BANK OF CANADA
BANQUE DU CANADA

Monetary Policy **Report**

October 2022

Canada's inflation-control strategy

Inflation targeting and the economy

- The objective of Canada's monetary policy is to promote the economic and financial well-being of Canadians. Canada's experience with inflation targeting since 1991 has shown that the best way that monetary policy can achieve this goal is by maintaining a low and stable inflation environment. Doing so fosters confidence in the value of money and contributes to sustained economic growth, a strong and inclusive labour market and improved living standards.
- In 2021, the Government of Canada and the Bank of Canada renewed the flexible inflation-targeting strategy of the monetary policy framework for a further five-year period, ending December 31, 2026.[1]
- The inflation target was renewed at the 2% midpoint of the 1%–3% control range, with inflation measured as the 12-month rate of change in the consumer price index (CPI).
- The Government and the Bank agreed that the best contribution monetary policy can make to the economic and financial well-being of Canadians is to continue to focus on price stability. The Government and the Bank also agreed that monetary policy should continue to support maximum sustainable employment, recognizing that maximum sustainable employment is not directly measurable and is determined largely by non-monetary factors that can change through time.
- Further, the Government and the Bank agreed that because well-anchored inflation expectations are critical to achieving both price stability and maximum sustainable employment, the primary objective of monetary policy is to maintain low, stable inflation over time.

Inflation targeting is *symmetric* and *flexible*

- Canada's inflation-targeting approach is *symmetric*, which means the Bank is equally concerned about inflation rising above or falling below the 2% target.
- Canada's inflation-targeting approach is also *flexible*. Typically, the Bank seeks to return inflation to target over a horizon of six to eight quarters. However, the most appropriate horizon for returning inflation to target will vary depending on the nature and persistence of the shocks buffeting the economy.
- The 2021 agreement with the Government specifies that the 2% inflation target remains the cornerstone of the framework.
- The agreement further notes that the Bank will continue to use the flexibility of the 1%–3% control range to actively seek the maximum sustainable level of employment, when conditions warrant. The Bank will also continue to leverage the flexibility inherent in the framework to help address the challenges of structurally low interest rates by using a broad set of policy tools. The Bank will use this flexibility only to an extent that is consistent with keeping medium-term inflation expectations well anchored at 2%.

Monetary policy tools

- Because monetary policy actions take time to work their way through the economy and have their full effect on inflation, monetary policy must be forward-looking.
- The Bank normally carries out monetary policy through changes in the target for the overnight rate of interest (the policy rate). The Bank also has a range of monetary policy tools it can use when the policy rate is at very low levels. These tools consist of guidance on the future evolution of the policy rate, large-scale asset purchases (quantitative easing and credit easing), funding for credit measures, and negative policy rates. The potential use and sequencing of these tools would depend on the economic and financial market context.
- All of the Bank's monetary policy tools affect total demand for Canadian goods and services through their influence on market interest rates, domestic asset prices and the exchange rate. The balance between this demand and the economy's production capacity is, over time, the main factor that determines inflation pressures in the economy.

Communications

- Consistent with its commitment to clear, transparent communications, the Bank regularly reports its perspectives on the economy and inflation. Policy decisions are typically announced on eight pre-set days during the year, and full updates of the Bank's outlook are published four times each year in the *Monetary Policy Report*.
- The Bank is committed to explaining when it is using the flexibility of the inflation-targeting strategy.
- Given the uncertainty about the maximum sustainable level of employment, the Bank will consider a broad range of labour market indicators.[2] The Bank will also systematically report to Canadians on how labour market outcomes have factored into its policy decisions.

Monitoring inflation

- In the short run, the prices of certain CPI components can be particularly volatile and can cause sizable fluctuations in CPI inflation.
- In setting monetary policy, the Bank seeks to look through such transitory movements in CPI inflation and focuses on a set of "core" inflation measures that better reflect the underlying trend of inflation. In this sense, these measures act as an operational guide to help the Bank achieve the CPI inflation target. They are not a replacement for CPI inflation.
- The Bank's three preferred measures of core inflation are CPI-trim, which excludes CPI components whose rates of change in a given month are the most extreme; CPI-median, which corresponds to the price change located at the 50th percentile (in terms of basket weight) of the distribution of price changes; and CPI-common, which uses a statistical procedure to track common price changes across categories in the CPI basket.

1 For more details, see *Joint Statement of the Government of Canada and the Bank of Canada on the Renewal of the Monetary Policy Framework* (December 13, 2021); *Monetary Policy Framework Renewal—December 2021;* and T. Macklem, "*Our Monetary Policy Framework: Continuity, Clarity and Commitment*" (speech to the Empire Club of Canada, Toronto, December 15, 2021).

2 See, for example, the range of indicators that the Bank is using to track the recovery of the labour market from the effects of the COVID-19 pandemic.

The *Monetary Policy Report* is available on the Bank of Canada's website at bankofcanada.ca.

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BANK OF CANADA
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Monetary Policy Report

October 2022

This is a report of the Governing Council of the Bank of Canada:
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Contents

Overview

Inflation around the world remains high and broad-based, despite falling commodity prices and evidence that supply challenges are gradually easing.

In response, many central banks have been rapidly increasing their policy rates. Global growth is slowing sharply due to the associated tightening in financial conditions worldwide, as well as the acute energy shortages and ongoing uncertainty because of Russia's invasion of Ukraine. Financial stresses have increased.

The Bank of Canada has been raising its policy interest rate to slow demand growth, anchor inflation expectations and bring inflation down. Slower domestic and foreign demand, lower commodity prices and the fading impact of global supply disruptions will reduce price pressures over the projection horizon. Inflation is expected to return to the top of the 1%–3% control range by the end of 2023 and to the 2% target by the end of 2024.

Key messages

- While inflation in Canada has declined from its peak, largely due to lower gasoline prices, it is still too high, and underlying inflationary pressures remain elevated.
- The Canadian economy continues to operate with significant excess demand. Businesses are facing widespread labour shortages and continuing tight labour markets.
- Monetary policy is beginning to help rebalance supply and demand in the economy. Financial conditions have become more restrictive following a series of interest rate hikes. Firms' investment and hiring plans are softening. Higher mortgage rates have led to significant declines in housing activity. Household spending on goods is slowing, and, as the effects of higher interest rates continue to work through the economy, spending on services is also expected to moderate.
- The pace of economic growth in Canada is slowing and is expected to moderate further. Growth is projected to essentially stall later this year and through the first half of 2023. Reducing demand growth in the economy allows supply to catch up, bringing inflation down.
- Growth in gross domestic product (GDP) is projected to decline from about 3¼% in 2022 to just under 1% in 2023. It then picks up modestly, reaching 2% in 2024.
- Inflation is projected to ease as the economy responds to higher interest rates and as the effects of elevated commodity prices and supply disruptions fade. The Bank expects inflation to decline to around 3% in late 2023 and return to 2% by the end of 2024.

Global economy

Inflation has continued to rise across the world this past year, reaching highs that have not been seen for decades. Many central banks have swiftly raised their policy rates in response. Although commodity prices are well below their peak from earlier this year and inflationary pressures from supply challenges have recently subsided, underlying inflation has yet to ease in many countries.

