.6	14.9	18.1	18.4	19.4	19.2	15.3	14.5	15.7	16.9	20.7	16.9	2.1	Dec	Sep
Credit	US IG CDX (5Y)	Bps	79.8	80.9	77.1	77.4	80.1	83.8	79.6	81.4	82.9	83.0	83.0	81.2	80.9	2.2	Jun	Mar
	Ontario vs GoC (3Y)	Bps	30.8	31.9	32.3	34.1	34.8	35.0	34.3	33.9	33.9	33.3	32.9	32.5	33.3	1.3	Jun	Jan
	Ontario vs GoC (5Y)	Bps	47.4	47.5	48.6	51.5	51.9	52.4	50.8	51.4	52.0	51.7	51.1	50.9	50.6	1.7	Jun	Jan
	Ontario vs GoC (10Y)	Bps	79.9	78.4	77.9	80.3	82.5	83.8	81.9	82.6	84.6	84.4	83.1	83.4	81.9	2.3	Sep	Mar
	Ontario vs GoC (30Y)	Bps	88.6	88.2	87.1	89.6	91.8	92.2	91.0	92.0	93.2	93.4	92.2	92.3	91.0	2.1	Oct	Mar
	RY Dep Note vs GoC (5Y)	Bps	94.5	91.7	88.9	88.8	90.9	96.2	92.9	93.7	96.2	95.8	94.3	98.8	93.5	3.0	Dec	Apr
	Hydro One vs GoC (30Y)	Bps	141.7	141.7	139.0	140.0	142.2	146.6	145.2	146.8	149.2	149.8	148.0	151.0	145.1	4.1	Dec	Mar
Stocks Vol	S&P 500	M/M %	1.3	0.8	2.2	0.9	0.1	-0.4	1.7	-0.7	0.6	0.9	1.5	0.9	0.8	0.8	Mar	Aug
	S&P TSX	M/M %	1.0	1.0	1.2	0.1	-0.3	-0.7	0.6	-0.4	0.2	0.0	0.5	-0.4	0.2	0.6	Mar	Jun
	Volatility (VIX)	Index	16.8	17.8	16.0	15.4	16.6	17.3	15.5	17.7	18.3	18.2	17.4	17.3	17.0	1.0	Sep	Apr
	US Financial Cond'n	Index	-0.09	-0.09	0.04	0.08	0.05	-0.09	0.05	-0.07	-0.11	-0.07	0.00	-0.11	-0.04	0.07	Apr	Dec
Ccy Commod	US Dollar (Trade Wgt)	Index	86.9	86.6	87.1	86.7	87.3	87.4	87.5	86.9	86.9	87.0	88.4	88.8	87.3	0.7	Dec	Feb
	Canadian Dollar	US\$/C\$	88.5	88.2	88.4	89.6	88.7	88.4	88.7	88.4	88.4	87.9	87.1	86.6	88.2	0.8	Apr	Dec
	Crude Oil (WTI Spot)	US\$/bbl	72.5	73.4	75.7	78.3	76.8	75.1	75.8	73.7	73.9	73.5	71.0	69.9	74.1	2.4	Apr	Dec
	Nat Gas (HH Future)	US\$/MMBtu	3.59	3.39	3.24	3.30	3.40	3.50	3.43	3.29	3.29	3.31	3.50	3.45	3.39	0.11	Jan	Mar
	Gold (Spot)	US\$/oz	1,325	1,349	1,347	1,346	1,335	1,332	1,323	1,356	1,372	1,358	1,345	1,319	1,342	16	Sep	Dec
Bond Supply	GoC Nominal (CAD)	C\$bln	8.5	9.8	6.3	9.2	10.3	7.5	8.9	10.3	5.0	9.9	10.5	4.3	8.4	2.1	Nov	Dec
	CHT (CAD)	C\$bln	0.0	4.5	5.3	0.0	4.8	5.3	0.0	4.5	5.3	0.0	4.5	5.3	3.3	2.4	4X	4X
	Provincial (CAD)	C\$bln	6.0	4.5	4.0	4.3	6.3	5.6	4.1	4.3	5.0	6.1	5.0	3.8	4.9	0.9	May	Dec
	Provincial (USD)	C\$bln	1.8	1.1	0.3	1.5	2.0	1.1	1.0	0.6	1.6	1.3	0.2	0.5	1.1	0.6	May	Nov
	Municipal (CAD)	C\$bln	0.2	0.3	0.3	0.4	0.5	0.4	0.2	0.1	0.5	0.5	0.5	0.1	0.3	0.2	Nov	Dec
	Corporate (CAD)	C\$bln	6.8	6.5	8.5	5.4	8.5	7.9	6.8	3.5	9.1	5.9	8.2	4.3	6.8	1.8	Sep	Aug

