NATIONAL BANK OF CANADA
FINANCIAL MARKETS

Special Report

Economics and Strategy

May 18, 2017

Where are we in the cycle?

Summary

- The odds of a recession in Canada or the U.S. in the years ahead is a contentious question in the economic community and the media. Some observers emphasize that the slope of the yield curve of government bonds remains distinctly positive, suggesting very little chance of recession. Others point to the age of the current expansion in arguing for a much higher probability.
- For this study, we defined the maturity of an expansion in relation to the spread between the unemployment rate and the NAIRU. Based on that interpretation, we compared the present situation with a sample going back to 1950 in order to gauge the chances of a U.S. recession. Give that the U.S. has only recently entered in the mature phase of expansion, our calculations show a historical probability of less than 20% over the next 12 months.
- Repeating this exercise for Canada, we found a probability of only 3% within a year, since by our definition the Canadian expansion has not yet entered its mature phase and because the sample consists of only five recessions since 1970. This seems low compared to the U.S., especially given the correlation of those two economies. A sample encompassing all of the G7 countries (38 recessions) seems more appropriate to us. The historical record for these countries yields a 15% probability of a Canadian recession within 12 months.

What are the probabilities of recession?

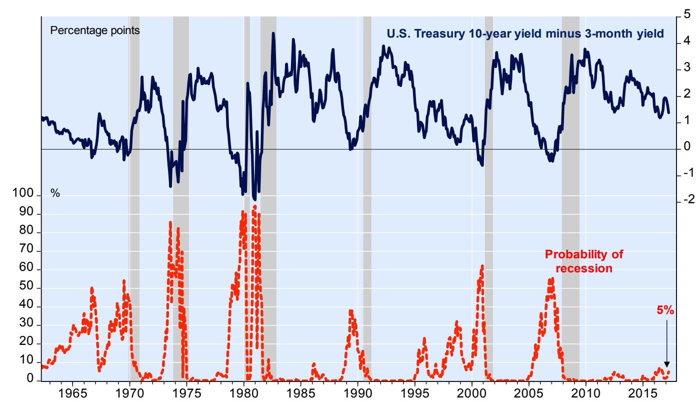
Our team periodically sets out the economic scenario that we consider the most probable for the coming quarters. At present our baseline scenario is one of continuing expansion in Canada and the U.S. over the next two years. Despite some divergences about the vigour of the expansion, most economists share this view.

However, the chances of a recession are never zero. Could it be that we are overoptimistic? That a recession is in the cards for the coming quarters? Under current conditions, what odds should we attach to that alternative scenario? In this Special Report we consider the probabilities of recession in the near and medium term.

What does the yield curve say?

Over time, the slope of the U.S. Treasury yield curve from 3 months to 10 years has become established as a reliable predictor of U.S. recessions. Inversion of this portion of the curve has often heralded economic downturns. Accordingly, the New York Fed has developed a model based solely on this indicator that it regularly updates to gauge the likelihood of recession within 12 months[1]. Applying this model, the probability of the U.S. falling into recession in the next year is only 5% (chart).

U.S.: No signal of economic downturn from the yield curve slope
Probability of recession within one year – Probit model based on slope of the yield curve



NBF Economy and Strategy (data via Bloomberg)

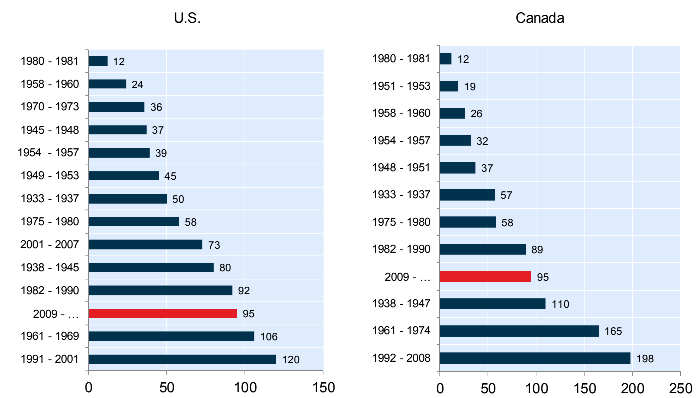
That being said, many economists question the usefulness of this model when the policy rate is close to zero, as it is today. In current conditions, i.e. with 3-month Treasuries yielding less than 1%, the yield of 10-year Treasuries would have to drop to unprecedented lows for the curve to invert. For example, an inversion as pronounced as that of December 1980, seven months before the U.S. economy tipped into recession, would require a 10-year yield near -1.4% — about 275 basis points beneath its record low.