The tightening of global monetary and financial conditions and Russia's invasion of Ukraine are weighing on business and consumer confidence as well as on economic activity around the world. The Bank is expecting a sharp slowdown in the global economy. In the United States, growth in household spending and investment has fallen markedly. These are important drivers of demand for Canadian exports. In the euro area, economic activity is expected to have started contracting in the second half of 2022 due to energy shortages and elevated uncertainty. While economic activity in China is recovering from the most recent round of lockdowns related to the COVID-19 pandemic, the correction in China's property sector continues to restrain growth.

The rapid rise in US policy interest rates and the surge in the US dollar have both caused important spillovers onto global financial conditions. Debt-servicing costs for many emerging-market economies (EMEs) are increasing, with some developing economies facing challenges servicing their debt. The appreciation of the US dollar also adds to inflationary pressures in many countries.

Overall, the Bank of Canada projects global growth to decline from roughly 3¼% in 2022 to about 1½% in 2023. This would mark the slowest rate of global growth since 1982, excluding the COVID-19 pandemic and the 2008–09 global financial crisis. Growth is projected to pick up to around 2½% in 2024, mainly as the effects of tighter monetary policy and financial conditions abate.

Globally, inflation is expected to decline in 2024 to levels that are close to central banks' targets. Lower commodity prices, easing supply challenges and slower demand growth due to monetary policy tightening are expected to reduce inflation over the projection horizon.

Compared with projections in the July Report, growth in regions important for the Canadian economy—such as the United States, the euro area and China—has been revised down significantly (**Table 1** and **Box 1**).[1]

1 The outlook presented in **Table 1** was constructed before third-quarter activity data for China were released.

Table 1: Projection for global economic growth

	Share of real global GDP* (%)	Projected growth† (%)			
		2021	2022	2023	2024
United States	16	5.9 (5.7)	1.8 (1.9)	0.2 (1.1)	1.0 (1.1)
Euro area	12	5.2 (5.3)	3.1 (2.7)	-0.5 (1.0)	1.6 (2.5)
Japan	4	1.7 (1.7)	1.7 (1.5)	1.6 (2.3)	1.2 (1.5)
China	19	8.1 (8.1)	2.4 (3.6)	4.9 (5.4)	5.0 (5.2)
Oil-importing EMEs‡	33	8.7 (8.6)	4.5 (4.5)	1.8 (1.5)	2.6 (3.2)
Rest of the world§	17	5.1 (5.1)	3.4 (2.7)	0.3 (0.6)	2.3 (2.8)
World	100	7.1 (7.0)	3.2 (3.3)	1.6 (2.0)	2.6 (3.0)

* GDP shares are based on International Monetary Fund (IMF) estimates of the purchasing-power-parity valuation of country GDPs for 2021 from the IMF's October 2022 *World Economic Outlook*. The individual shares may not add up to 100 due to rounding.

† Numbers in parentheses are projections used in the previous Report.

‡ The oil-importing emerging-market economies (EMEs) grouping excludes China. It is composed of large EMEs from Asia, Latin America, the Middle East, Europe and Africa (such as India, Brazil and South Africa) as well as newly industrialized economies (such as South Korea).

§ "Rest of the world" is a grouping of other economies not included in the first five regions. It is composed of oil-exporting EMEs (such as Russia, Nigeria and Saudi Arabia) and other advanced economies (such as Canada, the United Kingdom and Australia).

Source: Bank of Canada

Box 1

Changes to the economic projection since the July Report

Global outlook

Since the July Report, economic growth has been revised down in regions of the world that are particularly important for the Canadian outlook:

- In the United States, economic growth has been reduced markedly in 2023 and modestly in 2024. The main driver of this downward revision is tighter financial conditions.
- In the euro area, economic growth has been revised down substantially in 2023 and 2024 due to new disruptions to energy supply, lower real incomes and the need for higher policy rates to combat increased inflationary pressures.
- In China, the negative impacts of COVID-19 lockdowns and the property market correction have been larger than expected, leaving growth lower throughout the projection horizon.

On net, growth of global gross domestic product (GDP) is roughly ½ a percentage point lower in 2023 and 2024 compared with the July Report. Global inflation has been revised up marginally by the end of the projection horizon, mainly due to stronger projected inflation in the euro area.

Canadian outlook

GDP growth in 2022 has been revised down by about ¼ of a percentage point, to around 3¼%. It has been reduced by close to 1 percentage point in 2023 and almost ½ of a percentage point in 2024, to about 1% and 2%, respectively. These revisions leave the level of real GDP about 1½% lower by the end of 2024.

The following factors explain the downward revisions to the outlook for economic growth:

- Potential output growth has been revised down. The negative effects of supply chain disruptions on productivity and of labour market mismatch that were previously assumed to be temporary are now assumed to be permanent. Higher net immigration partially offsets this downward revision (see **Box 4** on page 21).
- Financial conditions are tighter, and wealth is lower than expected. Household spending has consequently been revised down.
- Exports have been revised down because of a lower path for commodity prices and a weaker projection for foreign demand. The depreciation of the Canadian dollar partially offsets these effects.

(*continued…*)

Box 1 (*continued*)

- Business investment is anticipated to be lower due to tighter-than-expected financial conditions, weaker foreign demand and the recent depreciation of the Canadian dollar, which raises the price in Canadian dollars of imported machinery and equipment.

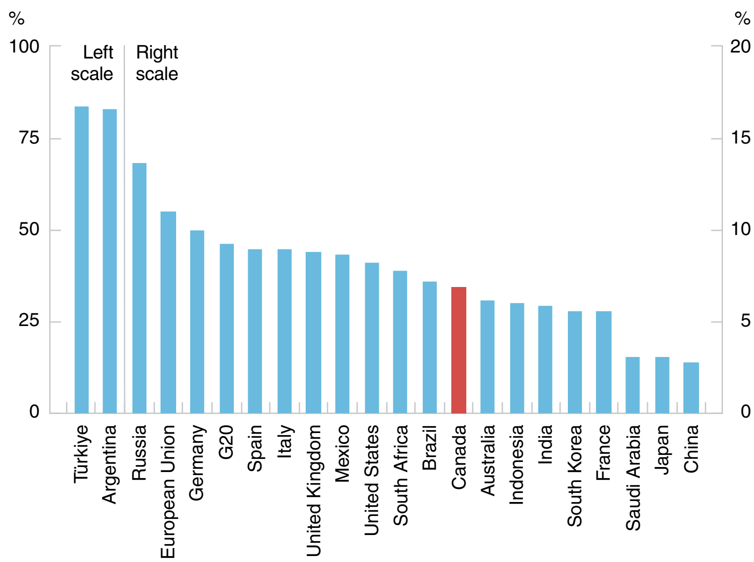
Consumer price index (CPI) inflation in 2022 and 2023 is anticipated to be lower than previously projected. The outlook for CPI inflation has been revised down by ¼ of a percentage point to just under 7% in 2022 and by ½ of a percentage point to about 4% in 2023. The outlook for inflation in 2024 is largely unchanged. The downward revisions are mainly due to lower gasoline prices and weaker demand. Easing global cost pressures, including lower-than-expected shipping costs, also contribute to reducing inflation in 2023. The weaker Canadian dollar partially offsets these cost pressures.

