Has the BoC disavowed its own core inflation measures?

By Matthieu Arseneau

Investors are scratching their heads right now about the risks of increased inflationary pressures under conditions of unprecedented fiscal and monetary stimulus deployed by public authorities. In our view, last week’s imbroglio over inflation in Canada comes at a bad time. The Bank of Canada argues in an explanatory box of its April Monetary Policy Review (MPR), released April 21, that the three measures of core inflation it usually favours – CPI-trim, CPI-median and CPI-common – do not give a faithful picture of trend inflation (see appendix 1). In the Bank’s view, today’s unprecedented conditions cause these measures to overstate current inflationary pressures. It accordingly emphasizes four other measures showing lower inflation on average (CPIXSMIP, CPIXFET, CPIX, CPIW). See Appendix 2 for a description of the various measures. What to think of all this? We comment on two passages that we find especially eyebrow-raising.

 инвестирую have sharply revised their inflation expectations
Inflation implied by difference between nominal and inflation-protected yield of 10-year government bonds

Passage 1:

*The pandemic is having unique impacts on prices and measures of total and core inflation. In particular, the economic effects of COVID-19 have been highly uneven. Large shifts in consumption patterns have been accompanied by extreme price movements. In the most affected parts of the economy, such as travel services, drops in demand have resulted in sharp price declines. These hardest-hit sectors continue to show signs of considerable economic slack. ...*

*Given the unique shifts in demand and supply and the resulting price movements caused by the pandemic and related containment measures, alternative measures of core inflation may provide additional useful insights into the assessment of underlying inflation.*

It is true that current conditions are unprecedented and that economists need to be cautious and review their analytical framework to assess the economic picture properly. Does that mean the three measures preferred by the Bank since 2017 are inappropriate under current conditions? In the introduction to Box 5 of its Monetary Policy Report, the Bank emphasizes the difficulties of particular sectors. It even mentions signs of economic slack attributable to low demand. Our perception diverges on this point. It is more a supply shock that explains why the output of some sectors has slowed. Public-health measures impose a number of restrictions that prevent demand from deploying. Whatever the monetary accommodation the central bank may offer, a rebound of output in these sectors will be possible only once the pandemic is under control and public-health restrictions are eased. Since the rebound could surprise by its vigour in the coming months, the Bank should be cautious and not interpret this weakness as a conventional demand shock. Over the last year, the main concern of economists has been whether other

---

sectors would hold up despite the weaknesses of some. In the event, resilience has been impressive and contagion avoided, resulting in a striking economic recovery.

**Canada: Losses remain limited to sectors affected by sanitary measures**

Employment

In our view, the Bank of Canada should not be overemphasizing sector-specific shocks which may be temporary. It is ironic in our eyes that the central bank is discrediting the core inflation measures it has favoured since 2017 for one of the reasons that led it to favour them. Its Monetary Policy Report of January 2017 states that CPI-trim, CPI-median and CPI-common compare favourably to CPIX\(^2\) (the measure it previously preferred) for two main reasons:\(^3\) First, that these three measures are less influenced by sector-specific shocks and can give a better account of persistent changes in inflation. Second, that they present a stronger empirical relationship to the macroeconomic variables (in particular the output gap) that are theoretically important for the conduct of monetary policy. A September 2019 update\(^4\) of the evaluation of the various measures of trend inflation made the same argument (table).

**Summary of evaluation of trend-inflation measures**

\(^2\) CPIX excludes eight of the most volatile components of the CPI basket (fruits, vegetables, gasoline, heating oil, natural gas, mortgage interest, intercity transport and tobacco products) and the effect on changes in indirect taxes on the other components

\(^3\) Bank of Canada Monetary Policy Report, January 2017 [link](#)

\(^4\) A Comprehensive Evaluation of Measures of Core Inflation in Canada: An Update, Bank of Canada, September 2019 [link](#)
Passage 2:

“These measures have seen little movement since COVID-19 hit. Early in the pandemic, both CPI-median and CPI-trim excluded components with large, sudden price declines. These declines were felt in the most heavily affected sectors of the economy. By excluding these components, the measures had been putting more weight on components that were not affected (e.g., property taxes). However, when the prices of hard-hit components stopped falling and started to recover gradually, these measures tended to include the associated increases. This resulted in an asymmetry... 

“[A set] of [alternative] core inflation measures, unlike CPI-trim and CPI-median, is not subject to the potential upward bias associated with excluding large, rapid price declines while including smaller, more gradual price increases.”

