

RECESSION BAROMETER

September 20, 2019

Spotlight on : Yield Curve Ratios – Canada and USA

A. FOCUS ON CANADA

Interest Rates: Various Maturities

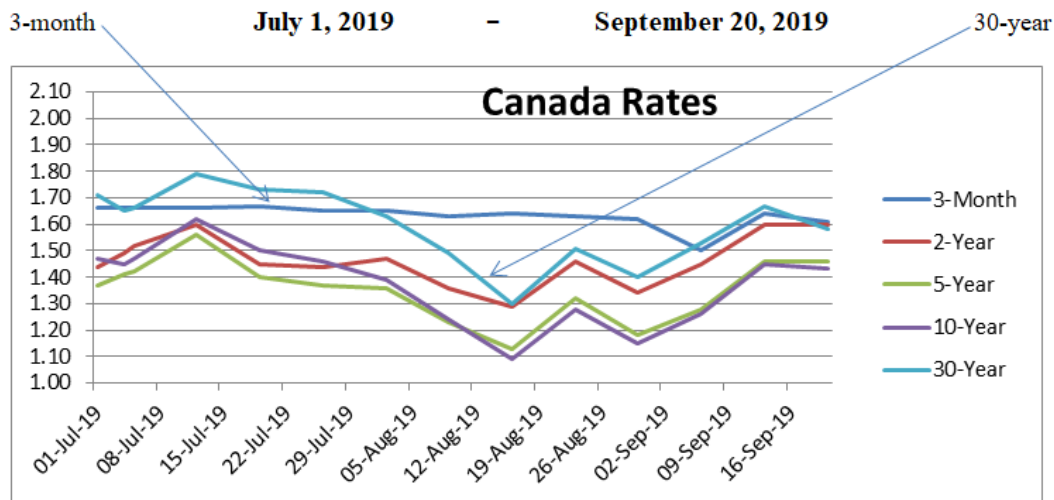
Interest Rates were fairly stable in Canada last week, unlike the continuing turmoil that is occurring in the USA. The very short end in Canada declined and everything from 10 years to 30 years declined, but the intermediate middle rates stayed flat.

As well documented in these Recession Barometer reports, eResearch put Canada on Recession Alert on August 8. Given that, historically, economic recessions have occurred some 15 to 20 months after an interest rate Inversion occurs, that puts a possible Economic Recession in Canada to occur between November 2020 and April 2021.

Below, we show Canadian interest rates since the start of Q3/2019 for various maturities ranging from 3 months to 30 years. Ironically, the interest rates at the opposite end of the spectrum, the 3-month rate and the 30-year rate, are almost identical.

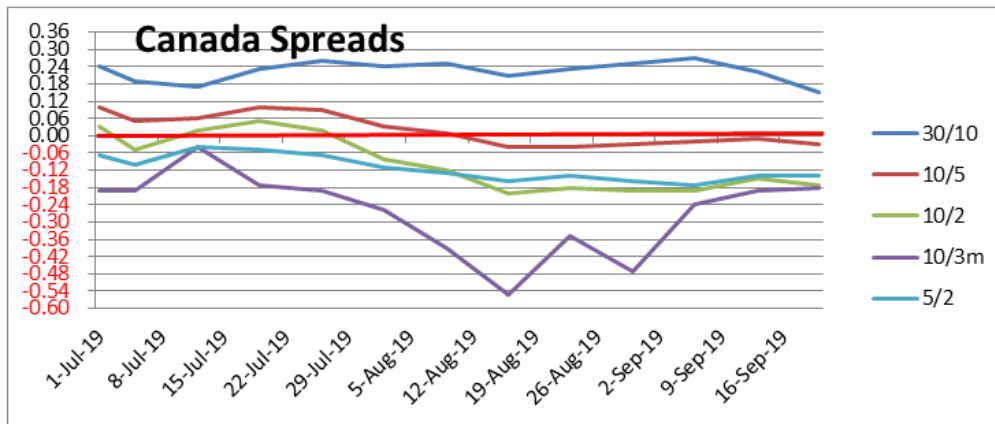
The table on the next page shows the actual rates, on a weekly basis, since July 1.

Since July 1, 2019



Date	3-Month	2-Year	5-Year	10-Year	30-Year
01-Jul-19	1.66	1.44	1.37	1.47	1.71
04-Jul-19	1.66	1.49	1.41	1.45	1.65
05-Jul-19	1.66	1.52	1.42	1.47	1.66
12-Jul-19	1.66	1.60	1.56	1.62	1.79
19-Jul-19	1.67	1.45	1.40	1.50	1.73
26-Jul-19	1.65	1.44	1.37	1.46	1.72
02-Aug-19	1.65	1.47	1.36	1.39	1.63
09-Aug-19	1.63	1.36	1.23	1.24	1.49
16-Aug-19	1.64	1.29	1.13	1.09	1.30
23-Aug-19	1.63	1.46	1.32	1.28	1.51
30-Aug-19	1.62	1.34	1.18	1.15	1.40
06-Sep-19	1.50	1.45	1.28	1.26	1.53
13-Sep-19	1.64	1.60	1.46	1.45	1.67
20-Sep-19	1.61	1.60	1.46	1.43	1.58

The chart below shows the Spreads for selected maturities. Only the 30-year/10-year Spread is not inverted. The horizontal **Red** line marks the Inversion level. The 10-year/5-year Spread is just into Inversion territory and is flirting with leaving it, but the other three metrics are still quite inverted.