Broad-based inflation

Much of the world is experiencing high inflation (**Chart 1**). However, price increases have recently slowed due to declines in commodity prices. Moreover, pressures on inflation for prices of durable goods have lessened. This easing is partly due to lower transportation costs between Asia and other continents (**Chart 2**). As well, supplier delivery times are showing signs of normalizing. Despite these developments, underlying inflation remains elevated.

Chart 1: Inflation is high across many G20 economies

Year-over-year percentage change



Note: All data are monthly, except for Australia, which uses quarterly data. For international comparison, the rate of inflation is calculated using the Harmonised Index of Consumer Prices for the European Union and the consumer price index for all other countries.

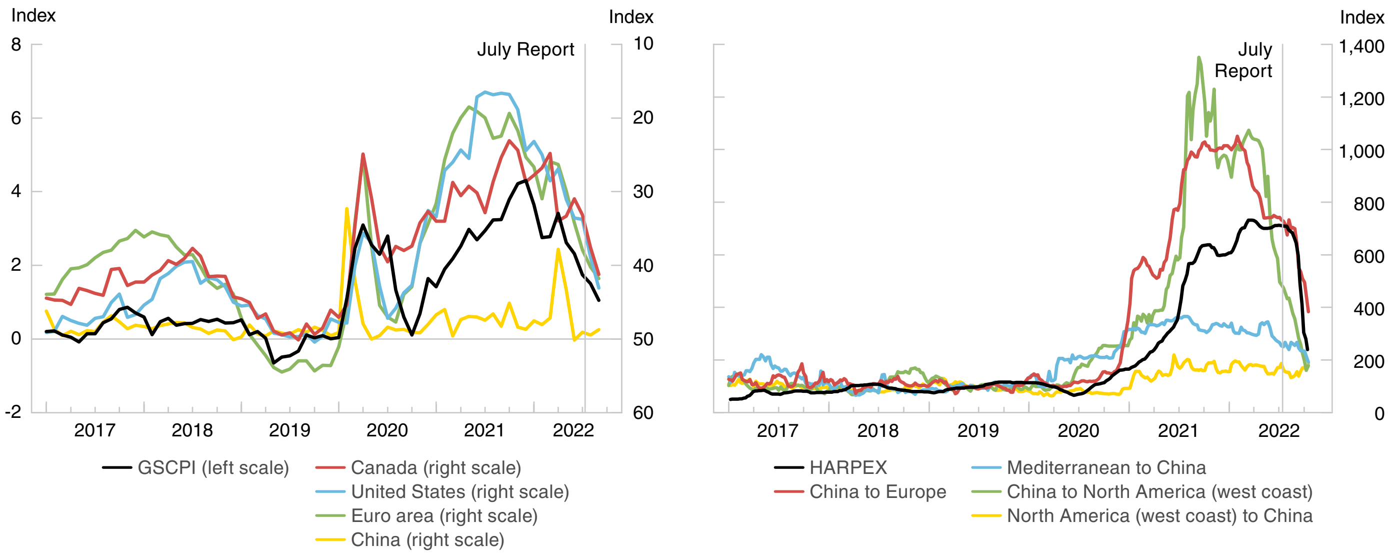
Sources: Federal State Statistics Service (Russia), Statistics South Africa, Statistics Canada, Ministry of Internal Affairs and Communications (Japan) and the Organisation for Economic Co-operation and Development via Haver Analytics

Last observations: Australia, 2022Q2; G20 and India, August 2022; others, September 2022

Chart 2: Inflationary pressures from supply bottlenecks are easing

a. GSCPI and PMI: Manufacturing suppliers' delivery times, monthly data

b. Transportation costs, index: 2019 = 100, weekly data



Note: The Global Supply Chain Pressure Index (GSCPI) provides a comprehensive summary of potential supply chain disruptions that controls for demand-side factors. The Purchasing Managers' Index (PMI) is a diffusion index of business conditions. For suppliers' delivery times, an inverted index is used to show that a reading less than (greater than) 50 indicates an increase (decrease) in delivery times compared with the previous month. All series in panel b are from the Freightos Baltic Index except the HARPEX (Harper Petersen Charter Rates Index). The Freightos Baltic Index provides market ocean freight rates for different trade lanes. The HARPEX reflects the worldwide price development on the charter market for container ships.

Sources: S&P Global and HARPEX via Haver Analytics, Freightos Baltic Index via Bloomberg Finance L.P., Federal Reserve Bank of New York and Bank of Canada calculations

Last observations: PMI and GSCPI, September 2022; HARPEX, October 14, 2022; Freightos Baltic Index, October 16, 2022

The sources and intensity of inflationary pressures differ significantly across regions:

- In the United States, measures of near-term inflation expectations have fallen slightly but are still considerably higher than the Federal Reserve's inflation target. Moreover, rates of job openings, separations, quits and unemployment continue to signal a tight labour market, with employment gains outpacing growth in the working-age population. Wages continue to rise rapidly.
- In the euro area, inflation is high and broadening across categories. Energy shortages are the main factor behind inflationary pressures, particularly after Russia further restricted natural gas exports. A tight labour market is also a factor, but it plays a smaller role.
- Elevated commodity prices have added to inflation worldwide. The appreciation of the US dollar is contributing to imported inflation in countries that have seen their currencies depreciate.[2]

The Bank forecasts that inflation globally will decline steadily. The tightening in financial conditions plays an important role in reducing demand growth and inflation over the projection.

2 In the United States, by contrast, many imported goods are priced in US dollars. As a result, the pass-through effects of a currency appreciation tend to appear only partially and do so gradually over time.

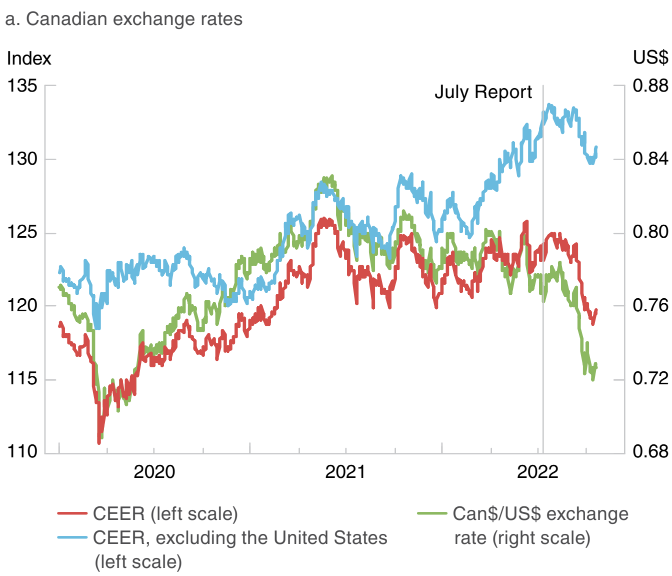
Tightening financial conditions and rising US dollar

