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Characterizing Breadth in Canadian Economic Activity

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Abstract

Real growth in gross domestic product tends to be meaningfully higher when a large share of industries and demand components are growing—that is, when growth is broad across many fronts. We present a simple new indicator, the overall breadth indicator (OBI), to measure how widespread economic activity is in Canada, allowing us to place recent data in historical context. The relationship between the OBI and the output gap is strong contemporaneously and one quarter ahead. Beyond that, however, the signal from the OBI is less robust.

Bank topic: Business fluctuations and cycles
JEL codes: E, E3, E32

Résumé

La croissance du produit intérieur brut réel tend à être nettement plus forte lorsqu'une proportion importante des branches d'activité et des composantes de la demande connaît une expansion, c'est-à-dire lorsque la croissance s'étend dans plusieurs secteurs. Nous proposons un nouvel indicateur simple, appelé « indicateur d'ampleur globale », pour mesurer l'ampleur de la croissance économique au Canada, qui nous permet de placer des données récentes dans leur contexte historique. L'étroite relation entre cet indicateur et l'écart de production ressort clairement pour le trimestre en cours et le suivant. Toutefois, quand l'horizon dépasse le trimestre suivant, le pouvoir de prédiction de l'indicateur est plus faible.

Sujet : Cycles et fluctuations économiques
Codes JEL : E, E3, E32

1. Introduction

Wilkins (2017) argues that economic growth is more likely to be sustainable over the medium term if it is broad-based. We explore the relationship between breadth and the growth of gross domestic product (GDP) and propose a method for tracking it.

Resilient economic growth requires a solid foundation. When an economy is growing on many fronts, a negative shock to just one component or sector is less likely to destabilize the broader economic expansion. However, if a single component (e.g., exports) is driving GDP growth, a shock to this area (e.g., a drop in foreign demand) would have meaningful consequences for growth.

We propose a simple new measure to summarize how widespread growth is in a given quarter: the overall breadth indicator (OBI). We define breadth as the share of subcomponents of final demand and industries that are growing from 1997 onward.[1] We combine these measures of breadth to create the OBI.

How does the OBI inform our view of GDP growth? Over the past 20 years, we find a robust relationship between breadth and the strength of GDP growth relative to that of potential output in the current and following quarter:

- When the OBI is positive (negative), we find that the output gap in the following quarter is also positive (negative) about 65 percent of the time.[2]
- In quarters when the signs do not match, the sign of the OBI correctly signals the change in the output gap in following quarters about 60 percent of the time (see **Section 3**).[3] This provides some evidence that broader GDP growth is more resilient to small or idiosyncratic shocks in the short term.
- The limited ability of the OBI to signal changes in the output gap beyond one quarter ahead suggests that broad growth in the current quarter does not imply sustainable growth over longer horizons. This is likely due to the inherent volatility in GDP components and industries and their sensitivity to external shocks.

[1] GDP data by industry are only available beginning in January 1997. Since this analysis relies on quarterly growth rates, our sample begins in the second quarter of 1997.

[2] In this note, the output gap refers to the average of the Bank of Canada's Integrated Framework and Extended Multivariate Filter measures.

[3] For example, when the OBI is positive and the output gap is negative, the output gap can be expected to shrink in following quarter.

2. The overall breadth indicator

Economic growth is classified as broader when more of its components are growing.[4] In our analysis, we first quantify breadth separately for the two accounting methods that Statistics Canada uses in calculating real GDP:

- GDP by final expenditure category. Breadth is calculated as the share of 104 subcategories of the five major components of final domestic demand from the National Accounts that are growing in each quarter (consumption, business investment, residential investment, non-energy exports and government spending).[5]
- GDP by industry. Breadth is similarly computed as the share of its 22 major industries that are growing.[6]

Aggregating the two measures of breadth into the OBI

We give equal weight to the breadth measures for GDP by expenditure and by industry and smooth using a two-quarter moving average to create the OBI (**Chart 1**). While growth rates by expenditure and by industry generally provide the same signal, differences can occur. Combining them allows us to better capture the turning points in both indexes and to remove some of the uninformative variation.[7] Furthermore, smoothing the OBI over two quarters helps look through noisy variations in the underlying set of subcomponents and industries of GDP, which often see growth oscillate from positive to negative. We then normalize the indicator, so the value of the OBI represents the deviation of breadth from the average breadth of GDP growth. Values above (below) zero suggest that growth is broader (narrower) relative to history.