An expansion getting on in years

Odds of 5% may seem low, especially for an expansion that is 95 months old as at present. Indeed, the current expansion is now the third-longest in the U.S. and the fourth-longest in Canada since 1933 (chart).

[1]https://www.newyorkfed.org/medialibrary/media/research/capital_markets/Prob_Rec.pdf

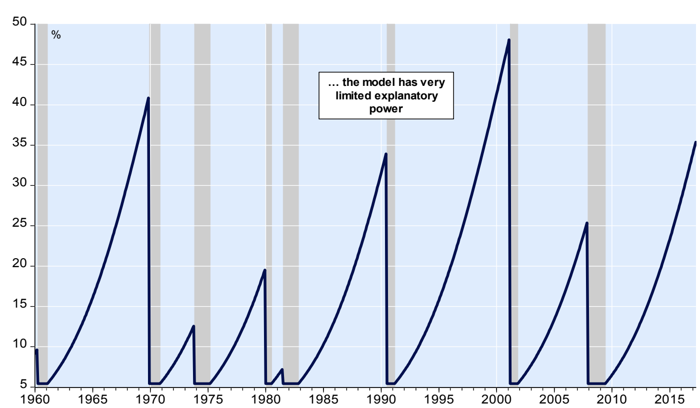
U.S. and Canada: Intervals between economic downturns since 1933
In months



NBF Economy and Strategy (data from National Bureau of Economic Research and C.D. Howe Institute)

But is the age of an expansion in itself a good reason to fear imminent recession? After all, only 12 months separated the U.S. recessions of 1980 and 1981-82. When we build a model based on duration of an expansion, we find its predictive power to be much lower than that of the yield curve.[2] This finding is consistent with the argument set out last year by Glenn D. Rudebusch of the San Francisco Fed, who studied economic expansions since World War II using a life-expectancy model borrowed from actuaries and concluded that the hypothesis stating that these periods must eventually die of old age is wrong[3]. Be that as it may, our model based on the age of an expansion put the probability of recession within a year at 35% (chart), much higher than that suggested by the slope of the Treasury yield curve.

U.S.: The age of the expansion plays a role but ...
Probability of recession within one year – Probit model based on duration of expansion



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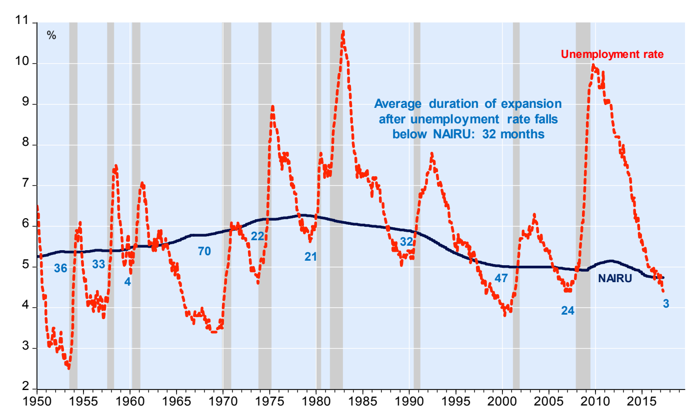
Another view of the maturity of an expansion

So the current expansion is getting long in the tooth. Does that necessarily make it mature? To weigh this question we defined an expansion as "mature" from the moment unemployment rate falls below NAIRU (Non-Accelerating-Inflation Rate of Unemployment). The NAIRU, also known as the natural rate of unemployment, is the unemployment level at which inflation is not rising nor declining. It usually happens when the economy is operating at full capacity. In these occasions, the remaining unemployed are essentially in transition (frictional unemployment) or unfit for businesses' needs (structural unemployment).

