

RECESSION BAROMETER

September 13, 2019

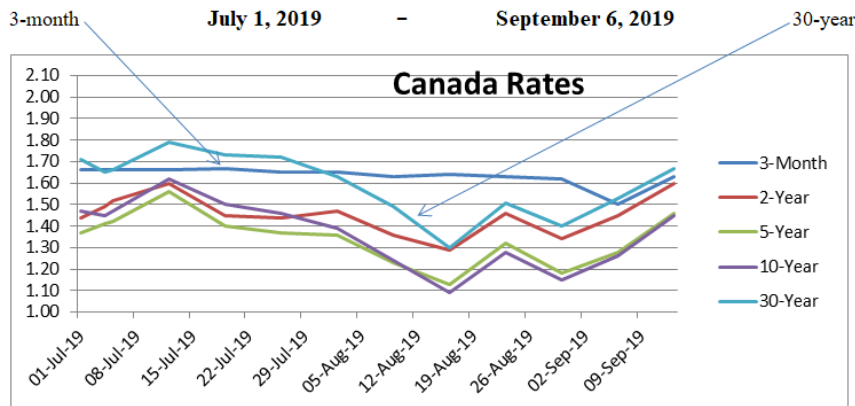
Spotlight on : Yield Curve Ratios – Canada and USA

A. FOCUS ON CANADA

Interest Rates: Various Maturities

Below, we show Canadian interest rates since the start of Q3/2019 for various maturities ranging from 3 months to 30 years. Over the past two weeks, the 30-year rate has finally reverted to its normal position on the rate ladder, at the top. The rate for 3-month Treasury Bills has shown relative stability until these last two weeks. Other than the 30-year rate, the 3-month T Bills rate is higher than all of the other maturities. That is not considered normal. In concert with U.S. interest rates, all of the maturities have risen over the last two weeks.

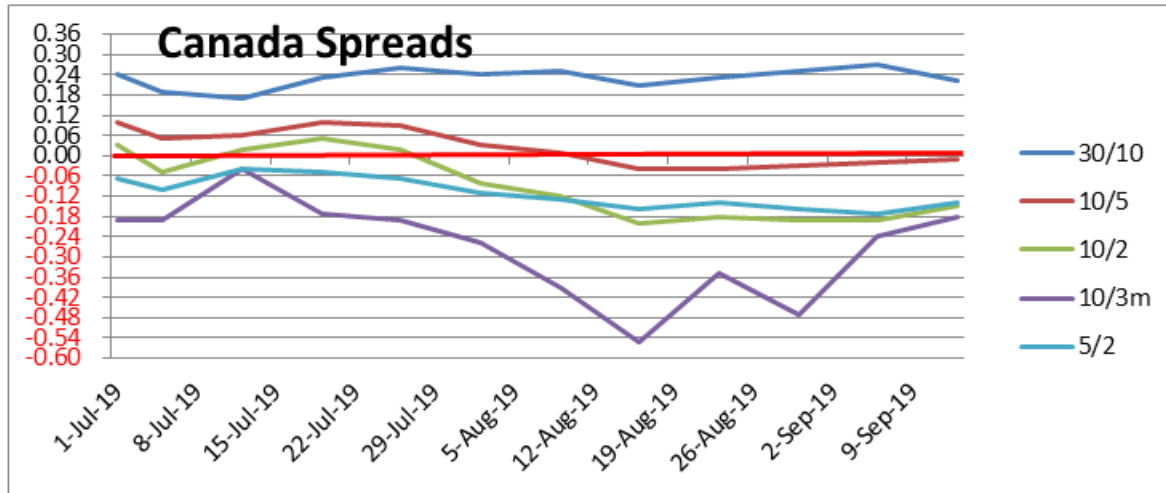
Since July 1, 2019



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	1.63	1.60	1.46	1.45	1.67

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 close to departing Inversion, but the other three metrics are still quite inverted albeit rising.

