Recession Obsession

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Google searches on "recession" surged in December to their loftiest level since 2011 (amid the European debt crisis). This was not surprising. The 9.2% plummet in the S&P 500 was the worst for any December since 1931. Meanwhile, the yield curve continued flattening. The spread between the 10- and 2-year nodes averaged just 15 bps for the month, the smallest since 2007 (ahead of the Great Recession), which was the last time the yield curve inverted. Historically, large stock price declines and yield curve inversions have corresponded with recessions, hence the surge in searches. Below, we take a look at how well these two market signals have done in predicting recessions.

Stock Prices

During the recent market rout, the S&P 500 at one point fell 19.8% from its September high, precariously close to what most consider "official" bear market territory (but the 20% mark is somewhat arbitrary). Since the 1950s, there have been nine bear markets, and seven were associated with recessions (*Table 1*). If we lower the bar a notch to at least a 19% decline, there have been 14 such occurrences including 2018's, and eight were associated with recessions… to paraphrase Nobel Laureate Paul Samuelson's famous quip, "the stock market has predicted 13 of the past eight recessions". Since the mid-1950s, all nine recessions aside from 1960, have corresponded with at least a 17% drop in the stock market; but, again, there have been six false positives (stock market drop, but no recession) including, most recently, during 2011 and 1998.

The S&P 500 has peaked ahead of recessions in almost every instance (1980's peak was more contemporaneous). The average lead time was 6-to-7 months, stretching out as far as 12-to-14 months. The latter reflects the stronger technology-inspired bull markets of the 1960s and 1990s (the cycles that most closely resemble the current one). While peak-to-trough declines have averaged about 30%, stocks have typically only fallen about 10% by the time the economic downturn actually started. At any rate, the action in the stock market since September seems at least negative enough to signal a risk of recession, but doesn't alone provide sufficient evidence.

Consider how the market got here. Equity valuations were clearly stretched by almost any measure heading into 2018, with the market giddy on the prospect of corporate-tax-cut-led fiscal stimulus at a time of zero real policy rates. At the same time, earnings growth was accelerating, and speculative activity (think Bitcoin) was picking up. As the prospect of 2019 conditions came into view, including more trend-like growth in GDP and earnings, and near-neutral policy rates, equities were at clear risk of correction. Although the recent correction was large, it is likely to be a false signal concerning recession. As mentioned above, stocks fell 19.4% in 2011 and 19.3% in 1998. Both turned out to be false positive signals, and were followed by subsequent rallies to new highs. The 1998 case is especially fitting given that it was late in the cycle, the

Table 1

Stock Market Selloffs and Recessions

Recession Start (expansion end)	S&P 500 Peak Lead Time (months)	Peak-to-Recession (%)	Peak-to-Trough (%)
07/1953	6.9	-7.3	-14.9
08/1957	1.6	-8.0	-20.7
04/1960	9.0	-10.4	-13.9
12/1969	13.2	-15.1	-36.1
11/1973	10.8	-20.2	-48.2
01/1980	-0.4	-3.6	-17.1
07/1981	8.2	-6.8	-27.1
07/1990	0.5	-3.5	-21.7
03/2001	12.4	-24.0	-49.1
12/2007	2.8	-5.6	-56.5
Mean	**6.5**	**-10.5**	**-30.5**
Median	**7.5**	**-7.6**	**-24.4**
High	**13.2**	**-24.0**	**-56.5**
Low	**-0.4**	**-3.5**	**-13.9**

Assumes expansion ends on last day of last non-recession month
Sources: BMO Economics, Haver Analytics

market had just come off a big tech-inspired run, and external factors led the Fed to pause its tightening campaign (actually cut rates three times).