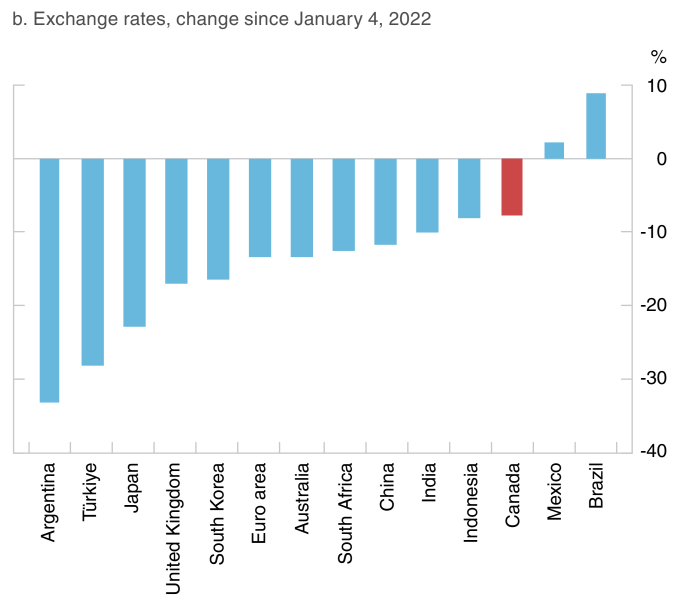
Global financial conditions are markedly more restrictive than they were at the time of the July Report largely because many central banks have continued to tighten monetary policy.[3] Global government bond yields have climbed quickly since the beginning of the year, leading to a repricing in global equities and other risky assets. The rapid rise in US interest rates and safe-haven flows resulting from concerns about a global recession have contributed to a substantial appreciation of the US dollar (**Chart 3**). While the Canadian dollar held steady against its US counterpart for most of the year, it has depreciated recently. The economic projection assumes the Canadian dollar will remain close to its average of around 74 cents US since September, 4 cents lower than assumed in July (**Box 2**).

As central banks in many countries raise their policy rates to address inflationary pressures, abrupt movements in risky asset prices and increased liquidity needs could occur. Financial vulnerabilities that have been building for some time—including high indebtedness and stretched asset valuations—could magnify the impact of global tightening. Moreover, a higher US dollar could amplify funding problems faced by some EMEs that have borrowed extensively in that currency.

Chart 3: The US dollar is appreciating against most currencies, including the Canadian dollar

Daily data





Note: CEER is the Canadian Effective Exchange Rate index—a weighted average of bilateral exchange rates for the Canadian dollar against the currencies of Canada's major trading partners. All exchange rates in panel b are quoted against the US dollar.

Sources: Bloomberg Finance L.P. and Bank of Canada calculations

Last observation: October 20, 2022

Further moderation in US activity

Economic activity in the United States is slowly expanding after having contracted over the first half of the year. Overall, GDP in 2022 is forecast to grow by roughly 1¾%. Components of US activity that are important for Canadian exports are anticipated to weaken further over the projection horizon.

3 Since the start of 2022, the US Federal Reserve has increased the target range of the federal funds rate by 300 basis points and has started to reduce its balance sheet. The European Central Bank has increased the deposit facility rate by 125 basis points over the same period. Both central banks have communicated that they will likely implement further interest rate hikes.

Box 2

Key inputs to the projection

The Bank of Canada's projection is conditional on several key assumptions, and changes to these will affect the outlook for the Canadian economy. The Bank regularly reviews these assumptions and how they may impact the economic projection. The key inputs into the Bank's projection are as follows:

- In Canada, almost all public health restrictions have been lifted, and pandemic-related effects on consumer demand are assumed to have dissipated. Moreover, the Bank now assumes that households are consuming from their stock of extra savings accumulated during the pandemic as they would from their other savings.
- The projection incorporates information from all provincial and federal budgets available at the time of writing.
- Oil prices have declined since the July Report. The per-barrel prices in US dollars are assumed to be $95 for Brent, $90 for West Texas Intermediate and $75 for Western Canadian Select. Prices in the fourth quarter are US$15 lower than assumed in July but are only US$5 lower by the end of the projection (**Chart 2-A**). The risk of price movements in either direction is viewed as roughly balanced.
- By convention, the Bank does not forecast the exchange rate in the *Monetary Policy Report*. The Canadian dollar is assumed to remain at 74 cents US over the projection horizon, close to its recent average and below the 78 cents US assumed in the July Report.
- With this Report, the Bank is ending its distinction between supply and potential output. The Bank made that distinction in recent Reports to account for the episodic nature of some supply decreases caused by pandemic-related factors. With most public health restrictions removed, this distinction is no longer meaningful. It is therefore appropriate to now interpret assumptions about potential output as also reflecting the expected evolution of supply. The difference between real gross domestic product and potential output reflects the output gap.

Chart 2-A: Oil prices are assumed to be lower than in July

Note: Historical oil prices use daily data, while oil price assumptions are presented quarterly.

Sources: Intercontinental Exchange via Haver Analytics and Bank of Canada

- Potential output growth in Canada is assumed to increase from about ¾% in 2022 to just over 2% in 2023 and 2024. These growth rates are slower than assumed for the growth of supply in the July Report, leaving the level of potential output at the end of 2024 about 1½% lower than the level of supply in the July Report. For more details on the Bank's potential output growth projection and revisions, see **Box 4** on page 21.
- The Bank estimates that the output gap was between 0.25% and 1.25% in the third quarter of 2022, similar to the estimate for the second quarter provided in the July Report.
- The nominal neutral policy interest rate is defined as the real neutral rate plus 2% for inflation. The real neutral rate is defined as the rate consistent with both output remaining sustainably at its potential and inflation remaining at target, on an ongoing basis. It is a medium- to long-term equilibrium concept. For Canada, the projection assumes that the nominal neutral rate is at the midpoint of the estimated range of 2% to 3%. This range was last reassessed in the April 2022 Report.

Consumption growth wanes as demand for in-person services stabilizes and household budgets are squeezed by high inflation and rising interest rates. Together, the slowdown in domestic demand and tighter borrowing conditions are projected to hamper business investment and industrial production. These factors are expected to dampen US output in 2023 before growth picks up over 2024.

Multiple headwinds in the euro area

In the euro area, activity is forecast to contract through the first quarter of 2023. The decline is mainly driven by severe supply disruptions caused by Russian restrictions of natural gas exports and other shortages related to Russia's invasion of Ukraine. Tighter monetary policy and lower confidence also dampen demand growth over the projection.

GDP is projected to grow around 3% in 2022 but to contract ½% in 2023. While a modest rebound is expected in 2024, the outlook remains highly uncertain.

Property market stress in China

As the most severe effects of pandemic-related lockdowns fade, China's economy appears to have partially rebounded. Activity is forecast to pick up further as the manufacturing sector recovers and in-person activities gradually resume. Containment measures in China are assumed to become less frequent and more targeted over the remainder of 2022 and 2023. Ongoing challenges related to its property market will continue to weigh on growth.