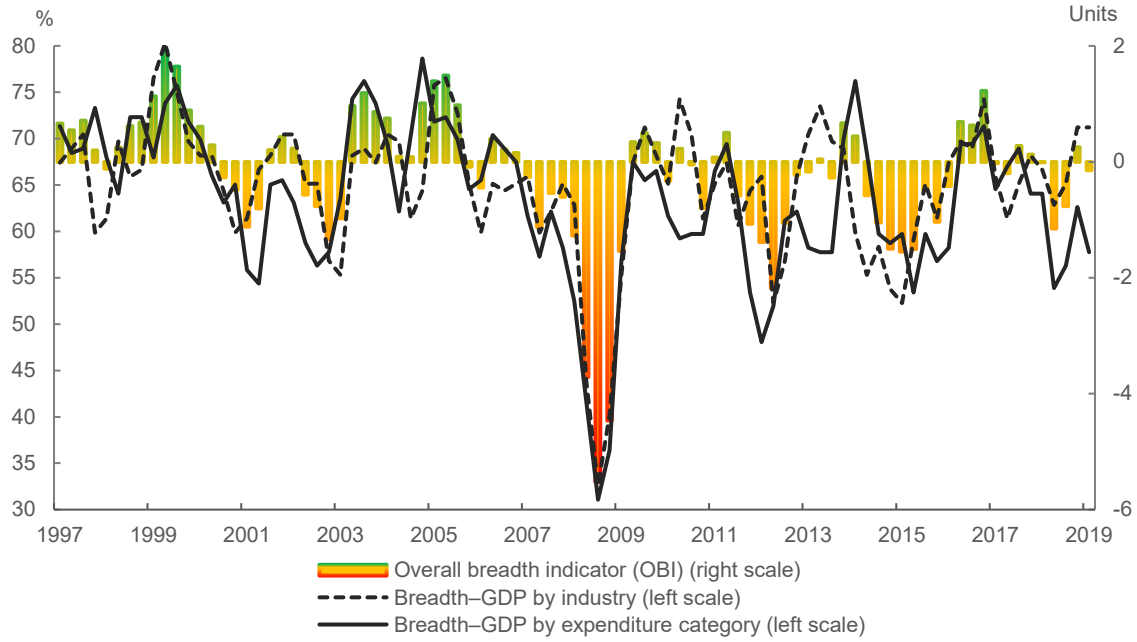
[4] We omit imports and inventories from our analysis because they largely represent a supply-side response to developments in the five major aggregate demand categories. Table A1 and Table A2 in the Appendix show the number of series used for the breadth indicators for GDP by expenditure and by industry.

[5] We abstract from energy exports because they tend to be more sensitive to past investments and developments in the global energy market rather than current domestic conditions.

[6] We use GDP data by industry for the 22 major two-digit North American Industry Classification System (NAICS) industries because data back to 1997 are not available for some of the three-digit NAICS industries.

[7] Averaging the share of categories growing in GDP by expenditure and by industry increases the number of quarters in which breadth and the output gap have the same sign. This also reduces or does not change the number of quarters in which breadth provides the wrong signal for changes in the output gap.

Chart 1: Breadth in GDP growth by expenditure, by industry, and the OBI
Share of categories and industries growing (percent) and the OBI (standardized units)



Note: Green shading is associated with above-average values of the OBI, yellow with near-average, and red with below-average.

Sources: Statistics Canada and Bank of Canada calculations

Last observation: 2019Q3

3. Interpreting the OBI

The OBI appears to have led the Canadian output gap since 1997 (**Chart 2**). The deterioration in breadth since the second half of 2017 reinforces the sudden shift in the output gap, which flatlined around zero after shrinking rapidly between the second quarter of 2016 and the second quarter of 2017. The more recent deterioration in breadth starting in the third quarter of 2018 is consistent with the Bank of Canada staff estimate that the output gap opened up modestly during this period.

