

Economic Research Note

Nowcasting Canada GDP

- We develop a “nowcaster” for Canadian GDP based on higher-frequency data from Canada and the US
- The data from late 1Q and early 2Q currently indicate a slowdown in GDP growth in 2Q
- We also build in effects of oil production shutdowns due to the Fort McMurray wildfires
- We cut our forecast for 2Q GDP growth from 2.0% to 0.2% after 1Q’s expected 3.4% gain

A “nowcaster” uses timely, high-frequency data to produce a statistical estimate of GDP growth in the current quarter, well before official GDP data are published. Nowcasting techniques are particularly useful in places where underlying GDP source data are unavailable or released with a long lag, precluding the construction of a “tracking estimate” like we produce for the United States. J.P. Morgan has produced a [weekly nowcast](#) of global economic growth since [September 2012](#).

In this note, we develop a nowcaster for Canada, where data publication lags are severe. The nowcaster is based on a framework similar to the J.P. Morgan global nowcaster, but modified somewhat to facilitate using a longer list of data series and additional underlying “factors” identified from the data. At the moment, the nowcaster projects another weak month for GDP growth in March, before a moderate bounceback in April. This trajectory points to a large step down in GDP growth from the 3.4% annual rate we expect for 1Q to only 0.4% growth in 2Q.

However, recent developments in Canada highlight the limits of the nowcasting approach. In particular, the nowcaster knows nothing of the devastating wildfires currently raging in Alberta, which could cause significant swings in GDP growth in May and June. Building in judgmental estimates of these effects, we now look for only 0.2% saar GDP growth in 2Q.

You can indicate everything you see

Most nowcasters—including the J.P. Morgan global nowcaster and the recently-introduced New York Fed US nowcast—are based on the technique of “dynamic factor analysis,” where a potentially large number of economic data series can be summarized in a smaller number of “factors” that contain most of the information in the data. We take a similar approach with our Canada nowcaster, with a few technical modifications. (Where the J.P. Morgan global nowcast uses the Kalman filtering technique to estimate the dynamic factors and compute forecasts for missing monthly data, we

use a simpler method based on principal component analysis. Our method appears to perform similarly to the Kalman filtering method on the same data, but it allows us to more easily incorporate more data series and more underlying factors.)

We base our Canada nowcaster on the 18 data series listed in Table 2. These include most of the well-known monthly Canadian economic indicators, as well as four data series from the United States, which a recent paper from the Federal Reserve Board showed improve forecasting power for Canada (“A Nowcasting Model for Canada: Do U.S. Variables Matter?” by Daniela Bragoli and Michele Modugno). We base our nowcaster on the first three principal components of these series, which are all statistically significant in regressions of GDP growth on the components.

At any point in time, the nowcaster produces a forecast for any monthly variables that are not yet available, based on all of the data that are available. When a new observation of any variable is received, the forecasts for any remaining variables are updated, as are the forecasts of monthly GDP based on the principal components of these forecasts. The nowcaster then constructs an estimate of quarterly GDP based on any available observations of monthly GDP, spliced together with the nowcaster’s prediction for monthly GDP in any missing months.

Figure 1: Canada monthly GDP growth and nowcaster

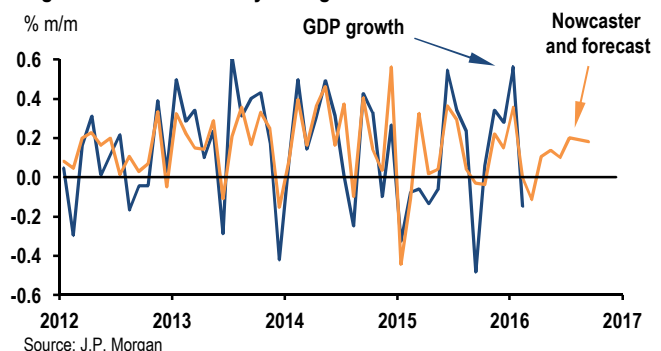


Figure 1 plots monthly GDP and the nowcaster’s current forecasts. The nowcaster looks for a 0.1% m/m GDP decline in March, followed by 0.1% growth per month in April through June. Table 1 shows that these forecasts add up to a 0.4% quarterly GDP growth forecast for 2Q.