Risks to economic activity are tilted to the downside. Authorities face a delicate balancing act between supporting growth, maintaining a "zero-COVID" policy and addressing financial vulnerabilities.

Sluggish growth in emerging-market economies and the rest of the world

Economic growth in oil-importing EMEs and the rest-of-the-world group is subdued and expected to remain so over the projection horizon. Russia's invasion of Ukraine and tight financial conditions have created headwinds in both regions. Some emerging markets have experienced capital outflows—particularly those with weaker macroeconomic fundamentals. The appreciation of the US dollar also risks creating additional issues for debt sustainability in countries with significant debt denominated in US dollars. The moderation in growth that began in 2022 is expected to continue through 2023. In 2024, growth is projected to rise as the effects of headwinds dissipate.

Falling commodity prices

Prices for Brent oil have declined since the July Report (**Chart 4**). Falling economic growth worldwide, due in part to tighter monetary policy globally and softening demand in China, has contributed to the decline in prices. These factors are outweighing the effects of the recent decision by the Organization of Petroleum Exporting Countries (OPEC) and some non-OPEC oil producers (OPEC+) to cut oil production.

Looking ahead, the Bank assumes that prices for Brent oil will stay near current levels. Prices for West Texas Intermediate and Western Canadian Select are assumed to be US$5 and US$20 below Brent prices, respectively (**Box 2**).

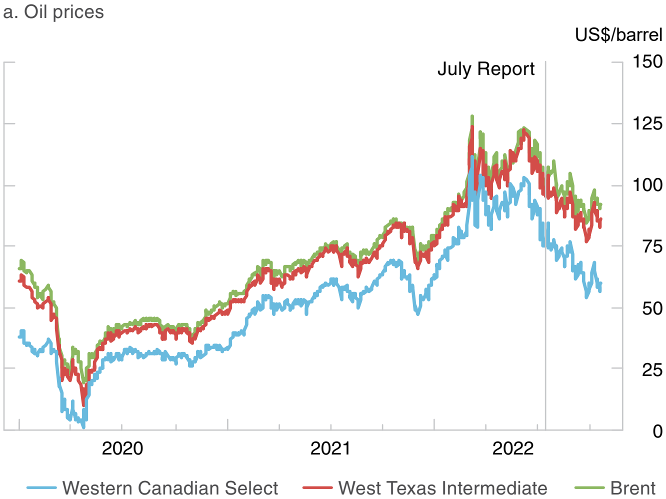
Natural gas prices are below those at the time of the July Report, and they have become more volatile. Russia's threat to cut off gas supplies to Europe this coming winter led to a price spike in that region. European prices then fell after gas storage facilities were filled ahead of schedule. Movements in European prices have had spillovers onto prices in Asia and, to a lesser extent, North America.

Since the July Report, the Bank's non-energy commodity price index has declined by roughly 5%. The largest drop was in forestry prices, due to slowing housing activity in North America. Agricultural prices have eased as a number of regions have reported bumper harvests and war-related disruptions have had a smaller effect than first projected.

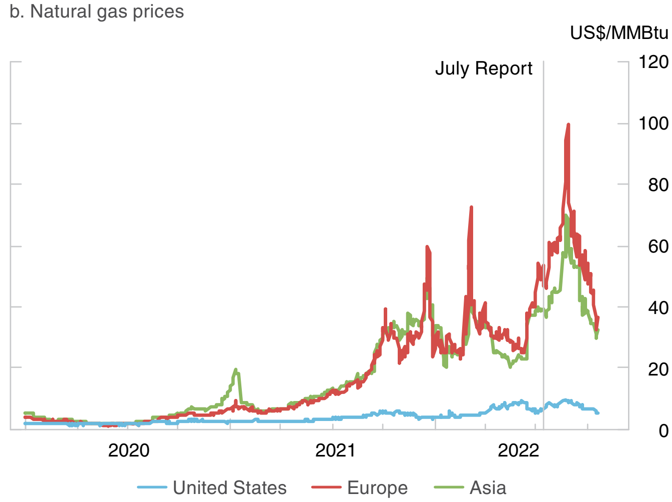
Chart 4: Energy prices have fallen since July

Daily data

a. Oil prices



b. Natural gas prices



Note: Oil price data for April 20, 2020, are excluded because disruptions in the oil futures market led to negative values of around -US$48 for Western Canadian Select and -US$38 for West Texas Intermediate on that day. European natural gas prices are converted from euros per megawatt hour to US dollars per metric million British thermal units (MMBtu). Prices in the United States are based on the Henry Hub benchmark, European prices are based on the Dutch Title Transfer Facility gas benchmark, and Asian prices are based on the Japan–Korea Marker for liquefied natural gas.

Sources: NYMEX and Intercontinental Exchange via Haver Analytics and Bank of Canada calculations

Last observation: October 20, 2022

Canadian economy

The rise in inflation in Canada through 2022 has been pronounced and has broadened over time. Demand for goods and, in particular, services has outpaced supply, and measures of core inflation continue to be elevated. Household and business expectations for inflation over the next two years remain high. The longer high inflation lasts and the more pervasive it becomes, the greater the risk that it becomes entrenched.

To lower inflation, the Bank of Canada rapidly raised its policy rate and is undertaking quantitative tightening. These actions, combined with interest rate increases by the US Federal Reserve and other central banks, have led to a rapid tightening in domestic financial conditions over the past year. As a result, economic growth in Canada is slowing, allowing supply to catch up with demand. Housing activity has fallen sharply from the exceptional peak recorded earlier this year. Household spending on goods is slowing, and firms' plans for investment and hiring are softening. The slowdown in economic activity abroad, particularly in the United States, has also begun to weigh on exports. Over the projection, the weaker Canadian dollar is expected to offset some of the impact on exports coming from slowing foreign demand.

Economic growth is forecast to slow from 3¼% in 2022 to just under 1% in 2023. It picks up to 2% in 2024 as the impact of higher interest rates on Canadian growth fades, potential output growth picks up and foreign demand stabilizes (**Table 2**).

Inflation has declined since June, primarily due to lower gasoline prices. It continues to decrease over the projection horizon, reaching around 3% by the end of 2023 and returning to the 2% target by the end of 2024. The decrease in inflation occurs as higher interest rates in Canada and abroad continue to work their way through the economy and the impact of global supply disruptions fades.