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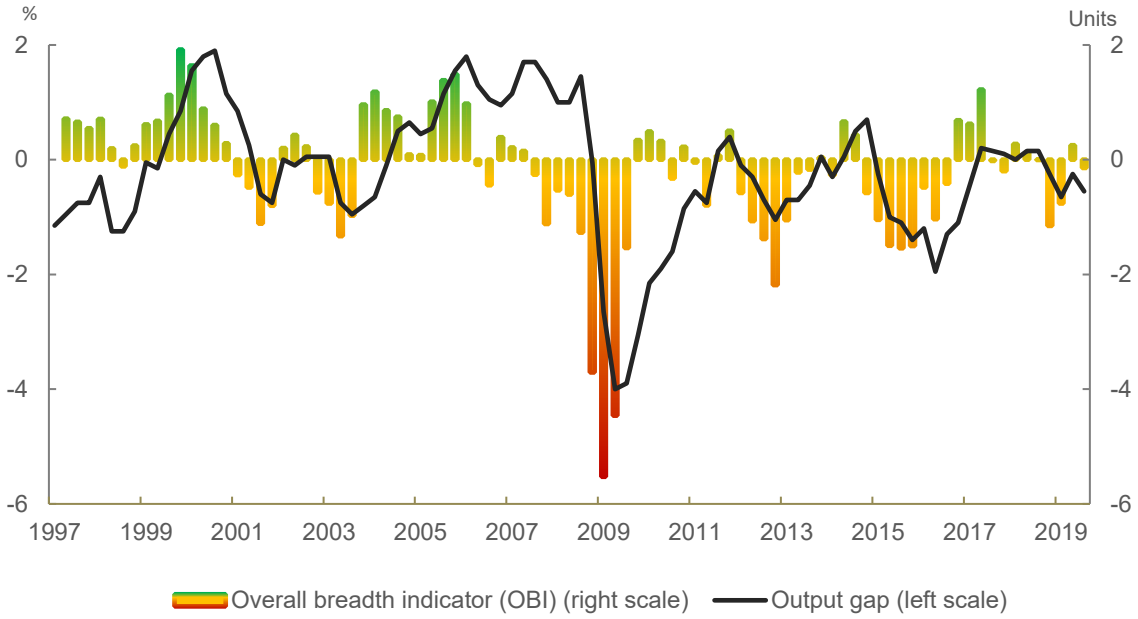
Chart 2: The OBI tracks turning points in the output gap over history
Output gap (percent) and the OBI (standardized units)



Note: Green shading is associated with above-average values of the OBI, yellow with near-average, and red with below-average.

Sources: Statistics Canada and Bank of Canada calculations

Last observation: 2019Q3

In general, we find that the pace of GDP growth tends to increase relative to potential GDP growth as breadth increases. Though this statement may seem tautological, in theory it is possible for a broad range of demand categories and industries to grow but at paces that are subdued enough to result in GDP growth that is below potential. Our empirical finding that this seldom occurs reinforces the intuition that broad-based growth is more resilient than narrow growth.

While this relationship is seen in the simple correlation between the OBI and the output gap, a two-quarter moving average of the OBI helps remove idiosyncratic movements and shows a stronger correlation with the output gap (**Table 1**). Moreover, the peak correlation between the OBI and the output gap occurs between the current value of the OBI and the value of the output gap two quarters ahead. **Table 2** also shows that, in the current and following quarter, the OBI and the output gap often share the same sign. It also shows that the OBI's sign provides a decent signal of the change in the output gap when the two signs differ. The OBI's relatively poorer signal of changes in the output gap beyond one quarter ahead, however, suggests that broad growth today does not necessarily imply more sustainable growth

over longer horizons. This is likely due to the inherent volatility in the subcomponents and industries of GDP.[8]

Table 1: The two-quarter moving average of the overall breadth index (OBI) has a higher correlation with the output gap

	Correlation between the OBI (*t*) and the output gap in:			
	t	***t + 1***	***t + 2***	***t + 3***
No moving average	0.27	0.52	0.63	0.61
Two-quarter moving average	0.46	0.67	0.72	0.64

Table 2: The overall breadth index (OBI) can help signal changes in the output gap at *t* and *t + 1*

	Output gap at time *t*		Output gap at time *t + 1*		Output gap at time *t + 2*		Output gap at time *t + 3*	
	No MA	2QMA	No MA	2QMA	No MA	2QMA	No MA	2QMA
Same sign (%)	50.0	61.4	55.7	64.8	55.7	67.0	64.8	62.5
Opposite sign, correct signal (%)[9]*	34.1	27.3	25.0	21.6	28.4	18.2	19.3	20.5
Opposite sign, wrong signal (%)	15.9	11.4	19.3	13.6	15.9	14.8	15.9	17.0

***** The OBI displays the "correct" signal when its change in sign coincides with that of the output gap, and the "wrong" signal when it does not.

Notes: "MA" means "moving average," and "2QMA" refers to the two-quarter moving average.

The strong relationship between the OBI and the Canadian business cycle over the past 20 years reassures us that breadth is a useful way to augment our view of near-term GDP growth. The OBI's dynamics through the key economic periods since 1997 provide us with a historical lens through which we can interpret incoming data (**Box 1**).

[8] It is worth noting that even sophisticated forecasting tools struggle to predict Canadian GDP accurately beyond the current quarter. For more information, see Chernis and Sekkel (2018).