July 1, 2019 - September 6, 2019



Here is the table for these Spreads:

Date	<u>30/10</u>	<u>10/5</u>	<u>10/2</u>	<u>10/3m</u>	<u>5/2</u>
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	-0.18	-0.14

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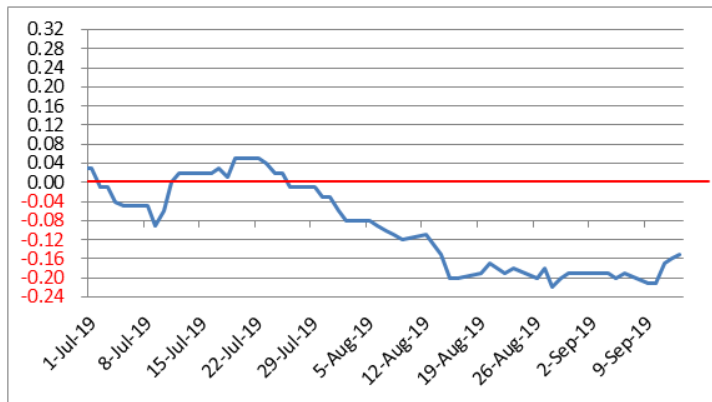
Recession Barometer: Canada

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 13, 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	Historically, a
inversion in	recession begins
Canada occurred	15 to 20 months
on August 8, 2019	hence

Inversion	Inversion	Inversion
<u>Occurred</u>	<u>+15 Months</u>	<u>+20 Months</u>
August 8, 2019	November/2020	April/2021

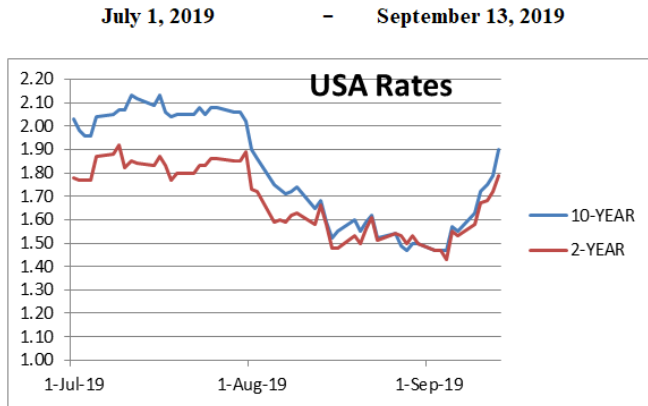
Source: eResearch

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B. FOCUS ON USA

1. 10-Year/2-Year Interest Rates

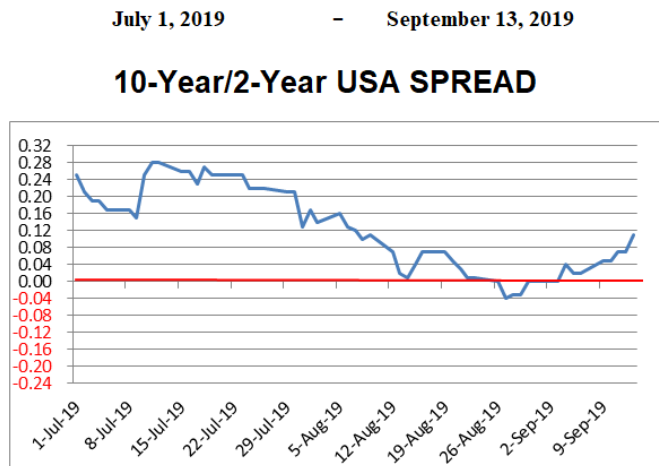
The following chart shows 10-year and 2-year interest rates since July 1, 2019.



Here is a table showing the rates since the end of August. There has been a dramatic increase in rates since then, and the Spread (DIFF) has widened out from 0.00x to 0.11x, well above Inversion.

<u>DATE</u>	<u>10-YEAR</u>	<u>2-YEAR</u>	<u>DIFF</u>
30-Aug-19	1.50	1.50	0.00
2-Sep-19	1.47	1.47	0.00
3-Sep-19	1.47	1.47	0.00
4-Sep-19	1.47	1.43	0.04
5-Sep-19	1.57	1.55	0.02
6-Sep-19	1.55	1.53	0.02
9-Sep-19	1.63	1.58	0.05
10-Sep-19	1.72	1.67	0.05
11-Sep-19	1.75	1.68	0.07
12-Sep-19	1.79	1.72	0.07
13-Sep-19	1.90	1.79	0.11

Here is the Spread since July 1. It has recovered from its three-day Inversion at the end of August.