Here is the table for these Spreads:

Date	30/10	10/5	10/2	10/3m	5/2
1-Jul-19	0.24	0.10	0.03	-0.19	-0.07
5-Jul-19	0.19	0.05	-0.05	-0.19	-0.10
12-Jul-19	0.17	0.06	0.02	-0.04	-0.04
19-Jul-19	0.23	0.10	0.05	-0.17	-0.05
26-Jul-19	0.26	0.09	0.02	-0.19	-0.07
2-Aug-19	0.24	0.03	-0.08	-0.26	-0.11
9-Aug-19	0.25	0.01	-0.12	-0.39	-0.13
16-Aug-19	0.21	-0.04	-0.20	-0.55	-0.16
23-Aug-19	0.23	-0.04	-0.18	-0.35	-0.14
30-Aug-19	0.25	-0.03	-0.19	-0.47	-0.16
6-Sep-19	0.27	-0.02	-0.19	-0.24	-0.17
13-Sep-19	0.22	-0.01	-0.15	-0.19	-0.14
20-Sep-19	0.15	-0.03	-0.17	-0.18	-0.14

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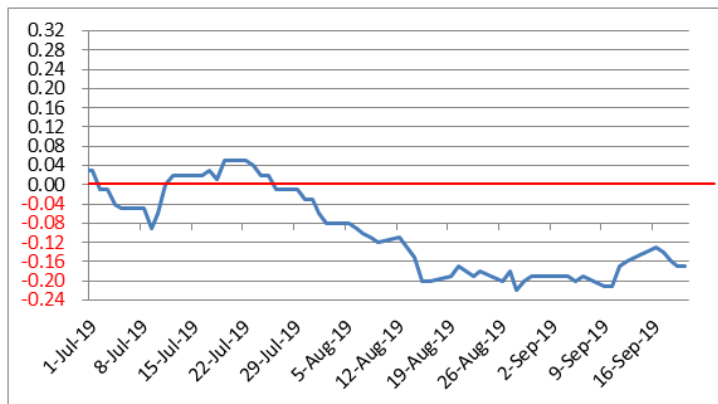
Recession Barometer: Canada

In Canada, we have already started our Count-Down to a possible recession. This was based on the 10-year/2-year Government of Canada bonds exhibiting Inversion for ten consecutive business days, which it did on August 8. (Our alternative criterion is that the 10/2 must be inverted for 20 out of 30 consecutive business days, and this has also occurred.)

The chart below shows the 10-year/2-year Spread for Canadas since July 1, 2019. It is nowhere near coming out of Inversion.

July 1, 2019 - September 20, 2019

10-Year/2-Year CANADA SPREAD



Observation: As shown above, there was an Inversion in the 10/2 from July 2 through July 10, being only seven consecutive days. However, starting on July 26, the 10/2 inverted again and it has remained inverted ever since. August 8 marked the tenth consecutive day of Inversion and, so, the Count-Down to an Economic Recession in Canada began. Historically, after an Inversion has occurred, it has taken between 15 and 20 months before a recession occurs. The expected time-frame is presented in the following table.

Forecasting the Commencement of a Recession in Canada

Using eResearch criteria, an inversion in Canada occurred on August 8, 2019	Historically, a recession begins 15 to 20 months hence
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<u>Inversion</u> <u>Occurred</u> August 8, 2019	<u>Inversion</u> <u>+15 Months</u> November/2020	<u>Inversion</u> <u>+20 Months</u> April/2021
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Source: eResearch

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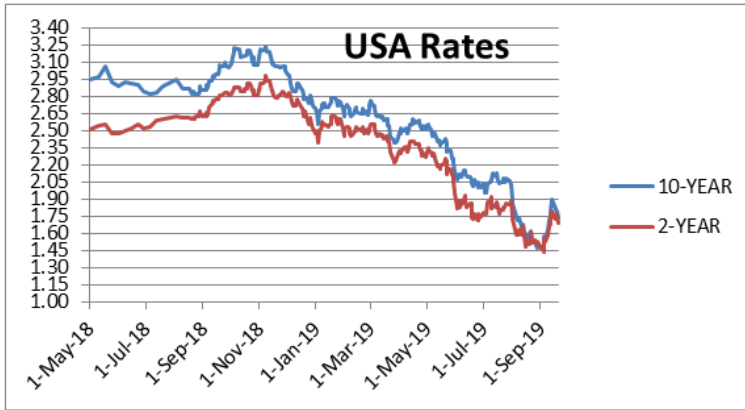
B. FOCUS ON USA

1. 10-Year/2-Year Interest Rates

A. Since May 1, 2018

In this report, we are going to look at some longer-term charts as well as the current ones. First, is the chart from May 2018.