The central bank seems uncomfortable with the resilience of the inflation exhibited by CPI-median and CPI-trim during this crisis, a resilience that in its view would be explained by a particular movement of certain prices. It is true in theory that CPI-trim would overestimate annual inflation if a large number of components initially fell sharply and then recovered gradually. But in practice, what components is the Bank referring to here? A scan of the 55 components currently used by Statistics Canada leaves us puzzled (see Appendix 3). Only four components show a tendency that could be related to what the central bank describes (large drops, slow recoveries): rental housing, fuel oil and other fuels, gasoline, and the use of recreational vehicles (circled in appendix). And what is most surprising is that these components have not had the suggested effect. Rental housing was included in calculation of CPI-trim for 12 of the 13 months since the beginning of the pandemic, including all the deflationary months. Fuel oil and other fuels was included for only one of the 10 months of recovery. As for gasoline and use of recreational vehicles, they were included in calculations for only three of the 10 months of recovery. In other words, the mechanics of construction of CPI-median and CPI-trim and the path of price components did not cause bias as suggested in the Monetary Policy Report.

Moreover, it is surprising that the central bank continues to wonder so much about 12-month-change data influenced by data disclosed some time ago. Though CPI-trim and CPI-median are calculated from monthly changes with seasonally adjusted data, the Bank of Canada and Statistics Canada have never thought necessary to publish the values of these indexes, preferring to share only the 12-month changes. This is regrettable, because the latter can be strongly influenced by base effects that mask more recent trends. To satisfy our curiosity, we exactly replicate Statistics Canada’s methodology in our own calculations using data supplied by the agency. Our findings are unequivocal: a very strong recent momentum. In March, the CPI-median had risen at an annual rate of 2.7% over the previous three months and the CPI-trim at 3.0% annualized (chart).

---

Canada : Measures of core inflation in March

<table>
<thead>
<tr>
<th>CPI inflation (%)</th>
<th>12-month</th>
<th>6-month (SAAR)</th>
<th>3-month (SAAR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total CPI</td>
<td></td>
<td>2.2</td>
<td>2.6</td>
</tr>
<tr>
<td>CPI-Trim (NBF for SAAR)</td>
<td></td>
<td>2.2</td>
<td>2.4</td>
</tr>
<tr>
<td>CPI-Median (NBF for SAAR)</td>
<td></td>
<td>2.1</td>
<td>2.2</td>
</tr>
<tr>
<td>CPI-Common</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

BoC mid-point target

---

NBF Economics and Strategy (data via Statistics Canada)

---

5 Similar inflation measures are published in the U.S. on FRED and are available in levels (CPI-trim and CPI-median)
Conclusion

In its April Monetary Policy Report the central bank pulled a joker from the deck. It said the three basic core inflation measures it had been using for some time did not provide a complete picture of the situation and suggested that alternative measures (showing lower inflation on average) provided “useful insights into the assessment of underlying inflation.” We disagree. The reasons for which CPI-trim and CPI-median have been favoured since 2017 is that they are less influenced by circumscribed sector-specific shocks that might be temporary – an especially important characteristic under current conditions where some sectors have been hurt by temporary restrictive measures and not by weakness of demand as is typically the case in a recession. Moreover, contrary to what the central bank claims, CPI-trim and CPI-median have not shown upward bias associated with exclusion of deep and sharp drops in prices and inclusion of smaller and more gradual price rises. In our opinion, the central bank should instead acknowledge that sector-specific downturns have fortunately had little disinflationary effect on the economy as a whole. Finally, it is interesting to note that Box 5 of the MPR twice notes significant changes in Canadian consumer habits during the pandemic. On this point it is on the mark, but that could mean inflation calculations are off the mark because CPI is a fixed-basket price index. Statistics Canada publishes an adjusted-CPI build in conjunction with the BoC that takes into account sudden changes in spending habits which shows annual inflation 0.4 or 0.5 percentage points higher than the official measure of recent months (chart). Though the Bank of Canada presents no fewer than seven inflation measures in its box, it omits to mention the path of adjusted CPI in its April MPR, though it did so in January. In our opinion, the BoC needs to provide more compelling arguments than those presented in a simple box with no reference to staff research on this matter to convince us that it is time to look to alternative measures of inflation. Perhaps the output gap is simply smaller than what is currently assumed.

Canada: Is inflation actually being underestimated?
Total and adjusted CPI for Canada and personal consumption expenditure deflator for U.S.