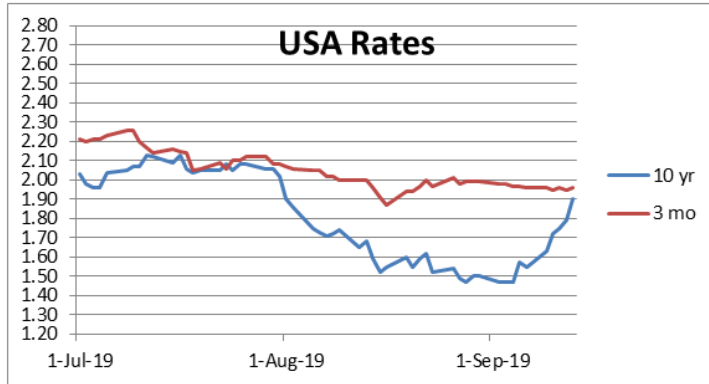


2. 10-Year/3-Month Interest Rates

First the chart from July 1, then the table from the end of August.

July 1, 2019 - September 13, 2019

USA Rates: 10-Year/3-Month



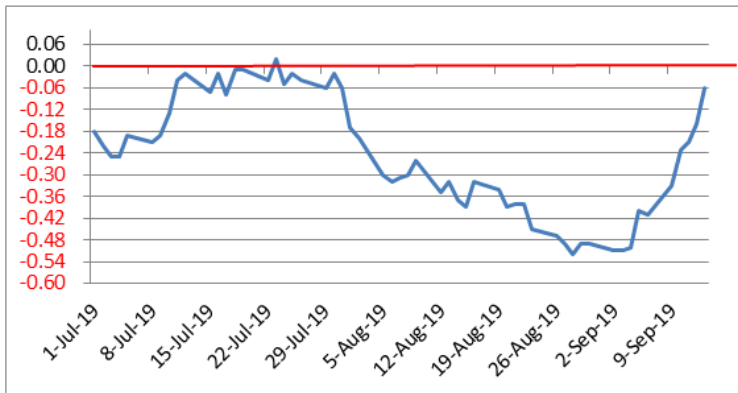
<u>DATE</u>	<u>10-YEAR</u>	<u>3-MONTH</u>	<u>DIFF</u>
30-Aug-19	1.50	1.99	-0.49
2-Sep-19	1.47	1.98	-0.51
3-Sep-19	1.47	1.98	-0.51
4-Sep-19	1.47	1.97	-0.50
5-Sep-19	1.57	1.97	-0.40
6-Sep-19	1.55	1.96	-0.41
9-Sep-19	1.63	1.96	-0.33
10-Sep-19	1.72	1.95	-0.23
11-Sep-19	1.75	1.96	-0.21
12-Sep-19	1.79	1.95	-0.16
13-Sep-19	1.90	1.96	-0.06

The chart shows clearly that the 10-year is quickly regaining its proper stature relative to the 3-month metric. The Spread (DIFF) was as high as 0.51x and now it is just 0.06x.

Here is the Spread in chart form for the 10-year/3-month metric since the beginning of July:

July 1, 2019 - September 13, 2019

USA Spread: 10-Year/3-Month



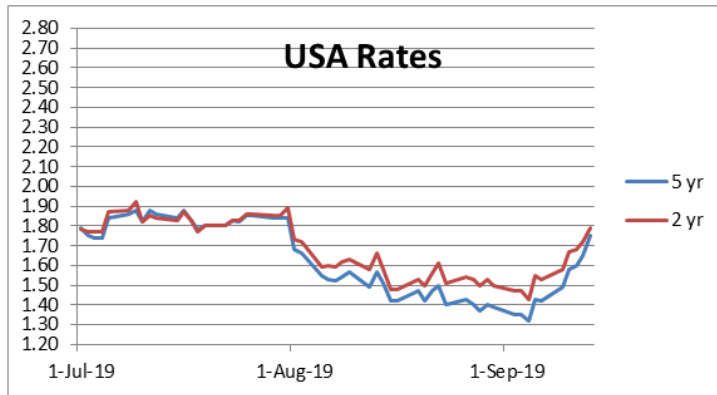
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3. 5-Year/2-Year Interest Rates

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.