May 1, 2018 - September 20, 2019

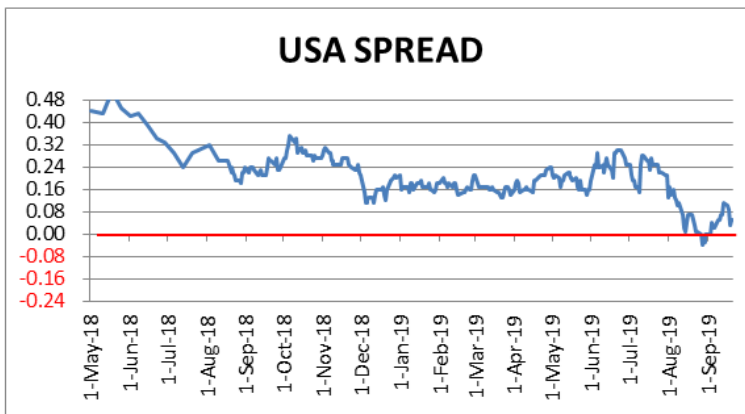


Observations: This chart clearly shows the downward trend in interest rates for both the 10-year and the 2-year maturities. Ironically, they have more or less moved in lockstep.

Here is the Spread chart for the 10/2 since May 2018.

May 1, 2018 - September 20, 2019

10-Year/2-Year

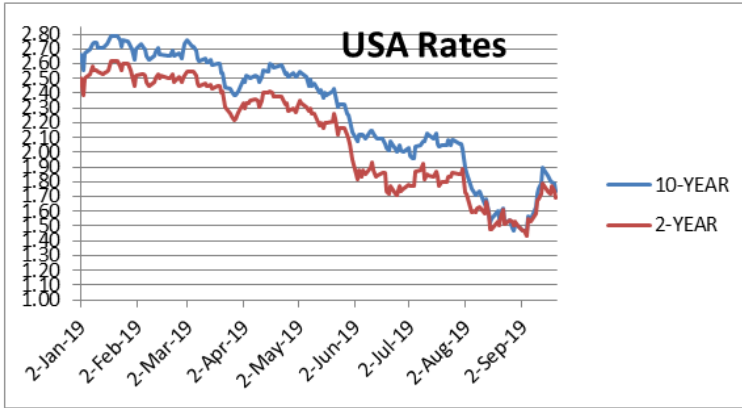


Observations: The Spread between the 10-year and the 2-year maturities has gradually narrowed since hitting a high of 0.48x in late May 2018. The spread stayed fairly level from the beginning of this year until the first of June when it moved higher before plunging into Inversion territory in late August. It rallied two weeks ago but has turned back down this past week.

B. Since January 2, 2019

January 2, 2019 - September 20, 2019

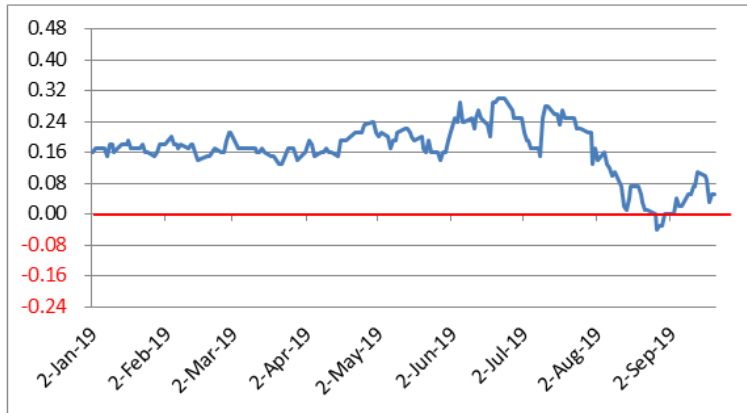
10-Year/2-Year



Observations: This chart shows the respective interest rate trend for the 10-year and 2-year maturity since the beginning of the year. The next chart shows the accompanying Spread.

January 2, 2019 - September 20, 2019

10-Year/2-Year USA SPREAD



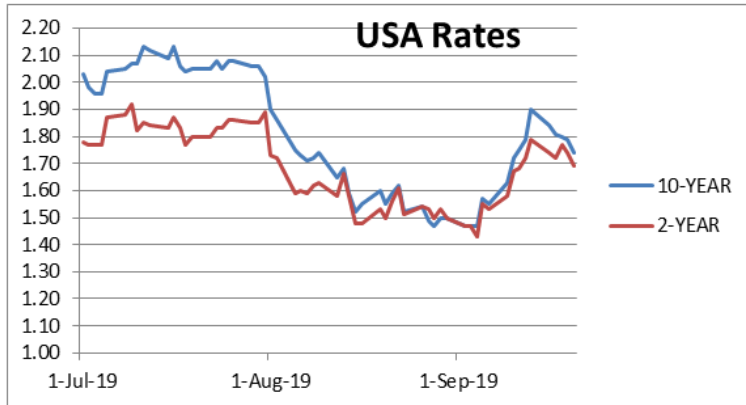
Observations: As observed previously, the Spread moved in a narrow range from the beginning of the year until about the beginning of June. It then see-sawed before plunging into Inversion territory at the end of August. It rose above the Inversion level but is again heading back towards it.

The next charts show the trend in interest rates and the Spread since July 1, 2019.