Table 2: Contributions to average annual real GDP growth
Percentage points*†

	2021	2022	2023	2024
Consumption	2.8 (2.8)	3.0 (2.8)	0.6 (1.0)	0.9 (1.5)
Housing	1.3 (1.3)	-0.9 (-0.7)	-0.6 (-0.6)	0.2 (0.2)
Government	1.5 (1.5)	0.4 (0.4)	0.3 (0.5)	0.5 (0.3)
Business fixed investment	0.2 (0.2)	0.7 (0.7)	0.2 (0.2)	0.2 (0.6)
Subtotal: final domestic demand	5.8 (5.8)	3.2 (3.2)	0.5 (1.1)	1.8 (2.6)
Exports	0.4 (0.4)	1.0 (0.9)	1.1 (1.3)	0.7 (0.8)
Imports	-2.3 (-2.3)	-2.4 (-1.6)	0.1 (-0.7)	-0.5 (-0.9)
Inventories	0.7 (0.7)	1.5 (1.0)	-0.8 (0.1)	0.0 (-0.1)
GDP	4.5 (4.5)	3.3 (3.5)	0.9 (1.8)	2.0 (2.4)
Memo items (percentage change):				
Range for potential output	2.1–2.5 (2.1–2.5)	0.5–2.0 (0.5–2.0)	1.4–3.3 (1.8–3.3)	1.4–3.5 (2.0–3.5)
Real gross domestic income (GDI)	8.8 (8.8)	5.2 (6.0)	-1.4 (0.3)	1.1 (1.6)
CPI inflation	3.4 (3.4)	6.9 (7.2)	4.1 (4.6)	2.2 (2.3)

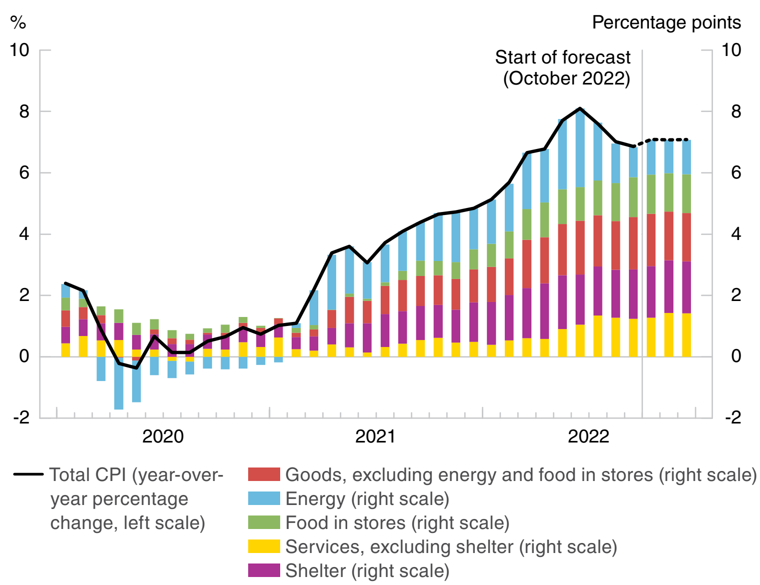
* Numbers in parentheses are from the projection in the previous Report.
† Numbers may not add to total due to rounding.
Sources: Statistics Canada and Bank of Canada calculations and projections

Persistently high inflation

At 6.9% in September, inflation in Canada was well above the Bank's target. Inflation is broad-based, with almost two-thirds of the components of the consumer price index (CPI) showing price increases of greater than 5% over the past year. For example, food price inflation and services price inflation have been high (**Box 3**).

However, due to falling gasoline prices, inflation has been declining from its 8.1% peak in June (**Chart 5**). Prices for agricultural products have also tapered off, as have the inflationary pressures from global supply bottlenecks. These forces are expected to pass through to lower food and goods price inflation in the months ahead.

Chart 5: CPI inflation has declined due to falling gasoline prices
Contribution to CPI inflation, monthly data



Sources: Statistics Canada and Bank of Canada calculations, estimates and projections

Last data plotted: December 2022

Box 3

Shelter and food inflation

High inflation is stretching household budgets and creating hardship for many families in Canada. This is evident in the rise in shelter costs and food prices, which form approximately 40% of the CPI basket and typically make up a greater share of spending for lower-income Canadians.[1]

Shelter price inflation was close to 7% earlier this year and remains elevated (**Chart 3-A**). Three main components drive shelter prices in the CPI:

- homeowners' replacement cost, which represents 24% of the category
- mortgage interest cost, which makes up 11%
- rent, which represents 24%[2]

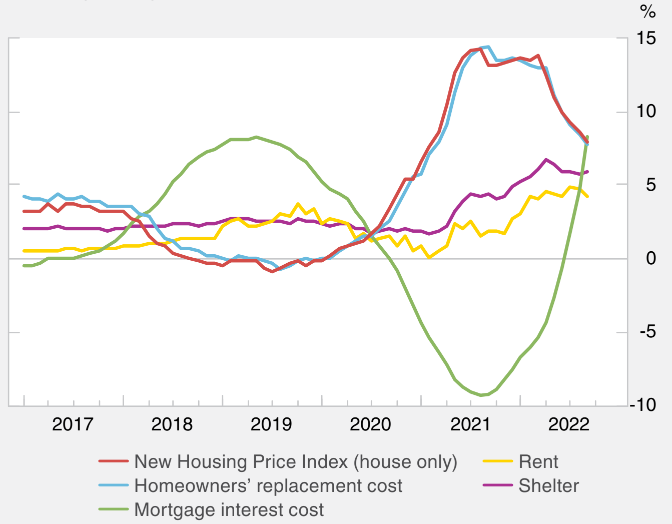
Homeowners' replacement cost inflation, constructed from the New Housing Price Index, peaked at 14% in the fall of 2021 as house prices boomed during the pandemic. It has since eased to about 8% as the housing market has slowed in response to higher interest rates.

Inflation rates for the other two main components of shelter have been rising. Mortgage interest cost, which mainly reflects changes in interest rates, turned positive in April on a month-over-month basis and is now up about 8% year-over-year. Rent price inflation is also elevated at 4% year-over-year because demand for rental accommodation has increased. This demand has several sources, including a strong resumption of immigration and the return of students to out-of-town universities.

Food price inflation picked up over 2022 and is now more than 11% on a year-over-year basis (**Chart 3-B**). Elevated food inflation is widespread: of the 20 major components of the CPI's "food purchased from stores" category, over four-fifths are above 7%. Food products that require more processing have seen the biggest price increases. For example, while prices of meat and fresh vegetables are increasing at roughly 8% and 12%, respectively, those of bakery and cereal products (which includes pasta) and condiments are up more than 16% and 12%, respectively.

Chart 3-A: Shelter inflation is elevated

New Housing Price Index and selected CPI components, year-over-year percentage change, monthly data

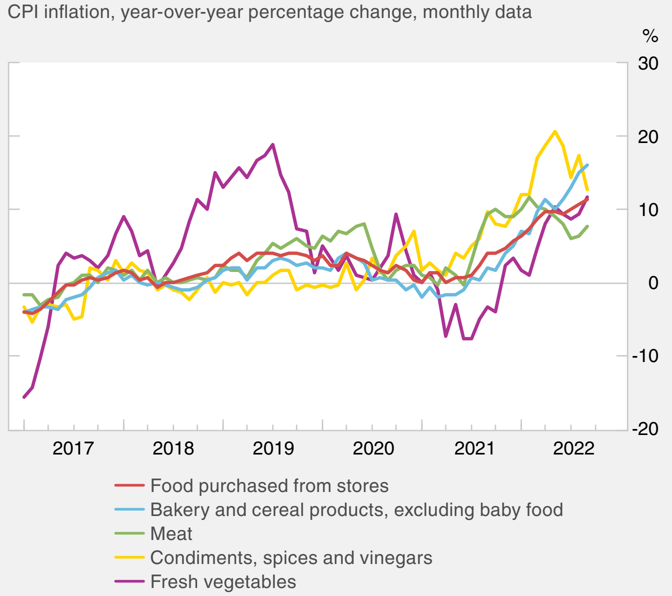


Sources: Statistics Canada and Bank of Canada calculations

Last observation: September 2022

Chart 3-B: Food inflation continues to rise

CPI inflation, year-over-year percentage change, monthly data



Source: Statistics Canada

Last observation: September 2022

1 Food refers to food purchased from stores and excludes meals in restaurants. Shelter excludes utilities other than water.