Table 1: Canada real GDP growth, J.P. Morgan forecast and nowcaster

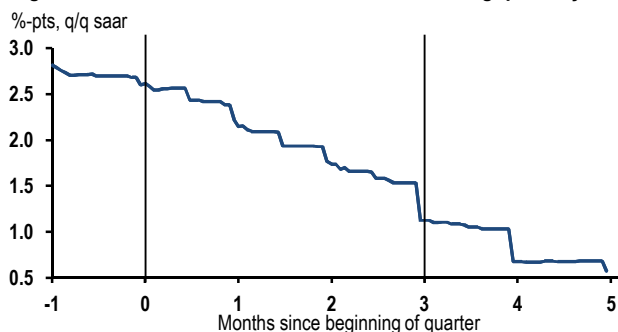
	1Q16	2Q16	3Q16
J.P. Morgan Forecast	3.4	0.2	2.8
Nowcaster	3.0	0.4	2.0

Source: J.P. Morgan

Figure 2 shows how the accuracy of the nowcaster’s forecast changes over time as new data are received. It plots the root mean squared error (RMSE) of the forecast of quarterly GDP

that would typically be available at any point in the months during and surrounding the quarter being forecast. These RMSE estimates are based on a quasi-real-time simulation, where we approximate the set of data that would have been available at any point (although we are limited to using the current vintage of the data, as first print values are not available for many of our series).

Figure 2: RMSE of Canada nowcaster in forecasting quarterly GDP



Source: J.P. Morgan. RMSE calculated for forecasts over the period 1Q2006 to 3Q2015.

Table 2: Reduction in RMSE from each monthly data series

	Total reduction	First two mths. of quarter	Later months
Monthly GDP	-1.20	-0.33	-0.87
Auto production	-0.13	-0.10	-0.03
Exports	-0.11	-0.04	-0.07
Manufacturing sales	-0.08	-0.03	-0.05
Wholesale sales	-0.08	-0.02	-0.06
RBC/Markit PMI	-0.08	-0.05	-0.02
US Industrial production	-0.08	-0.08	0.00
US Capacity utilization	-0.05	-0.06	0.01
US Payroll employment	-0.04	-0.03	-0.01
CFIB Business sentiment	-0.04	-0.04	0.00
Auto sales	-0.03	-0.01	-0.02
US ISM composite	-0.03	-0.02	-0.01
Household employment	-0.03	0.01	-0.04
Retail sales	-0.03	0.00	-0.03
Imports	-0.01	-0.01	0.00
Housing starts	-0.01	0.00	-0.01
Nanos consumer sentiment	0.00	-0.01	0.00
Ivey PMI	0.00	-0.02	0.02

Source: J.P. Morgan

Table 2 also shows the total reduction in RMSE after the beginning of the quarter that can be attributed to each of the data releases. Monthly GDP has the biggest effect in reducing forecast errors in quarterly GDP—it is first by a wide margin in Table 2, and the sharpest moves down in the RMSE in Figure 2 come when monthly GDP is released for the first and second months of the quarter. But information also trickles out before the release of monthly GDP. Auto production, exports, manufacturing sales, business sentiment, and the rest of the familiar Canadian indicators all make some contribution

to reducing the forecasting error, particularly early in the quarter before monthly GDP is available.

I feel the wind blow

Of course, there are still many things that the nowcaster cannot see. For example, the nowcaster has no way of incorporating news reports about the ongoing wildfires in the oil sands region of northern Alberta, which we expect to have noticeable effects on economic activity in the current quarter. Our [strategists estimate](#) that about 1 million barrels per day of oil production will be halted due to the fires—more than 20% of total Canadian production—with the bulk of the impact seen in non-conventional extraction. We also expect utility output to be affected as the disaster has reduced demand for natural gas and electrical infrastructure in the area has sustained extensive damage. In total, we estimate that the fires will subtract as much as 0.4%-pt from real GDP in May, and then produce a rebound of similar magnitude in June as operations come back online. But, of course, these estimates are subject to significant uncertainty.

Adding these effects to the already-weak growth implied by the nowcaster, we now forecast real GDP growth to be a slight 0.2%q/q, saar in 2Q, and we look for 2.3%Q4/Q4 growth in 2016, compared with our 2.8% earlier forecast.

The wildfire's likely effects on the data on employment and unemployment are less clear. Some workers have already returned to work as companies are reportedly flying staff in and out to help resume normal operations. Nevertheless, a high percentage of workers may still be off-line during the household survey reference week, which includes the 15th. Statistics Canada may add special questions to the survey in June or July to determine the impact on hours worked during the outage as they did after the catastrophic flooding in southern Alberta in June of 2013.

The Bank of Canada already expected subdued 1%q/q growth in 2Q in its April Monetary Policy Report, published before the fires had begun. And with the government's fiscal stimulus set to boost growth in 3Q after this weak 2Q, we now expect quarterly real GDP growth to be quite volatile over the first to third quarters of this year. We expect the Bank of Canada will look through this volatility and see an economy continuing to grow moderately above its potential. We thus maintain our call for the Bank to remain on hold for the rest of the year.

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