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C. Since July 1, 2019

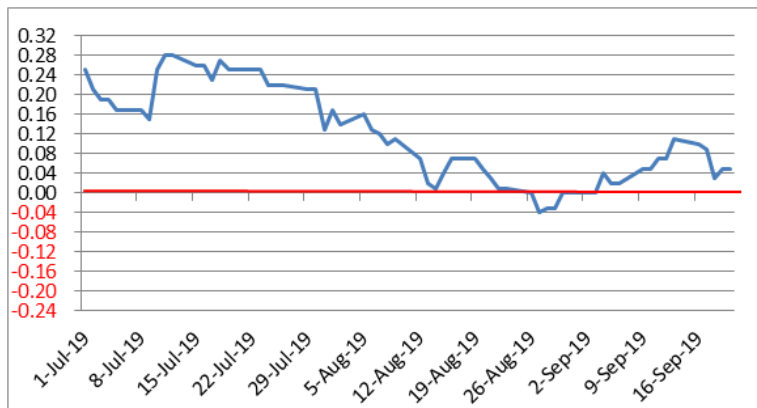
July 1, 2019 - September 20, 2019



Observations: Interest rates in the USA are being impacted by so many geopolitical factors. As August progressed, there were mounting fears that the USA would definitely go into recession. As those fears mitigated, interest rates rallied in the first two weeks of September, but they have fallen back again and the Spread has narrowed as the next chart clearly shows.

July 1, 2019 - September 20, 2019

10-Year/2-Year USA SPREAD

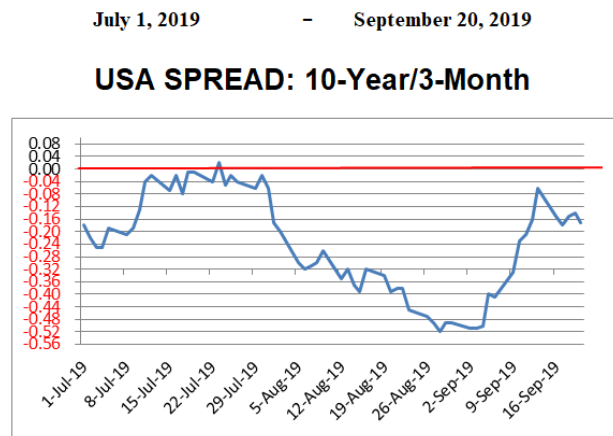
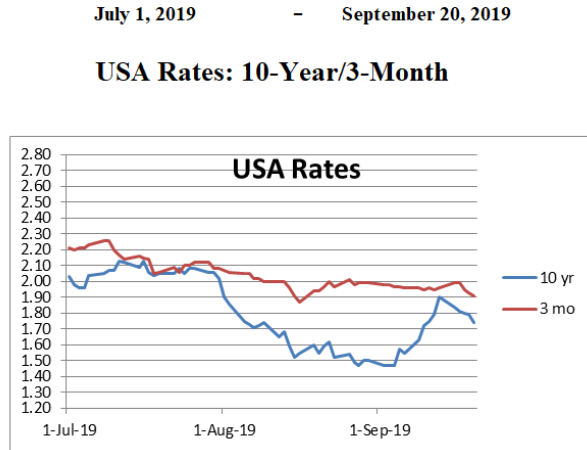


Observations: A key signal for our Count-Down to an Economic Recession is that the 10/2 yield curve ratio must be inverted, and Inversion must be for ten consecutive days. In late August, the 10/2 inverted for three straight days, then moved above the 0.00x line. After reaching 0.11x last week, the Spread turned down this past week and ended at 0.05x, having reached a low of 0.03x. The 10/2 is one of four yield curve metrics that we use to initiate our Count-Down to recession. We provide those other metrics below.

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2. 10-Year/3-Month Interest Rates

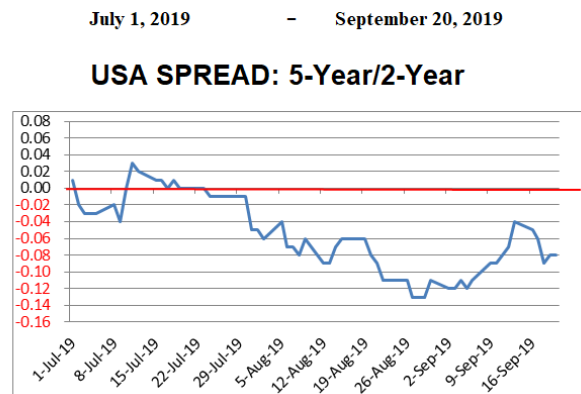
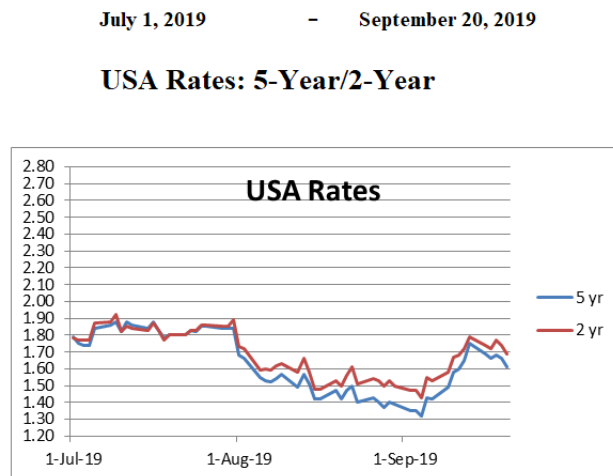
First the chart and then the Spread, both from July 1.