2 The remaining 41% of shelter in the CPI captures other costs, such as insurance, property taxes, water, maintenance and other owned accommodation expenses.

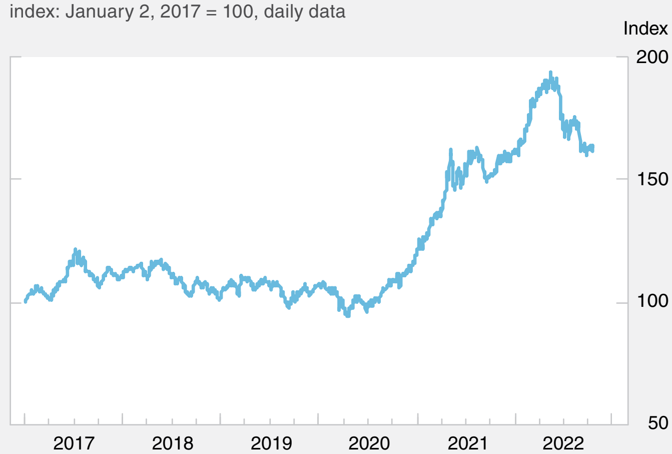
(continued...)

Box 3 (*continued*)

Several factors are behind the high inflation of food prices. Agricultural commodity prices had increased dramatically since mid-2020, hitting a peak earlier this year (**Chart 3-C**). Moreover, the past increase in commodity input costs is still being passed on to consumers. High distribution costs and increases in processing costs, such as energy inputs and labour costs, are also contributing to food price inflation. The decline in agricultural commodity prices in recent months, however, should start to put downward pressure on food price inflation in the coming year.

Chart 3-C: Agricultural prices have declined from their peak

Bank of Canada commodity price index (agricultural products), index: January 2, 2017 = 100, daily data



Source: Bank of Canada Last observation: October 21, 2022

In Canada, the demand for goods and services is outpacing the economy's ability to supply them. Businesses continue to report widespread labour shortages. And strong demand has led to a sharp rise in the prices of services.

This strong and persistent demand is reflected in the Bank's measures of core inflation. CPI-median and CPI-trim are currently at 4.7% and 5.2%, respectively. For more on core inflation measures, see the **Appendix** on page 28.

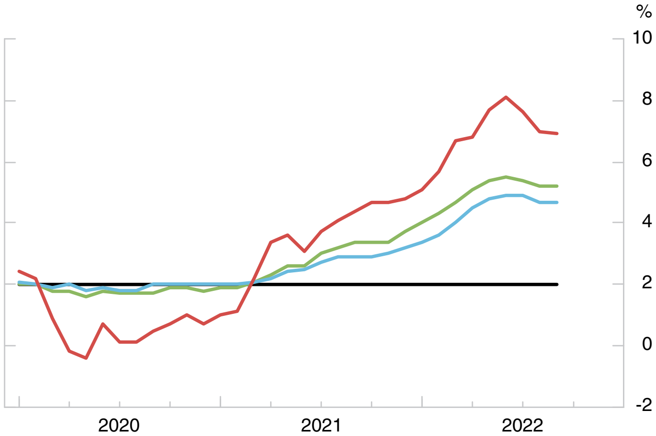
Inflation is typically reported on a year-over-year basis to smooth out some of the fluctuations that occur in higher-frequency measures. However, movements over a 12-month period do not provide as timely an assessment of inflationary pressures as those measures that focus on the most recent data do. Three-month measures of inflation are both more timely and more volatile than year-over-year measures.

Largely due to the drop in gasoline prices, 3-month CPI inflation has fallen sharply and is now well below the year-over-year measure. Measures of 3-month core inflation point to a slowdown to around 4% (**Chart 6**). This reflects fewer near-term price pressures from durable goods and shelter. At the same time, however, food price inflation and services price inflation (excluding shelter) have been showing strong momentum (**Chart 7**).

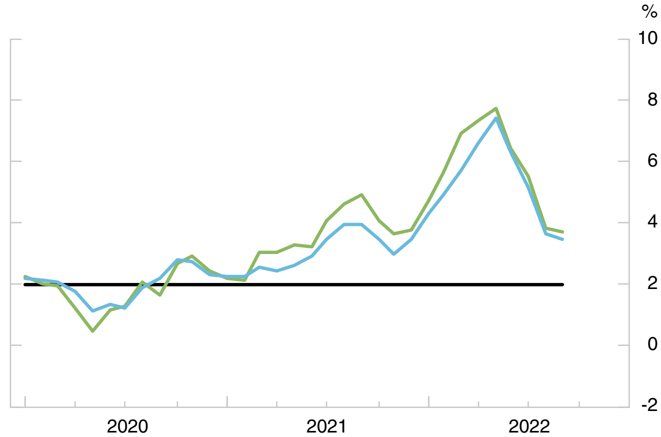
Chart 6: Core inflation remains elevated, but momentum has eased

Measures of total and core inflation, monthly data

a. Year-over-year percentage change



b. 3-month seasonally adjusted annual rate



Total CPI CPI-median CPI-trim Target

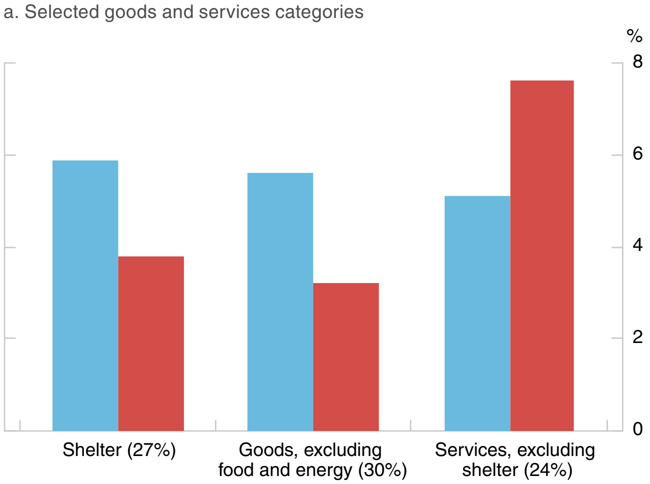
Source: Statistics Canada

Last observation: September 2022

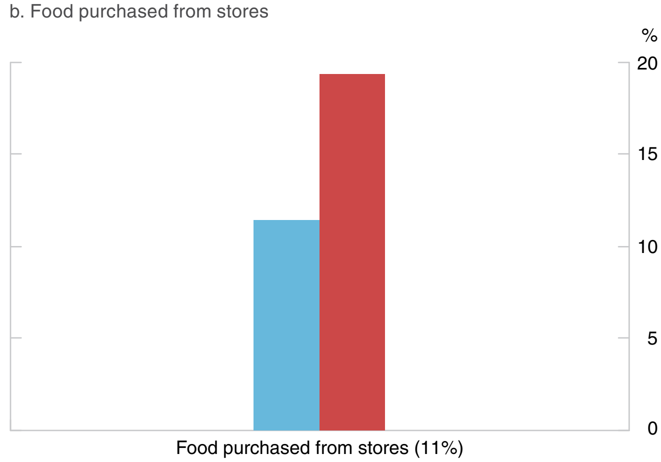
Chart 7: Some categories of CPI are easing, while others are picking up

Inflation of major CPI categories, September 2022

a. Selected goods and services categories



b. Food purchased from stores



Year-over-year percentage change 3-month seasonally adjusted annual rate

Note: Numbers in parentheses refer to the weight of the categories in the CPI basket.