Since 1950, the time interval between the moment the unemployment rate falls below NAIRU and the beginning of a recession has averaged 32 months. As of now, the current expansion has only just entered its mature period; the U.S. unemployment rate fell below NAIRU just three months ago (chart)[4].

U.S.: Another perspective on the timing of economic cycles
Observed unemployment rate vs. NAIRU (non-accelerating-inflation rate of unemployment)



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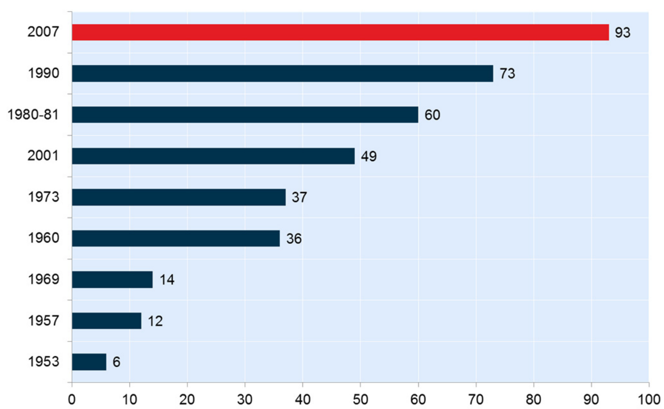
The length of the current expansionary phase is thus not a reflection of its maturity, but the result of a lengthy recovery. As the following chart illustrates, it took more than 93 months from the bottom of the recession of 2007-09 for the unemployment rate to drop below NAIRU. The extreme slowness of this recovery, the longest since World War II (chart), attests to the severity of the last recession, but also suggests that the expansion could continue for a while yet.

[2] Its R2 is only 9%, compared to 38% for the yield curve model.
[3] "Will the Economic Recovery Die of Old Age?", G. D. Rudebusch, 2016

[4] NAIRU estimated by the Congressional Budget Office (CBO).

U.S.: A long path up from the Great Recession
Months from the end of a recession before unemployment rate fell below NAIRU for more than one quarter



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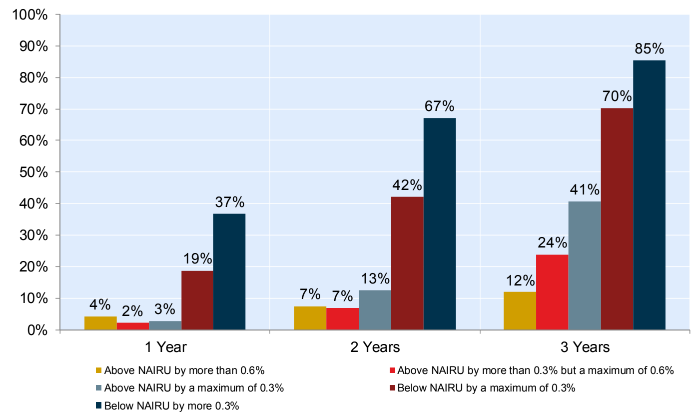
Recession probability by maturity of expansion – U.S.
Historical probabilities based on unemployment rate vs. NAIRU



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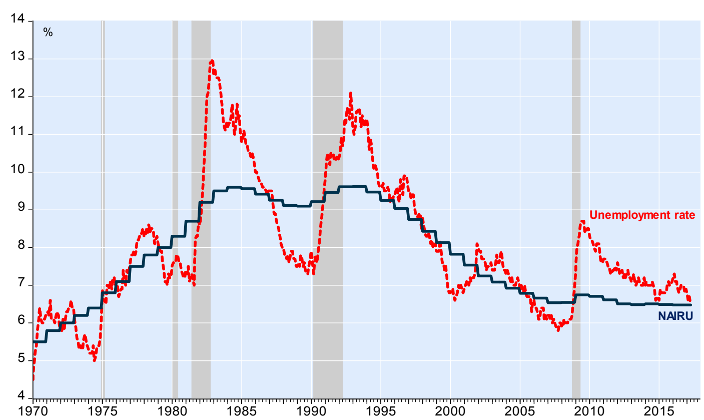
The hypothesis that the probability of recession correlates with the maturity of an expansion – as measured by the unemployment rate relative to NAIRU – was studied by the research firm Macroeconomic Advisers (MA)[5]. The authors of the study used historical labour-market data going back to 1950 in order to assess the probability of a recession occurring over different time spans.