Observations: The Rates chart shows the sharp increase in 10-year rates since the beginning of September while the 3-month rate stayed fairly stable. Both moved down this past week. The Spread narrowed significantly since the beginning of September but Inversion is still prevalent and the Spread widened out a bit this past week as the 10-year declined more so than the 3-month.

3. 5-Year/2-Year Interest Rates

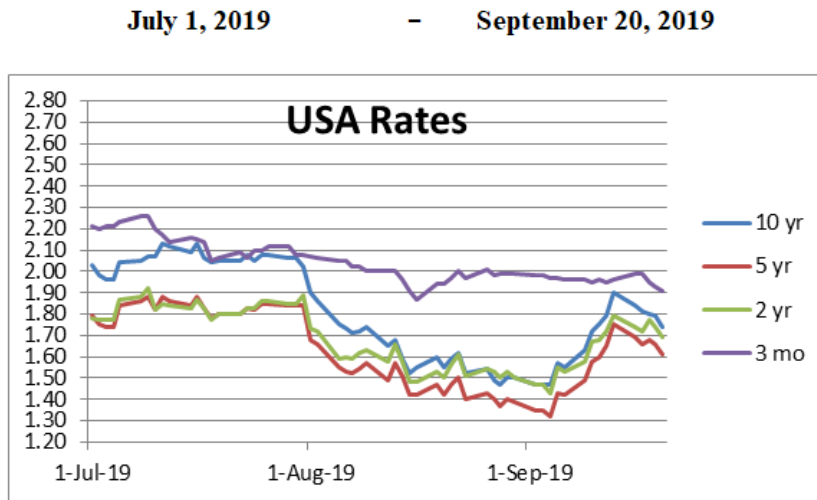
The 5-year/2-year metric is not considered to be as key as the 10-year/2-year or the 10-year/3-month metrics, but it is still a worthwhile metric to be analyzed. The chart and table below shows that interest rates for the two maturities have trended fairly closely.



Observations: Two weeks ago, there was increased geopolitical “noise” plus the Fed meeting/commentary that resulted in shorter-term maturities, such as the 5-year and the 2-year, rallying substantially, and particularly the 5-year that caused the degree of Inversion to narrow. That Inversion increased again last week.

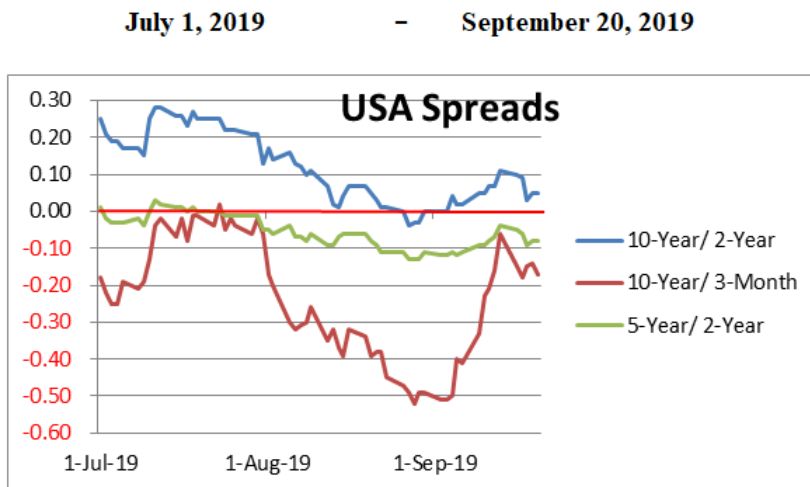
4. Summary of the Three Metrics

The next chart puts all four of the interest rate maturities, 10-year, 5-year, 2-year, and 3-month, on the same graph:



Observations: All four interest rate maturities ended last week lower than when they started out. It is too early to tell whether these four metrics will go on to test their respective early September lows.

The next graph shows the Spreads for the three metrics previously presented:



Observations: The 10Y/2Y (Blue line) left Inversion behind at the end of August and reached 0.11x two weeks ago. It was under pressure this past week and closed at 0.05x. The (Red line) 10Y/3M degree of Inversion got worse, but the 5Y/2Y (Green line) stayed fairly constant in shallow Inversion territory.

<continued>

Recession Barometer: USA

Our Recession Barometer for the United States reflects the average of three different yield spreads.

1. 10-Year/2-Year Spread
2. Equal-Weight Average of Three Spreads: 20-Year/10-Year; 10-Year/3-Month; and 5-Year/2-Year
3. Equal-Weight Average of Twelve Spreads: 30-year/20-year, 30-year/10-year, 20-year/10-year, 20-year/5-year, 10-year/2-year, 10-year/3-month, 5-year/2-year, 5-year/3-month, 2-year/1-year, 2-year/3-month, 1-year/6-month, and 1-year/3-month.