As an aside, the relentless strength in corporate profits has been one of the factors bucking typical late-cycle behaviour seen across the equity spectrum, but the picture isn't as strong below the surface. In Q3, headline corporate profits were up a hefty 19.6% y/y (after tax and with CCA adjustment). But, that picks up tax relief and accelerated depreciation allowances. Before tax and ex-CCA, profit growth was flat in the quarter, and is actually down from the 2014Q3 high. From another perspective, headline profits as a share of GDP have turned higher (counter to what you'd see late in the cycle), but that's not the case after stripping out stimulus effects. In fact, the latter looks very consistent with what you'd expect at this late-cycle stage (*Chart 1*). All factors considered, the equity market backdrop seems to have fulfilled the necessary conditions for recession starting sometime later this year (or early next year at the latest), but is it sufficient? Given the spotty track record, we look to the other indicators for confirmation.

Yield Curve

The yield curve has a better track record than stock prices in predicting recessions (*Chart 2*). For example, the spread between 10- and 2-year Treasury yields (the market's most-followed slope metric) has turned—persistently—negative before each of the past five recessions (persistent meaning negative on a monthly average basis). On average, the inversion begins some 17-to-18 months before a recession begins (*Table 2*). Apart from the briefest and near-smallest possible inversion (just one month averaging -2 bps in June 1998), there has never been a false positive in the past 40 years… i.e., an inversion but no recession within 1-to-2 years.

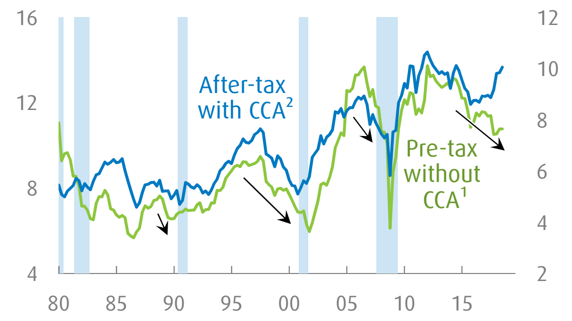
However, 2-year notes only started being issued in 1976, so either the 3-month T-bill rate or the fed funds (overnight) rate is typically paired with the 10-year note yield. For example, the NY and Cleveland Fed's recession probability models include the 3-month rate whereas the Conference Board's Leading Index includes the fed funds rate.[1] The yield curve (employing bond-equivalent 3-month rates) did not invert ahead of the 1957-58 and 1960-61 recessions (false negatives). Interestingly, it also didn't invert in 1998 (it did for five scattered days during September and October, but not enough to turn the monthly or even weekly averages negative). However, it did invert in 1966 without an ensuing recession (false

Chart 1

Profit Picture Less Pretty

United States (% of GDP)

Corporate Profits



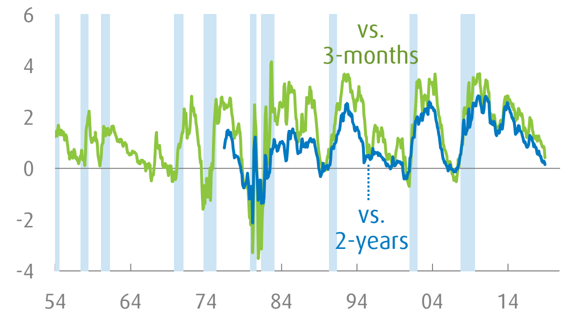
Shading marks periods of U.S. recession ^{1} (lhs) ^{2} (rhs)
Sources: BMO Economics, Haver Analytics

Chart 2

Inversions' Indication

United States (ppts)

10-year Treasury Spreads



Shading marks periods of U.S. recession
Sources: BMO Economics, Haver Analytics

Table 2

Yield Curve Inversions and Recessions

	10-yr less 2-yr		10-yr less 3-mo	
Recession Start (expansion end)	Inversion?	Months to recession	Inversion?	Months to recession
08/1957			No	
04/1960			No	
12/1969			Yes	14
11/1973			Yes	7
01/1980	Yes	18	Yes	16
07/1981	Yes	12	Yes	11
07/1990	Yes	20	Yes	15
03/2001	Yes	15	Yes	10
12/2007	Yes	24	Yes	18
Mean		**17.8**		**13.0**
Median		**18.0**		**14.0**
High		**24**		**18**
Low		**15**		**7**

Sources: BMO Economics, Haver Analytics

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[1] The New York Fed model, based on monthly averages, pegged the one-year odds of recession at 21% in December. The Cleveland Fed model, based on the mid-month weekly average, pegged the one-year odds of recession at 24% as at December 14. Both odds should be marked a bit higher in January.

positive). With three sets of false signals recorded, the yield curve's recession-forecasting ability is clearly not fool-proof. But, to its credit, the full curve has correctly flagged the past seven recessions since the 1969-70 contraction with no false signals, and an average lead time of 13 months.