* CPI adjusted for changes in consumption habits

NBF Economics and Strategy (Statistics Canada and BEA data)
Diverging measures of core inflation under COVID-19

The pandemic is having unique impacts on prices and measures of total and core inflation. In particular, the economic effects of COVID-19 have been highly uneven. Large shifts in consumption patterns have been accompanied by extreme price movements. In contrast, some components of the consumer price index (CPI) have seen price jumps due to relatively strong demand amid supply limitations.

Given the unique shifts in demand and supply and the resulting price movements caused by the pandemic and related containment measures, alternative measures of core inflation may provide additional useful insights into the assessment of underlying inflation.2

CPI-trim and CPI-median

CPI-median and CPI-trim filter out extreme price movements that might be caused by factors limited to specific components. CPI-trim does this by excluding components whose price changes fall in the top and bottom 20 percent in a given month. CPI-median excludes all monthly price changes except for the component at the midpoint of the distribution. In normal circumstances, this filtering helps give a better sense of overall inflationary pressures by reducing the impact of large changes in the prices of individual components.

These measures have seen little movement since COVID-19 hit (Chart 5-A, panel a). Early in the pandemic, both CPI-median and CPI-trim excluded components with large, sudden price declines. These declines were felt in the most heavily affected sectors of the economy. By excluding these components, the measures had been putting more weight on components that were not affected (e.g., property taxes). However, when the prices of hard-hit components stopped falling and started to recover gradually, these measures tended to include the associated increases. This resulted in an asymmetry. Because their composition is based on monthly price movements, these measures do not account for the fact that the price increases have been from particularly low levels. Consequently, CPI-median and CPI-trim have likely been overestimating underlying inflation.

CPI-common

CPI-common tracks common price changes across multiple categories in the CPI basket. Common price movements indicate changes to overall demand. The weights are estimated using a statistical procedure called a factor model to detect these common variations. As a result, idiosyncratic price movements are averaged out.

CPI-common’s design means this measure tends to reflect aggregate slack in the economy when spending patterns do not shift significantly. Because the weights adjust very slowly over time, CPI-common treats price changes symmetrically on the way down and on the way up.

CPI-common is also more susceptible to base-year effects than the other two preferred measures because it is calculated using year-over-year price changes. Notably, sharp declines in the prices of electricity, clothing and footwear accounted for about three-quarters of the fall in CPI-common between February and April 2020. A year later, base-year effects are working in the opposite direction and are expected to contribute about 0.2 percentage points to the pickup in CPI-common from February to April 2021.

A broader set of core measures

Alternative measures of core inflation exclude or reduce the impact of some relatively volatile components, but they do so in different ways.

CPIX and CPIXFET each exclude a fixed set of historically volatile components, such as food and energy in the case of CPIXFET, and adjust the remaining components to exclude the effects of changes in indirect taxes. Other countries commonly assess underlying inflation using similar types of exclusion measures of core inflation. CPIW includes

(continued...)
Appendix 1 (cont’d) – Box 5 in April 2021 Monetary Policy Report

Chart 5-A: Measures of core inflation have diverged
Year-over-year percentage change, monthly data

- a. CPI-trim, CPI-common and CPI-median
- b. Alternative measures of core inflation

<table>
<thead>
<tr>
<th>Range of alternative measures</th>
<th>CPI-trim</th>
<th>CPI-common</th>
<th>CPI-median</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPIX, CPIXFET, CPIW, MEANSTD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: Statistics Canada and Bank of Canada calculations

All components but assigns lower weights to those with higher historical volatility. The weights in all these measures are fixed over two years.

MEANSTD does not have fixed weights. However, it filters out large year-over-year price changes instead of month-over-month seasonally adjusted price changes. This feature should make it less susceptible to base-year effects.

All of these alternative measures fell sharply at the beginning of the pandemic and for the most part have remained relatively low (Chart 5-A, panel b). This set of core inflation measures, unlike CPI-trim and CPI-median, is not subject to the potential upward bias associated with excluding large, rapid price declines while including smaller, more gradual price increases. These measures currently fall in a broad range around CPI-common, between 0.8 and 1.8 percent.

3 MEANSTD excludes prices whose rate of year-over-year change is above or under 1.5 standard deviations from total inflation.
Appendix 2 – Measures of basic inflation in Canada

CPIX
Calculated using a price index that excludes eight of the most volatile components of the CPI and the effect on the remaining components of changes in indirect taxes. The eight excluded components are fruits, vegetables, gasoline, fuel oil, natural gas, mortgage interest, intercity transportation and tobacco products.

CPIXFET
CPI excluding food, energy and the effect of changes in indirect taxes.