4. Conclusion

The OBI is a helpful tool for summarizing and characterizing the breadth of growth in the Canadian economy. Overall, our approach summarizes growth across 104 categories of expenditure and 22 industries in an accessible and useful way. We find a meaningful relationship between the OBI and the output gap in the current and following quarters, though no robust evidence that growth at longer horizons is stronger when growth in the current quarter is broader.

Box 1: Breadth and GDP growth in key Canadian economic periods 1997–2018	
The late 1990s and early 2000s **1997Q1–2003Q2**	The late 1990s showed broad, above-potential GDP growth and a period of excess demand. In 2000–01, a slowdown in growth across industries (and later expenditure components) coincided with the slowing of domestic demand and a US recession. Until late-2003, breadth was elusive and GDP growth oscillated around potential, resulting in a relatively flat output gap.
Transition into excess demand **2003Q3–08Q3**	The overall breadth index (OBI) turned positive in late 2003. Growth was broad across demand components, especially business investment and housing, until mid-2006. Above-potential GDP growth drove the economy into excess demand. Consumption had its strongest sustained period of broad growth in our 20-year sample. Non-energy exports were a smaller and inconsistent contributor to the expansion, while foreign demand growth slowed and the Canadian effective exchange rate appreciated. Government expenditures grew quickly and broadly. Overall, the OBI implied above-potential growth until the second half of 2007, providing reason to discount softer quarters of GDP growth. Breadth began to deteriorate in the second half of 2007, with softer domestic and global economic conditions and the United States inching closer to recession.
Global financial crisis and recovery **2008Q4–11Q4**	Just ahead of the recession, economic growth was narrow across demand components. Breadth and GDP growth deteriorated during the global financial crisis; this is not surprising given the magnitude of the external shock. As growth rebounded in the third quarter of 2009, business and residential investment, and later exports, experienced broad-based rebounds that contributed to closing the output gap. Meanwhile, consumption temporarily rose in 2010, but its growth was narrow and quickly diminished. Government expenditure started to broaden at the end of 2010 as fiscal stimulus took hold. Similarly, in production, the goods sectors rebounded quickly from the crisis.

	However, breadth never returned to the levels seen during the expansion in the mid-2000s, likely contributing to the protracted recovery from the crisis.
The recovery stalls **2012Q1–14Q2**	In 2012, GDP growth weakened as the moderate breadth of 2010–11 deteriorated. Consumption growth softened and remained narrow. The rebound in residential investment stalled. Exports slowed across many product types as the gradual US recovery and ongoing European economic crisis weighed on global growth and business confidence.
Oil price shock **2014Q3–16Q2**	The sharp decline in oil prices over the second half of 2014 and 2015 affected oil extraction and many other interconnected industries. Breadth consequently deteriorated across both expenditure categories (particularly business investment) and industries. The output gap widened as GDP growth weakened below potential.
Reducing the output gap **2016Q3–17Q2**	In the second half of 2016, growth across expenditure categories began to broaden and GDP growth accelerated. While a rebound in the energy sector contributed to this, it was only part of the surge. The goods sector saw a broad-based rebound over the second have of 2016 and the first half of 2017, and service growth also broadened substantially in the first half of 2017. This broadening was consistent with the narrowing of the output gap over this period, though the expansions of both breadth and growth were short-lived.
Breadth stumbles **2017Q3–19Q1**	The deterioration of breadth in the second half of 2017 coincided with a halt in the closing of the output gap until breadth fell further below average and GDP growth dropped below potential in the fourth quarter of 2018 and the first quarter of 2019. National, provincial and local housing market policies, disruptions and transportation issues in the energy sector, and narrow growth in government spending all contributed to the dynamic over this period.
Where to from here? **2019Q2–present**	Real GDP growth surged in the second quarter of 2019. However, breadth was relatively subdued because growth was driven primarily by a surge in exports, and indeed GDP growth slowed significantly in the third quarter of 2019. With some government budgets pointing to upcoming fiscal consolidation and trade policy uncertainty weighing on exports and investment, the continued softness in the OBI is consistent with GDP growth remaining somewhat below potential in the near term.

Appendix: Number of categories in GDP by expenditure component and by industry

Table A1: GDP components and associated number of National Accounts categories

GDP by expenditure component	Number of categories (% of total)	Nominal share of final demand (%)*
Consumption	38 (36.5)	45.7
Business investment	14 (13.5)	8.8
Housing	3 (2.9)	6.0
Non-energy exports	35 (33.7)	20.2
Government	14 (13.5)	19.3

* Energy exports are removed from final demand to compute these shares.

Note: Shares may not add up due to rounding.

Table A2: GDP by industry categories

GDP by industry	Number of industries (% of total)	Nominal share (%)
Goods	8 (36.4)	29.7
Services	14 (63.6)	70.2

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