Source: NBF, Bloomberg; to aid interpretation, shading has been applied from high to low values, with green generally synonymous with "risk-on" and red most consistent with "risk-off"; for equities, values reflect monthly changes

Table 2: Seasonal heat map (change)

Average change by month: 2010-2018 (i.e., 9 years)

	Variable	Unit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg	Std dev	High	Low
Eco	US Economic Surprise	Index pts	-2	-9	-3	-14	-20	-16	6	12	16	10	12	8	0	12	Sep	May
	Cda Economic Surprise	Index pts	-6	-6	-4	25	14	-6	-10	-12	-2	2	2	4	0	11	Apr	Aug
	Cda-US Eco Surprise	Index pts	-4	2	-1	39	34	10	-16	-24	-18	-8	-10	-4	0	19	Apr	Aug
Rates Swaps	US Bond Yield (2Y)	Bps	1.1	1.2	5.8	-1.0	-1.2	-0.4	-0.8	-1.9	3.2	0.7	7.1	6.4	1.7	3.2	Nov	Aug
	US Bond Yield (10Y)	Bps	-0.9	2.1	3.2	-6.6	-5.5	-3.6	-2.1	-10.9	0.1	-0.3	8.0	8.1	-0.7	5.6	Dec	Aug
	Cda Bond Yield (2Y)	Bps	-0.8	-1.4	4.7	6.7	-1.9	-3.9	2.0	-4.2	5.3	0.3	1.2	-0.4	0.6	3.5	Apr	Aug
	Cda Bond Yield (10Y)	Bps	-1.6	-1.0	-0.6	0.1	-0.5	-5.3	-1.2	-6.7	2.3	-1.8	3.0	-2.0	-1.3	2.7	Nov	Aug
	Cda-US Yield Spread (2Y)	Bps	-1.9	-2.6	-1.1	7.7	-0.7	-3.5	2.8	-2.3	2.2	-0.4	-6.0	-6.8	-1.1	3.9	Apr	Dec
	Cda-US Yield Spread (10Y)	Bps	-0.7	-3.1	-3.8	6.7	5.0	-1.7	0.9	4.2	2.3	-1.5	-5.1	-10.1	-0.6	4.7	Apr	Dec
	US Swap Spread (5Y)	Bps	-0.7	1.3	-1.2	0.1	1.2	0.9	-0.7	-0.1	-1.4	0.6	-1.2	-1.6	-0.3	1.0	Feb	Dec
	Cda Swap Spread (5Y)	Bps	0.7	0.4	-0.9	3.2	1.5	1.9	-1.0	-4.1	-2.2	1.7	0.0	2.2	0.3	2.1	Apr	Aug
	Cda-US Swap Sprd/Sprd (5Y)	Bps	1.5	-0.9	0.3	3.1	0.4	1.0	-0.2	-3.9	-0.8	1.1	1.2	3.8	0.6	2.0	Dec	Aug
Credit	US IG CDX (5Y)	Bps	-2.3	1.2	-3.8	0.2	2.7	3.8	-4.3	1.8	1.5	0.0	0.0	-1.7	-0.1	2.5	Jun	Jul
	Ontario vs GoC (3Y)	Bps	-0.3	1.1	0.4	1.8	0.7	0.2	-0.7	-0.4	0.0	-0.6	-0.3	-0.4	0.1	0.8	Apr	Jul
	Ontario vs GoC (5Y)	Bps	-1.1	0.2	1.1	2.9	0.4	0.6	-1.6	0.6	0.6	-0.3	-0.6	-0.2	0.2	1.2	Apr	Jul