CPIW
Assigns a weight to each CPI component that is inversely proportional to its historical volatility (i.e. it is a volatility-weighted measure).

CPI-trim
Excludes CPI components whose rates of change in a given month fall in the top and bottom 20% of the distribution of price changes.

CPI-median
Price change of the component that is at the midpoint of the distribution of price changes in a given month.

CPI-common
Tracks common price changes across categories in the CPI basket.

CPI-SMIP
Excludes components considered idiosyncratic. The systematic measure of idiosyncratic prices (SMIP) identifies as idiosyncratic the CPI components that have the highest scores based on five criteria:

- high volatility,
- low persistence,
- low degree of correlation with common movement across CPI components,
- low correlation with the output gap, and
- extreme movements in the current period (Dockrill and Savoie-Chabot, 2018).
Special Report
Economics and Strategy

Economics and Strategy
Montreal Office
514-879-2529
Stéfane Marion
Chief Economist and Strategist
stefane.marion@nbc.ca
Kyle Dahms
Economist
kyle.dahms@nbc.ca
Angelo Katsoras
Geopolitical Analyst
angelo.katsoras@nbc.ca
Matthieu Arseneau
Deputy Chief Economist
matthieu.arseneau@nbc.ca
Daren King
Economist
daren.king@nbc.ca
David Djavid
Intern Economist
david.djavid@nbc.ca
Paul-André Pinsonnault
Senior Economist
paulandre.pinsonnault@nbc.ca
Jocelyn Paquet
Economist
jocelyn.paquet@nbc.ca
Alexandra Ducharme
Intern Economist
alexandra.ducharme@nbc.ca

Toronto Office
416-869-8598
Warren Lovely
Chief Rates and Public Sector Strategist
warren.lovely@nbc.ca
Taylor Schleich
Rates Strategist
taylor.schleich@nbc.ca

General
This Report was prepared by National Bank Financial, Inc. (NBF), a Canadian investment dealer, member of IIROC, an indirect wholly owned subsidiary of National Bank of Canada. National Bank of Canada is a public company listed on the Toronto Stock Exchange.

The particulars contained herein were obtained from sources which we believe to be reliable but are not guaranteed by us and may be incomplete and may be subject to change without notice. The information is current as of the date of this document. Neither the author nor NBF assumes any obligation to update the information or advise on further developments relating to the topics or securities discussed. The opinions expressed are based upon the author(s) analysis and interpretation of these particulars and are not to be construed as a solicitation or offer to buy or sell the securities mentioned herein, and nothing in this Report constitutes a representation that any investment strategy or recommendation contained herein is suitable or appropriate to a recipient’s individual circumstances. In all cases, investors should conduct their own investigation and analysis of such information before taking or omitting to take any action in relation to securities or markets that are analyzed in this Report. The Report alone is not intended to form the basis for an investment decision, or to replace any due diligence or analytical work required by you in making an investment decision.

This Report is for distribution only under such circumstances as may be permitted by applicable law. This Report is not directed at you if NBF or any affiliate distributing this Report is prohibited or restricted by any legislation or regulation in any jurisdiction from making it available to you. You should satisfy yourself before reading it that NBF is permitted to provide this Report to you under relevant legislation and regulations.

National Bank of Canada Financial Markets is a trade name used by National Bank Financial and National Bank of Canada Financial Inc.

Canadian Residents
NBF or its affiliates may engage in any trading strategies described herein for their own account or on a discretionary basis on behalf of certain clients and as market conditions change, may amend or change investment strategy including full and complete divestment. The trading interests of NBF and its affiliates may also be contrary to any opinions expressed in this Report.

NBF or its affiliates often act as financial advisor, agent or underwriter for certain issuers mentioned herein and may receive remuneration for its services. As well NBF and its affiliates and/or their officers, directors, representatives, associates, may have a position in the securities mentioned herein and may make purchases and/or sales of these securities from time to time in the open market or otherwise. NBF and its affiliates may make a market in securities mentioned in this Report. This Report may not be independent of the proprietary interests of NBF and its affiliates.