To obtain a little more granularity in the unemployment rate than was presented in the MA study, we repeated its exercise for the United States. Our results were similar. We found that, when the unemployment rate exceeds NAIRU by whatever margin, the odds of a recession within a year are very low, i.e. less than 5% (chart, below).

However, the odds rise significantly when the unemployment rate falls below NAIRU. At this writing the U.S. unemployment rate is 4.4%, 0.3 points below NAIRU. Such a situation is historically associated with a 19% probability of recession within 12 months and 70% probability of recession within three years (chart).

We then applied this approach to Canada using data going back to 1970. Since the current Canadian unemployment rate of 6.5% is marginally above NAIRU[6], the historical probability of recession is only 3% within a year and 13% within three years (second chart below). As it happens, our results show probabilities of recession below those of the U.S. for almost all unemployment rates.

Canada: Unemployment rate and NAIRU since 1970

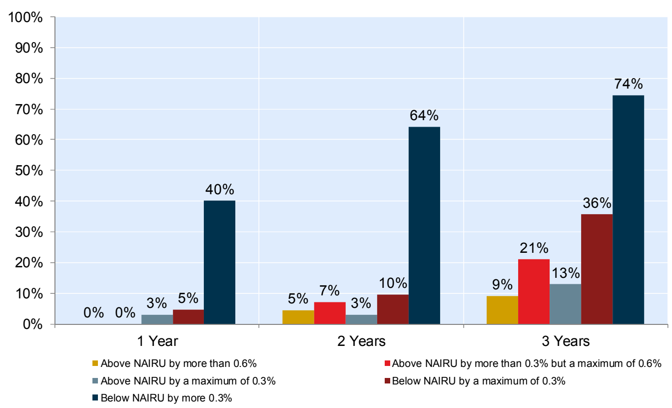


NBF Economics and Strategy (Datastream)

[5] "Recession Probabilities", B. Herzon and J. Prakken, 2016

[6] The NAIRUs used for countries except the U.S. are those estimated by the OECD

Recession probability by maturity of expansion – Canada
Historical probabilities based on unemployment rate vs. NAIRU



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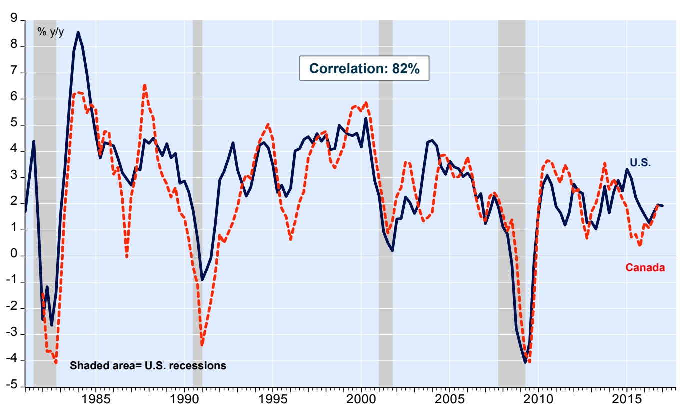
Could our approach underestimate the risk of recession in Canada? Truly, is it reasonable to consider that Canada has significantly lower recession probabilities than the United States given the strong correlation between the two economies (chart)?

Canada and U.S.: Highly correlated economic cycles
Change in real gross domestic product



NBF Economics and Strategy (Datastream)