	Ontario vs GoC (10Y)	Bps	-1.8	-1.5	-0.6	2.5	2.2	1.3	-1.9	0.7	2.0	-0.2	-1.3	0.2	0.1	1.6	Apr	Jul
	Ontario vs GoC (30Y)	Bps	-1.5	-0.4	-1.1	2.5	2.2	0.5	-1.3	1.0	1.2	0.2	-1.2	0.2	0.2	1.4	Apr	Jan
	RY Dep Note vs GoC (5Y)	Bps	-0.8	-2.8	-2.9	0.0	2.1	5.3	-3.4	0.8	2.5	-0.4	-1.4	4.4	0.3	2.8	Jun	Jul
	Hydro One vs GoC (30Y)	Bps	-6.2	0.0	-2.7	1.0	2.3	4.4	-1.5	1.6	2.4	0.6	-1.8	3.0	0.3	2.9	Jun	Jan
Stocks Vol	S&P 500	%-pts	1.3	0.8	2.2	0.9	0.1	-0.4	1.7	-0.7	0.6	0.9	1.5	0.9	0.8	0.8	Mar	Aug
	S&P TSX	%-pts	1.0	1.0	1.2	0.1	-0.3	-0.7	0.6	-0.4	0.2	0.0	0.5	-0.4	0.2	0.6	Mar	Jun
	Volatility (VIX)	%-pts	0.5	10.5	-8.3	-2.5	5.8	5.4	-8.4	13.5	2.9	4.9	-4.2	2.2	1.9	6.8	Aug	Jul
	US Financial Cond'n	Index pts	0.0	0.0	0.1	0.0	0.0	-0.1	0.1	-0.1	0.0	0.0	0.1	-0.1	0.0	0.1	Jul	Jun
Ccy Commod	US Dollar (Trade Wgt)	%-pts	0.3	-0.2	0.5	-0.5	0.9	0.2	0.0	-0.6	0.0	0.1	1.5	0.6	0.2	0.6	Nov	Aug
	Canadian Dollar	%-pts	-0.4	-0.3	0.2	1.3	-0.8	-0.4	0.3	-0.3	0.1	-0.5	-1.0	-0.7	-0.2	0.6	Apr	Nov
	Crude Oil (WTI Spot)	%-pts	-1.5	1.0	3.9	4.4	-0.3	-1.8	0.1	-2.8	0.9	0.7	-3.4	-2.1	-0.1	2.5	Apr	Nov
	Nat Gas (HH Future)	%-pts	-0.5	-6.5	-3.0	1.7	4.5	3.8	-0.6	-3.6	0.6	0.9	5.4	-0.9	0.1	3.5	Nov	Feb
	Gold (Spot)	%-pts	1.7	1.9	0.1	0.2	-0.6	-0.2	-0.8	2.2	1.0	-0.7	-1.1	-1.8	0.2	1.3	Aug	Dec
Bond Supply	GoC Nominal (CAD)	C\$bln	4.1	1.2	-3.5	2.9	1.1	-2.7	1.4	1.4	-5.3	5.0	0.6	-6.2	0.0	3.6	Oct	Dec
	CHT (CAD)	C\$bln	-5.2	4.5	0.8	-5.3	4.8	0.4	-5.3	4.5	0.8	-5.3	4.5	0.7	0.0	4.2	May	4X
	Provincial (CAD)	C\$bln	2.2	-1.5	-0.6	0.3	2.0	-0.7	-1.4	0.2	0.7	1.1	-1.1	-1.2	0.0	1.3	Jan	Feb
	Provincial (USD)	C\$bln	1.2	-0.7	-0.8	1.2	0.5	-0.9	-0.1	-0.3	0.9	-0.3	-1.0	0.3	0.0	0.8	Apr	Nov
	Municipal (CAD)	C\$bln	0.0	0.1	0.0	0.1	0.1	0.0	-0.3	-0.1	0.4	-0.1	0.1	-0.5	0.0	0.2	Sep	Dec
	Corporate (CAD)	C\$bln	2.2	-0.3	2.0	-3.1	3.1	-0.6	-1.1	-3.3	5.6	-3.2	2.3	-3.9	0.0	3.1	Sep	Dec