The Spreads from these three metrics are then averaged to derive the Reading for the Recession Barometer. However, to initiate our Count-Down to an Economic Recession in the USA, ALL four metrics must be inverted. The 10-Year/2-Year Spread, the most important metric, was inverted for only three consecutive days in August, and we require ten consecutive days to initiate our Count-Down. This is the only metric with this consecutive 10 business day requirement.

The table below shows how these four metrics have evolved since the beginning of July 2019.

Date	10Year/2Year U.S. Spread		3 U.S. Spreads		12 U.S. Spreads		Combined Spreads	
	Spread	Reading	Spread	Reading	Spread	Reading	Spread	Reading
July 5, 2019	0.17	7.0 X	0.03	9.0 X	0.02	9.5 X	0.07	8.5 X
July 12, 2019	0.28	6.0 X	0.10	8.0 X	0.07	8.5 X	0.15	7.5 X
July 19, 2019	0.25	6.5 X	0.10	8.0 X	0.08	8.5 X	0.14	7.5 X
July 26, 2019	0.22	6.5 X	0.08	8.5 X	0.07	8.5 X	0.12	8.0 X
August 2, 2019	0.14	7.5 X	0.01	9.5 X	0.02	9.5 X	0.06	8.5 X
August 9, 2019	0.11	8.0 X	-0.01	10.0 X	0.00	9.5 X	0.03	9.0 X
August 16, 2019	0.07	8.5 X	-0.04	10.0 X	-0.03	10.0 X	0.00	9.5 X
August 23, 2019	0.01	9.5 X	-0.09	10.0 X	-0.06	10.0 X	-0.05	10.0 X
August 30, 2019	0.00	9.5 X	-0.11	10.0 X	-0.08	10.0 X	-0.06	10.0 X
September 6, 2019	0.02	9.5 X	-0.08	10.0 X	-0.06	10.0 X	-0.04	10.0 X
September 13, 2019	0.11	8.0 X	0.06	8.5 X	0.05	9.0 X	0.07	8.5 X
September 20, 2019	0.05	9.0 X	0.00	9.5 X	0.02	9.5 X	0.02	9.5 X

Observation: The 10/2 Spread widened out two weeks ago after briefly flirting with Inversion at the end of August. The “3 Spreads” were negative, or “inverted”, for five straight weeks before going decidedly positive two weeks ago and then back to an Inversion cusp at the end of this past week. The “12 Spreads” also were negative/inverted until two weeks ago, and this metric also narrowed this past week. After three negative/inverted weeks, the Combined Spread went positive two weeks ago but is once again testing the possibility of Inversion.

CURRENT U.S. RECESSION BAROMETER READING, Week Ending September 20:

9.5x

There was a meaningful increase this past week.

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OTHER CONSIDERATIONS

1. The Unbelievable OBFR Yield

This next table of interest rates is truly remarkable. Until this past week, the overall yield curve was truly dysfunctional since the Overnight Bank Funding Rate (OBFR), as indicated by the **Green** numbers, were providing a higher rate than only the two longest-dated maturities. With the repo market in disarray this past week, the OBFR gyrated widely. Here are the Monday through Thursday numbers and the estimate for Friday: 2.18%; 2.25%; 2.18%; and 1.85%. The Friday estimate by eResearch is 1.82% but it might be a lot lower than that. The **Black** numbers are at or higher than the OBFR and the **Red** numbers indicate those maturities with a lower rate than the OBFR.

Date	OBFR	1 mo	2 mo	3 mo	6 mo	1 yr	2 yr	3 yr	5 yr	7 yr	10 yr	20 yr	30 yr
28-Jun-19	2.38	2.18	2.15	2.12	2.09	1.92	1.75	1.71	1.76	1.87	2.00	2.31	2.52
5-Jul-19	2.40	2.26	2.22	2.23	2.14	1.98	1.87	1.82	1.84	1.93	2.04	2.34	2.54
12-Jul-19	2.37	2.16	2.18	2.14	2.07	1.96	1.84	1.81	1.86	1.98	2.12	2.42	2.64
19-Jul-19	2.40	2.11	2.16	2.06	2.03	1.94	1.80	1.77	1.80	1.91	2.05	2.35	2.57
26-Jul-19	2.37	2.13	2.15	2.12	2.10	2.00	1.86	1.83	1.85	1.95	2.08	2.38	2.59
2-Aug-19	2.10	2.11	2.12	2.06	2.02	1.85	1.72	1.67	1.66	1.75	1.86	2.16	2.39
9-Aug-19	2.10	2.05	2.06	2.00	1.95	1.78	1.63	1.58	1.57	1.65	1.74	2.03	2.26
16-Aug-19	2.11	2.05	1.95	1.87	1.85	1.71	1.48	1.44	1.42	1.49	1.55	1.82	2.01
23-Aug-19	2.10	2.07	2.02	1.97	1.87	1.73	1.51	1.43	1.40	1.46	1.52	1.82	2.02
30-Aug-19	2.11	2.10	2.04	1.99	1.89	1.76	1.50	1.42	1.39	1.45	1.50	1.78	1.96
6-Sep-19	2.11	2.05	2.00	1.96	1.88	1.73	1.53	1.46	1.42	1.50	1.55	1.83	2.02
13-Sep-19	2.14	1.99	1.98	1.96	1.92	1.88	1.79	1.76	1.75	1.83	1.90	2.17	2.30
20-Sep-19	1.82	1.95	1.94	1.91	1.91	1.84	1.69	1.63	1.61	1.68	1.74	1.99	2.17