July 1, 2019 - September 13, 2019

USA Rates: 5-Year/2-Year

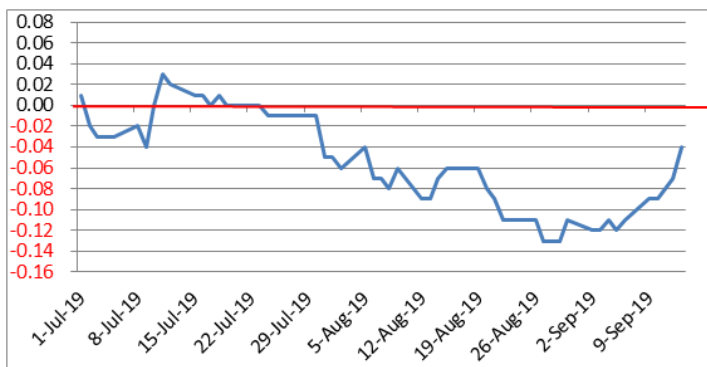


DATE	5-YEAR	2-YEAR	DIFF
30-Aug-19	1.39	1.50	-0.11
2-Sep-19	1.35	1.47	-0.12
3-Sep-19	1.35	1.47	-0.12
4-Sep-19	1.32	1.43	-0.11
5-Sep-19	1.43	1.55	-0.12
6-Sep-19	1.42	1.53	-0.11
9-Sep-19	1.49	1.58	-0.09
10-Sep-19	1.58	1.67	-0.09
11-Sep-19	1.60	1.68	-0.08
12-Sep-19	1.65	1.72	-0.07
13-Sep-19	1.75	1.79	-0.04

Here in chart form is the Spread (DIFF in the table above) since July 1. The Spread is narrowing.

July 1, 2019 - September 13, 2019

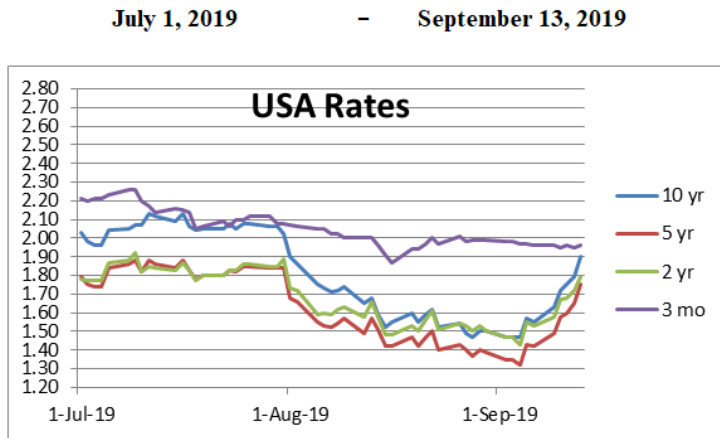
USA SPREAD: 5-Year/2-Year



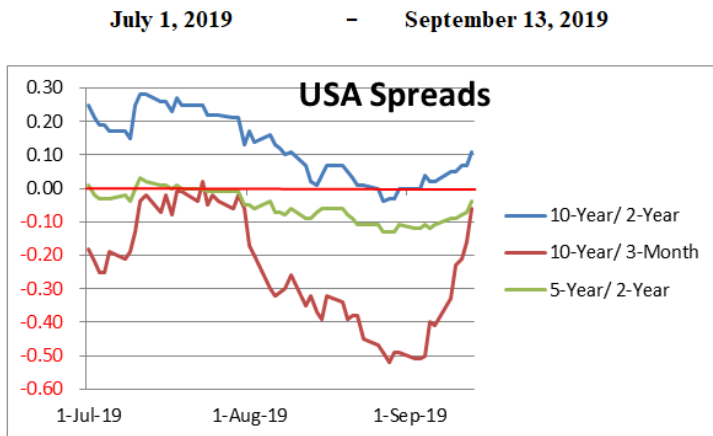
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4. Summary of the Three Metrics

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



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



The 10Y/2Y has left Inversion behind and the 10Y/3M and the 5Y/2Y are attempting to do the same.

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Recession Barometer: USA

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

- 10-Year/2-Year Spread
- Equal-Weight Average of Three Spreads: 20-Year/10-Year; 10-Year/3-Month; and 5-Year/2-Year
- 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. We require ten consecutive days to initiate our Count-Down.