Source: NBF, Bloomberg; to aid interpretation, shading has been applied from high to low values, with green generally synonymous with "risk-on" and red most consistent with "risk-off"

Table 3: An illustration of seasonals in provincial spreads

Average level and change in Ontario 10-year constant maturity spread by month: 2010-2018 (i.e., 9 years)

Ontario constant maturity spread vs GoC curve: 10-year											
Average monthly level, bps											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average	Std dev
Jan	60.3	71.5	84.8	90.8	79.8	84.3	108.7	80.0	59.0	79.9	15.3
Feb	60.3	66.0	83.0	91.0	80.5	75.5	111.8	77.8	60.0	78.4	16.3
Mar	57.2	73.0	89.3	90.5	80.0	74.6	99.0	74.3	63.0	77.9	13.4
Apr	67.0	70.3	97.0	94.6	83.3	73.8	93.8	75.3	68.0	80.3	12.1
May	85.2	75.8	101.7	88.0	85.3	73.8	91.8	75.6	65.3	82.5	11.0
Jun	87.8	78.8	104.3	87.8	83.5	74.6	95.5	74.8	67.3	83.8	11.5
Jul	85.8	74.5	102.0	88.2	83.3	77.8	88.0	69.6	68.2	81.9	10.7
Aug	84.0	82.4	96.3	90.3	83.8	83.4	85.4	70.8	67.0	82.6	8.9
Sep	82.3	91.8	95.8	91.4	82.4	93.0	85.5	71.3	68.0	84.6	9.7
Oct	75.3	89.6	96.8	91.5	87.0	101.0	85.2	68.2	65.0	84.4	12.4
Nov	71.0	92.0	98.3	88.3	86.5	96.0	85.0	64.0	67.3	83.1	12.6
Dec	72.3	92.0	98.4	81.8	84.4	98.3	81.5	60.7	81.0	83.4	12.1
Average	74.0	79.8	95.6	89.5	83.3	83.8	92.6	71.8	66.6	81.9	12.2
Std dev	11.0	9.5	6.7	3.1	2.4	10.5	9.7	5.6	5.5	2.3	-

Average monthly change, bps											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average	Std dev
Jan	-6.2	-0.8	-7.2	-7.7	-2.1	-0.1	10.4	-1.5	-1.7	-1.8	5.4
Feb	-0.1	-5.5	-1.8	0.3	0.8	-8.8	3.1	-2.3	1.0	-1.5	3.7
Mar	-3.1	7.0	6.3	-0.5	-0.5	-0.9	-12.8	-3.5	3.0	-0.6	5.9
Apr	9.8	-2.8	7.8	4.1	3.3	-0.8	-5.3	1.0	5.0	2.5	4.9
May	18.2	5.6	4.7	-6.6	2.0	0.0	-2.0	0.3	-2.8	2.2	7.1
Jun	2.6	3.0	2.6	-0.3	-1.8	0.8	3.7	-0.8	2.0	1.3	1.9
Jul	-2.0	-4.3	-2.3	0.5	-0.3	3.2	-7.5	-5.2	1.0	-1.9	3.3
Aug	-1.8	7.9	-5.8	2.1	0.5	5.7	-2.6	1.2	-1.2	0.7	4.2
Sep	-1.8	9.3	-0.5	1.2	-1.3	9.6	0.1	0.5	1.0	2.0	4.3
Oct	-7.0	-2.2	1.1	0.1	4.6	8.0	-0.3	-3.1	-3.0	-0.2	4.4
Nov	-4.3	2.4	1.5	-3.3	-0.5	-5.0	-0.2	-4.2	2.3	-1.3	3.0
Dec	1.3	0.0	0.2	-6.5	-2.1	2.3	-3.5	-3.3	13.8	0.2	5.8
Average	0.5	1.6	0.5	-1.4	0.2	1.2	-1.4	-1.7	1.7	0.1	4.5
Std dev	7.1	5.0	4.5	3.7	2.1	5.2	5.9	2.2	4.5	1.6	-

Source: NBF; shading applied to individual years, with green highlighting greatest relative performance and red consistent with relative weakness

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