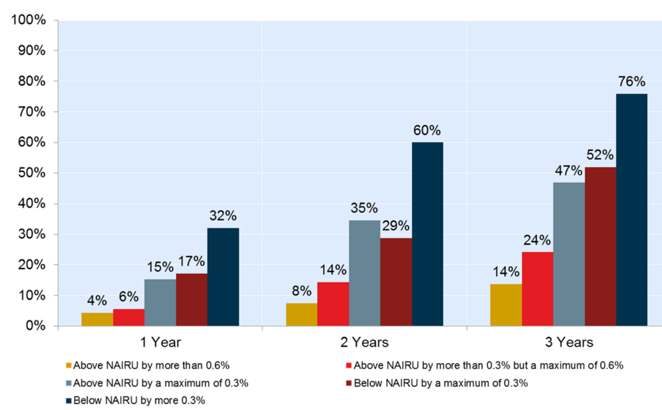
In fact, the low probability of a recession in Canada is partly due to the fact that the country has experienced fewer recessions than its southern neighbor. In Canada, there has been a recession every 9.5 years since 1970, compared with 6.7 years in the United States since 1950. Since 1970, the C.D. Howe Institute has estimated that 5 recessions have occurred in Canada; the NBER counts 7 such occurrences in the United States. It should be understood that the two bodies responsible for defining periods of recession base their respective decisions on a multitude of economic indicators analyzed by experts. Knowing this, the line can sometimes be thin between what is considered a recession per se and what is judged to be a "mere" economic downturn.

For example, it is likely that, for the 2001 episode in Canada, the verdict of no recession was given after intense debate. Even though that period wasn't labelled a recession, the economy still experienced a significant slowdown and investors suffered major losses on the stock markets. The resilience of the labor market in Canada probably contributed in tipping the balance for experts. The fact remains that the Canadian economy has been relatively spared since 1970, based on the official number of recessions that have been identified.

A larger sample

To remedy the weaknesses of a sample with only 5 recessions, we repeated the exercise for all G7 countries. This allowed us to base ourselves on a history of no less than 38 recessions whose dates were determined by ECRI (Economic Cycle Research Institute) using a single analysis framework. For consistency, NAIRU estimated by the OECD were used. The evolution of the unemployment rates of the different countries as well as these recession periods are presented in the Annex section. If the results so obtained are applied to Canada, the current probability of recession within a year rises to 15% (chart), slightly less than the 19% estimated for the U.S.. The three-year probability rises to 47%. This estimate seems intuitively more appropriate.

Recession probability by maturity of expansion – G7 countries
Weighted historical probabilities based on unemployment rate vs. NAIRU



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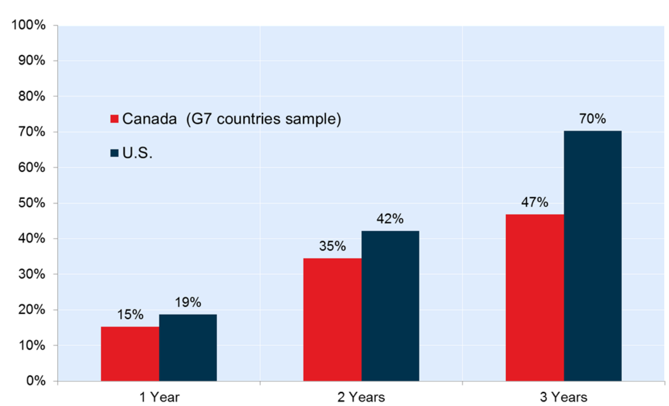
Recession probability at current unemployment rate
Historical probabilities based on unemployment rate vs. NAIRU



NBF Economics and Strategy (Datastream, OECD, ECRI)

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Conclusion

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Matthieu Arseneau and Jocelyn Paquet
514-879-2529

Special Report

Economics and Strategy

Montreal Office
514-879-2529

Stéfane Marion
Chief Economist and Strategist
stefane.marion@nbc.ca

Paul-André Pinsonnault
Senior Fixed Income Economist
paulandre.pinsonnault@nbc.ca

Krishen Rangasamy
Senior Economist
krishen.rangasamy@nbc.ca

Marc Pinsonneault
Senior Economist
marc.pinsonneault@nbc.ca

Matthieu Arseneau
Senior Economist
matthieu.arseneau@nbc.ca

Angelo Katsoras
Geopolitical Analyst
angelo.katsoras@nbc.ca

Kyle Dahms
Economist
kyle.dahms@nbc.ca

Toronto Office
416-869-8598

Warren Lovely
MD, Public Sector Research and Strategy
warren.lovely@nbc.ca