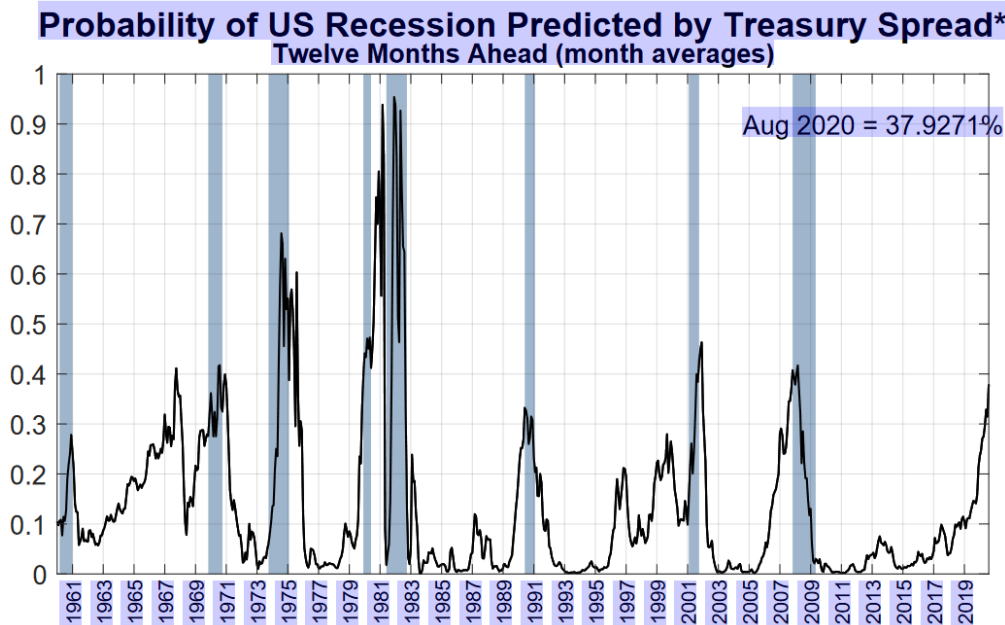
2. U.S. Inversions

We monitor 24 different yield curve ratios. Of these, 15 are inverted, in **Red** in the table below. The fact that so many of the metrics are inverted still suggests that an Economic Recession in the USA is coming. The move back towards Inversion situations this past week for many of the ratios lends credence to that possibility.