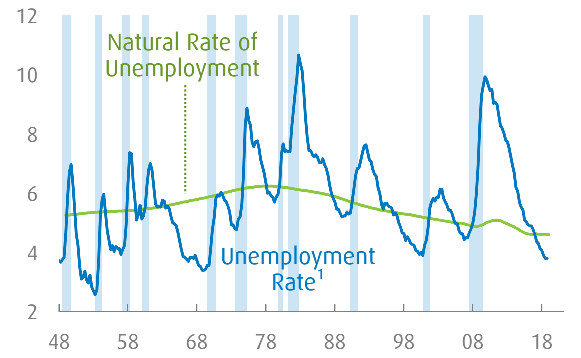
Note that since the Great Recession, the yield curve has become inherently flatter than in past cycles, potentially making it prone to more false positives (inversions without recessions) and weakening its recession-signalling power. There are three key reasons why the curve has become flatter.

First, the neutral policy rate has fallen sharply in recent years, mostly due to demographics (we're getting older and retiring) and productivity (it's gotten slower). When the FOMC first began publishing its longer-run projections for the neutral rate in late 2012, the median was 4.25% (in line with historic norms). The latest projection was 2.75%, down 150 bps. Second, smaller inflation risk premiums are embedded in longer-run inflation expectations today. This reflects the Fed's adoption of a formal 2% inflation target in January 2012 and the fact that core PCE inflation has not been north of 1.9% since April 2012. Third, the Fed has purposely flattened the yield curve. Through three rounds of quantitative easing (QE) as well as "Operation Twist", it amassed $2.5 trillion of Treasuries with a skew to longer-term maturities. While the Fed began paring its Treasury portfolio in October 2017 (by $243 billion so far), the remaining holdings should still exert some flattening influence (augmented by other central banks' QE and massive portfolios).

Chart 3

Crossovers' Countdown

United States (percent)



Shading marks periods of U.S. recession   [1] (s.a.)

Sources: BMO Economics, Haver Analytics

Table 3

Natural Rate Crossovers and Recessions

Recession Start (expansion end)	Crossover?	Quarters ahead
07/1953	Yes	12
08/1957	Yes	11
04/1960	Yes	5
12/1969	Yes	26
11/1973	Yes	9
01/1980	Yes	14
07/1981	Yes	8
07/1990	Yes	12
03/2001	Yes	19
12/2007	Yes	8
Mean		**12.4**
Median		**11.5**
High		**26**
Low		**5**

Sources: BMO Economics, Haver Analytics

Natural Rate Crossover

We also take a look at a third economic omen. The juncture at which the unemployment rate falls below the natural rate (what we call the "natural rate crossover") is a compelling recession predictor (*Chart 3*). Looking at the past 10 recessions, the crossover occurs an average of 12-to-13 quarters before the onset of recession (*Table 3*). The relatively long lead time (compared to stock prices or the yield curve) reflects the time it takes for ebbing labour market and broader economic slack (a diminishing output gap) and, eventually, a mounting positive output gap, to stoke the inflation process. And, also, the time it takes for Fed policy tightening to reach a point that causes recession. (Note that the difference between the current and natural unemployment rates tracks the output gap quite closely.)

For the current cycle, the natural rate crossover occurred in 2017Q1, pointing to a potential recession in 2020H1 if the average lead time holds. Interestingly, although the yield curve is not yet inverted (persistently), if it were to happen in the immediate months ahead, and the average lead time here holds, this, too, would point to a potential recession in 2020H1. For the stock market's signal to make this a trifecta, September's peak would have to be surpassed this year. The Fed's action this year might again determine the expansion's fate.

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