This Report is not considered a research product under Canadian law and regulation, and consequently is not governed by Canadian rules applicable to the publication and distribution of research Reports, including relevant restrictions or disclosures required to be included in research Reports.
UK Residents

This Report is a marketing document. This Report has not been prepared in accordance with EU legal requirements designed to promote the independence of investment research and it is not subject to any prohibition on dealing ahead of the dissemination of investment research. In respect of the distribution of this Report to UK residents, NBF has approved the contents (including, where necessary, for the purposes of Section 2(1) of the Financial Services and Markets Act 2000). This Report is for information purposes only and does not constitute a personal recommendation, or investment, legal or tax advice. NBF and/or its parent and/or any companies within or affiliates of the National Bank of Canada group and/or any of their directors, officers and employees may have or may have had interests or long or short positions in, and may at any time make purchases and/or sales as principal or agent, or may act or may have acted as market maker in the relevant investments or related investments discussed in this Report, or may act or have acted as investment and/or commercial banker with respect hereto. The value of investments, and the income derived from them, can go down as well as up and you may not get back the amount invested. Past performance is not a guide to future performance. If an investment is denominated in a foreign currency, rates of exchange may have an adverse effect on the value of the investment. Investments which are illiquid may be difficult to sell or realise; it may also be difficult to obtain reliable information about their value or the extent of the risks to which they are exposed. Certain transactions, including those involving futures, swaps, and other derivatives, give rise to substantial risk and are not suitable for all investors. The investments contained in this Report are not available to retail customers and this Report is not for distribution to retail clients (within the meaning of the rules of the Financial Conduct Authority). Persons who are retail clients should not act or rely upon the information in this Report. This Report does not constitute or form part of any offer for sale or subscription of or solicitation of any offer to buy or subscribe for the securities described herein nor shall it or any part of it form the basis of or be relied on in connection with any contract or commitment whatsoever.

This information is only for distribution to Eligible Counterparties and Professional Clients in the United Kingdom within the meaning of the rules of the Financial Conduct Authority. NBF is authorised and regulated by the Financial Conduct Authority and has its registered office at 71 Fenchurch Street, London, EC3M 4HD.

NBF is not authorised by the Prudential Regulation Authority and the Financial Conduct Authority to accept deposits in the United Kingdom.

U.S. Residents

With respect to the distribution of this report in the United States of America, National Bank of Canada Financial Inc. ("NBCFI") which is regulated by the Financial Industry Regulatory Authority (FINRA) and a member of the Securities Investor Protection Corporation (SIPC), an affiliate of NBF, accepts responsibility for its contents, subject to any terms set out above. To make further inquiry related to this report, or to effect any transaction, United States residents should contact their NBCFI registered representative.

This report is not a research report and is intended for Major U.S. Institutional Investors only.

This report is not subject to U.S. independence and disclosure standards applicable to research reports.

HK Residents

With respect to the distribution of this report in Hong Kong by NBC Financial Markets Asia Limited ("NBCFMA") which is licensed by the Securities and Futures Commission ("SFC") to conduct Type 1 (dealing in securities) and Type 3 (leveraged foreign exchange trading) regulated activities, the contents of this report are solely for informational purposes. It has not been approved by, reviewed by, verified by or filed with any regulator in Hong Kong. Nothing herein is a recommendation, advice, offer or solicitation to buy or sell a product or service, nor an official confirmation of any transaction. None of the products issuers, NBCFMA or its affiliates or other persons or entities named herein are obliged to notify you of changes to any information and none of the foregoing assume any loss suffered by you in reliance of such information.

The content of this report may contain information about investment products which are not authorized by SFC for offering to the public in Hong Kong and such information will only be available to, those persons who are Professional Investors (as defined in the Securities and Futures Ordinance of Hong Kong ("SFO"). If you are in any doubt as to your status you should consult a financial adviser or contact us. This material is not meant to be marketing materials and is not intended for public distribution. Please note that neither this material nor the product referred to is authorized for sale by SFC. Please refer to product prospectus for full details.

There may be conflicts of interest relating to NBCFMA or its affiliates’ businesses. These activities and interests include potential multiple advisory, transactional and financial and other interests in securities and instruments that may be purchased or sold by NBCFMA or its affiliates, or in other investment vehicles which are managed by NBCFMA or its affiliates that may purchase or sell such securities and instruments.

No other entity within the National Bank of Canada group, including National Bank of Canada and National Bank Financial Inc, is licensed or registered with the SFC. Accordingly, such entities and their employees are not permitted and do not intend to: (i) carry on a business in any regulated activity in Hong Kong; (ii) hold themselves out as carrying on a business in any regulated activity in Hong Kong; or (iii) actively market their services to the Hong Kong public.

Copyright

This Report may not be reproduced in whole or in part, or further distributed or published or referred to in any manner whatsoever, nor may the information, opinions or conclusions contained in it be referred to without in each case the prior express written consent of NBF.