30Y	30Y	30Y	30Y	20Y	20Y	20Y	10Y	10Y	10Y	10Y	10Y	5Y	5Y	5Y	5Y	5Y	2Y	2Y	2Y	2Y	1Y	1Y	1Y
20Y	10Y	5Y	2Y	10Y	5Y	2Y	5Y	2Y	1Y	6M	3M	2Y	1Y	6M	3M	1M	1Y	6M	3M	1M	6M	3M	1M
0.18	0.48	0.60	0.48	0.30	0.42	0.30	0.12	0.00	-0.25	-0.41	-0.51	-0.12	-0.37	-0.53	-0.63	-0.71	-0.25	-0.41	-0.51	-0.59	-0.16	-0.26	-0.34
0.18	0.48	0.60	0.48	0.30	0.42	0.30	0.12	0.00	-0.25	-0.41	-0.51	-0.12	-0.37	-0.53	-0.63	-0.71	-0.25	-0.41	-0.51	-0.59	-0.16	-0.26	-0.34
0.20	0.50	0.65	0.54	0.30	0.45	0.34	0.15	0.04	-0.22	-0.40	-0.50	-0.11	-0.37	-0.55	-0.65	-0.73	-0.26	-0.44	-0.54	-0.62	-0.18	-0.28	-0.36
0.20	0.49	0.63	0.51	0.29	0.43	0.31	0.14	0.02	-0.16	-0.31	-0.40	-0.12	-0.30	-0.45	-0.54	-0.62	-0.18	-0.33	-0.42	-0.50	-0.15	-0.24	-0.32
0.19	0.47	0.60	0.49	0.28	0.41	0.30	0.13	0.02	-0.18	-0.33	-0.41	-0.11	-0.31	-0.46	-0.54	-0.63	-0.20	-0.35	-0.43	-0.52	-0.15	-0.23	-0.32
0.20	0.48	0.62	0.53	0.28	0.42	0.33	0.14	0.05	-0.11	-0.24	-0.33	-0.09	-0.25	-0.38	-0.47	-0.55	-0.16	-0.29	-0.38	-0.46	-0.13	-0.22	-0.30
0.19	0.47	0.61	0.52	0.28	0.42	0.33	0.14	0.05	-0.09	-0.17	-0.23	-0.09	-0.23	-0.31	-0.37	-0.46	-0.14	-0.22	-0.28	-0.37	-0.08	-0.14	-0.23
0.20	0.47	0.62	0.54	0.27	0.42	0.34	0.15	0.07	-0.04	-0.13	-0.21	-0.08	-0.19	-0.28	-0.36	-0.41	-0.11	-0.20	-0.28	-0.33	-0.09	-0.17	-0.22
0.16	0.43	0.57	0.50	0.27	0.41	0.34	0.14	0.07	-0.03	-0.11	-0.16	-0.07	-0.17	-0.25	-0.30	-0.34	-0.10	-0.18	-0.23	-0.27	-0.08	-0.13	-0.17
0.13	0.40	0.55	0.51	0.27	0.42	0.38	0.15	0.11	0.02	-0.02	-0.06	-0.04	-0.13	-0.17	-0.21	-0.24	-0.09	-0.13	-0.17	-0.20	-0.04	-0.08	-0.11
0.20	0.47	0.62	0.57	0.27	0.42	0.37	0.15	0.10	-0.02	-0.09	-0.15	-0.05	-0.17	-0.24	-0.30	-0.39	-0.12	-0.19	-0.25	-0.34	-0.07	-0.13	-0.22
0.19	0.46	0.61	0.55	0.27	0.42	0.36	0.15	0.09	-0.06	-0.12	-0.18	-0.06	-0.21	-0.27	-0.33	-0.44	-0.15	-0.21	-0.27	-0.38	-0.06	-0.12	-0.23
0.19	0.45	0.57	0.48	0.26	0.38	0.29	0.12	0.03	-0.07	-0.11	-0.15	-0.09	-0.19	-0.23	-0.27	-0.26	-0.10	-0.14	-0.18	-0.17	-0.04	-0.08	-0.07
0.18	0.43	0.56	0.48	0.25	0.38	0.30	0.13	0.05	-0.09	-0.13	-0.14	-0.08	-0.22	-0.26	-0.27	-0.35	-0.14	-0.18	-0.19	-0.27	-0.04	-0.05	-0.13
0.18	0.43	0.56	0.48	0.25	0.38	0.30	0.13	0.05	-0.10	-0.17	-0.17	-0.08	-0.23	-0.30	-0.30	-0.34	-0.15	-0.22	-0.22	-0.26	-0.07	-0.07	-0.11

3. New York Fed Recession Probability Curve

The chart below, courtesy of the New York Fed, shows that, as at the end of August 2019, the probability of a recession occurring in the USA within the next 12 months stands at 37.9%.

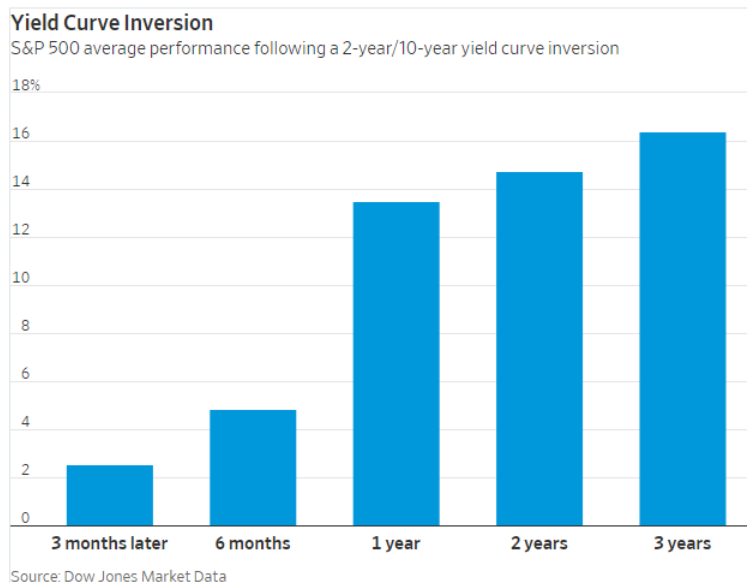


*Parameters estimated using data from January 1959 to December 2009, recession probabilities predicted using data through Aug 2019. The parameter estimates are $\alpha = -0.5333$, $\beta = -0.6330$.

Updated 04-Sep-2019

4. Stock Market Performance Post Inversion

Historically, an Inversion of the yield curve does not necessarily mean that there will be a major sell-off in the equity market. The following graph shows equity performance post Inversion for various periods.



The Dow Jones Market Data graph shown on the previous page shows that, on average, after a yield-curve inversion, the S&P 500 Index rose 2.5% in the next three months, 4.9% in the following six months, 13.5% after a year, 14.7% over the next two years, and 16.4% in the three years following the Inversion occurrence.

Even accepting that an Inversion has generally occurred in the USA because of the 10-Year/2-Year Spread inverting for three days in August and, therefore, joining many other inverted yield curve metrics, particularly the prolonged Inversion of the 10-year/3-month yield curve ratio, an Economic Recession typically occurs 15 to 20 months hence. In the meantime, because stocks are always forward-looking, equity performance post Inversion has done well because the reality of a possible recession has been telegraphed and the stock market is ready to move on.

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