The table below shows how these four metrics have evolved since the beginning of May 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
May 3, 2019	0.21	6.5 X	0.11	8.0 X	0.10	8.0 X	0.14	7.5 X
May 10, 2019	0.21	6.5 X	0.09	8.0 X	0.08	8.5 X	0.13	7.5 X
May 17, 2019	0.19	7.0 X	0.07	8.5 X	0.07	8.5 X	0.11	7.5 X
May 24, 2019	0.16	7.5 X	0.06	8.5 X	0.06	8.5 X	0.09	8.0 X
May 31, 2019	0.19	7.0 X	0.01	9.5 X	-0.01	10.0 X	0.06	8.5 X
June 7, 2019	0.24	6.5 X	0.03	9.0 X	0.00	9.5 X	0.09	8.0 X
June 14, 2019	0.25	6.5 X	0.06	8.5 X	0.04	9.0 X	0.12	7.5 X
June 21, 2019	0.30	6.0 X	0.10	8.0 X	0.07	8.5 X	0.15	7.5 X
June 28, 2019	0.25	6.5 X	0.07	8.5 X	0.04	9.0 X	0.12	7.5 X
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

Observation: The 10/2 Spread has widened out 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 this past week. The “12 Spreads” also were negative/inverted until this past week. As shown in the table on the next page, there has been a dramatic increase in interest rates at maturities from one-year out to 30-years, while short-term rates have stayed fairly stable over the past fortnight. After three negative/inverted weeks, the Combined Spread has gone positive.

CURRENT U.S. RECESSION BAROMETER READING, Week Ending September 13:

8.5x

This is the first positive week in a while.

OTHER CONSIDERATIONS

1. The Unbelievable OBFR Yield

This next table of interest rates is truly remarkable, as it illustrates just how dysfunctional the yield curve scenario is right now. (The **Green** numbers are the Overnight Bank Funding Rate (OBFR); the **Red** numbers comprise those maturities with a lower rate than the OBFR; and the **Black** numbers are at or higher 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
1-Mar-19	2.40	2.44	2.46	2.44	2.52	2.55	2.55	2.54	2.56	2.67	2.76	2.97	3.13
15-Mar-19	2.41	2.46	2.46	2.45	2.52	2.52	2.43	2.39	2.40	2.49	2.59	2.83	3.02
22-Mar-19	2.40	2.49	2.48	2.46	2.48	2.45	2.31	2.24	2.24	2.34	2.44	2.69	2.88
1-Apr-19	2.41	2.42	2.43	2.43	2.46	2.41	2.33	2.29	2.31	2.40	2.49	2.71	2.89
8-Apr-19	2.41	2.43	2.44	2.43	2.48	2.43	2.36	2.31	2.33	2.42	2.52	2.74	2.93
15-Apr-19	2.41	2.42	2.43	2.43	2.46	2.43	2.40	2.36	2.37	2.46	2.55	2.77	2.96
23-Apr-19	2.44	2.43	2.44	2.45	2.46	2.43	2.36	2.34	2.36	2.46	2.57	2.81	2.98
1-May-19	2.44	2.42	2.41	2.43	2.44	2.39	2.31	2.28	2.31	2.41	2.52	2.74	2.92
8-May-19	2.38	2.42	2.43	2.43	2.45	2.37	2.30	2.26	2.28	2.38	2.49	2.71	2.89
15-May-19	2.39	2.40	2.41	2.42	2.43	2.30	2.16	2.12	2.15	2.25	2.37	2.63	2.82
22-May-19	2.37	2.36	2.37	2.38	2.41	2.37	2.23	2.17	2.19	2.28	2.39	2.64	2.82
31-May-19	2.38	2.35	2.38	2.35	2.35	2.21	1.95	1.90	1.93	2.03	2.14	2.39	2.58
14-Jun-19	2.35	2.23	2.21	2.20	2.18	2.00	1.84	1.79	1.85	1.96	2.09	2.38	2.59
21-Jun-19	2.37	2.16	2.16	2.11	2.05	1.95	1.77	1.74	1.80	1.93	2.07	2.37	2.59
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	2.13	1.99	1.98	1.96	1.92	1.88	1.79	1.76	1.75	1.83	1.90	2.17	2.30

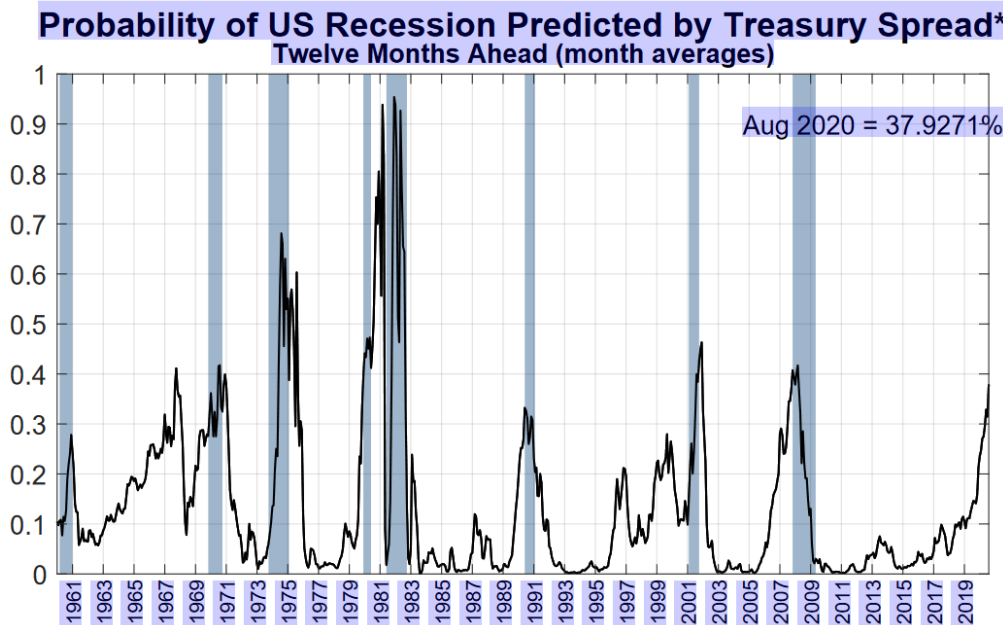
2. U.S. Inversions

We monitor 24 different yield curve ratios. Of these, 14 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, despite the retreat from Inversion at the longer end this past week.

	30Y	30Y	30Y	30Y	20Y	20Y	20Y	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
30-Aug-19	0.18	0.46	0.57	0.46	0.28	0.39	0.28	0.11	0.00	-0.26	-0.39	-0.49	-0.11	-0.37	-0.50	-0.60	-0.71	-0.26	-0.39	-0.49	-0.60	-0.13	-0.23	-0.34
2-Sep-19	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
3-Sep-19	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
4-Sep-19	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
5-Sep-19	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
6-Sep-19	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
9-Sep-19	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
10-Sep-19	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
11-Sep-19	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
12-Sep-19	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
13-Sep-19	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

3. New York Fed Recession Probability Curve

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

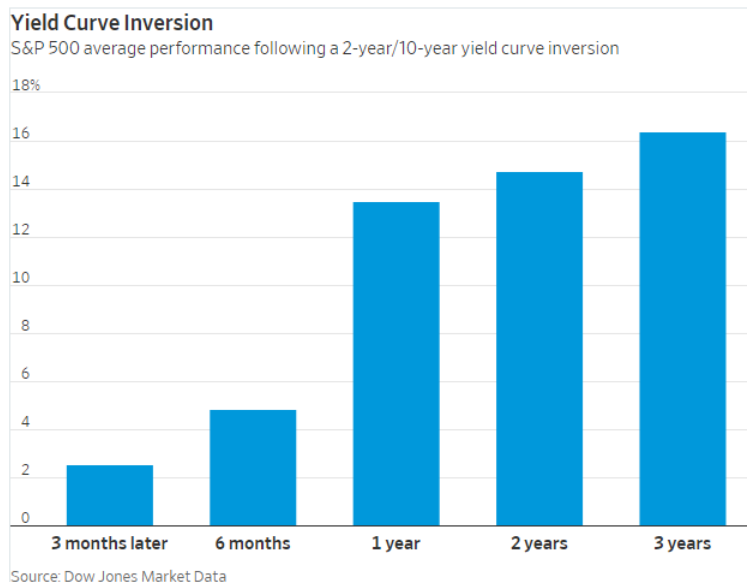


*Parameters estimated using data from January 1959 to December 2009, recession probabilities predicted using data through Aug 2019. The parameter estimates are $\alpha = -0.5333$, $\beta = -0.6330$.

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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, 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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