Sources: Statistics Canada and Bank of Canada calculations

Although 3-month measures of core inflation point to a lower level of underlying inflation than the year-over-year measure, their levels remain well above target. To see a clear decline in underlying inflation, a more sustained further decrease in the 3-month measures would be required.

Elevated inflation expectations

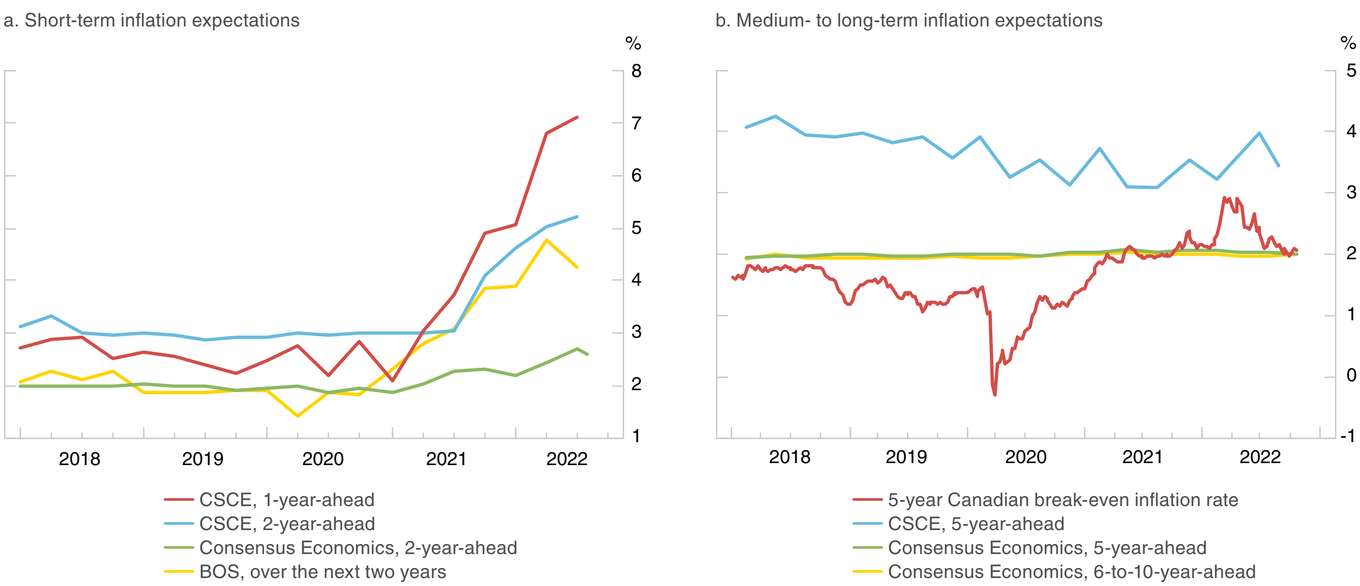
Most respondents to consumer and business surveys expect average CPI inflation over the next two years to be well above the 2% target (**Chart 8**). The distribution of survey responses remains markedly wider than before the pandemic, suggesting that the level of uncertainty about the future path of inflation over the next few years is still high. Moreover, more respondents expect inflation to be above target than below. At the same time, long-term expectations for CPI inflation—particularly those gathered from surveys of professional forecasters and measures based on financial markets—remain consistent with the 2% target. This indicates that longer-term expectations remain well anchored.

Recent dynamics are mixed. Consumers' short-term CPI inflation expectations have continued to edge higher, driven by concerns about supply chain disruptions and oil prices. In contrast, the results of the Business Outlook Survey (BOS) for the third quarter of 2022 suggest that firms' short-term CPI inflation expectations have eased slightly. The share of firms expecting very large price increases has moderated (**Chart 9**).

When it comes to expectations of their own input cost pressures and pricing, firms see inflation slowing. For the first time since mid-2020, firms now expect that cost and pricing pressures will be less intense than they were over the past 12 months (**Chart 10**).

Chart 8: Short-term inflation expectations remain elevated

Quarterly, monthly and weekly data



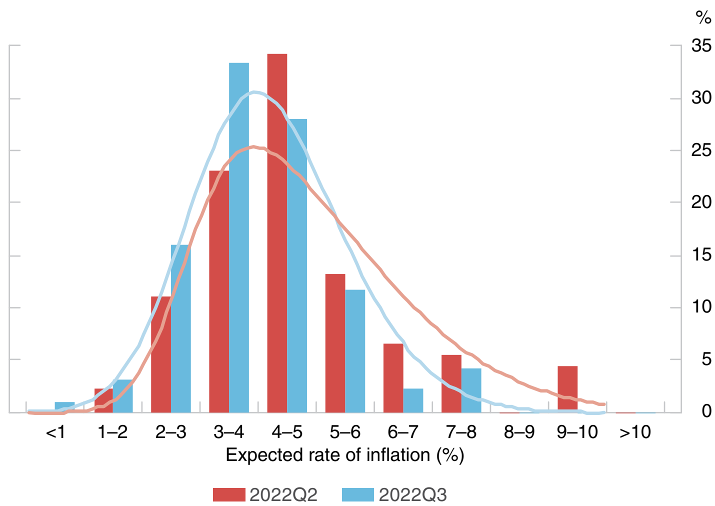
Note: CSCE is the Canadian Survey of Consumer Expectations; BOS is the Business Outlook Survey. The 5-year Canadian break-even inflation rate is the difference between the yields of a nominal bond and a real return bond of the same maturity, both issued by the Government of Canada. Consensus Economics' forecasts for the next 5 years and the next 6 to 10 years are transformed into fixed-horizon forecasts (2-year, 5-year) by weighted average.

Sources: Bloomberg Finance L.P., Consensus Economics, Bank of Canada and Bank of Canada calculations

Last observations: Consensus Economics, October 2022; BOS and CSCE, 2022Q3; break-even inflation rate, October 21, 2022

Chart 9: The distribution of firms' inflation expectations has tightened

Share of firms responding to the Business Outlook Survey (BOS) with 2-year inflation expectations in each range, quarterly data



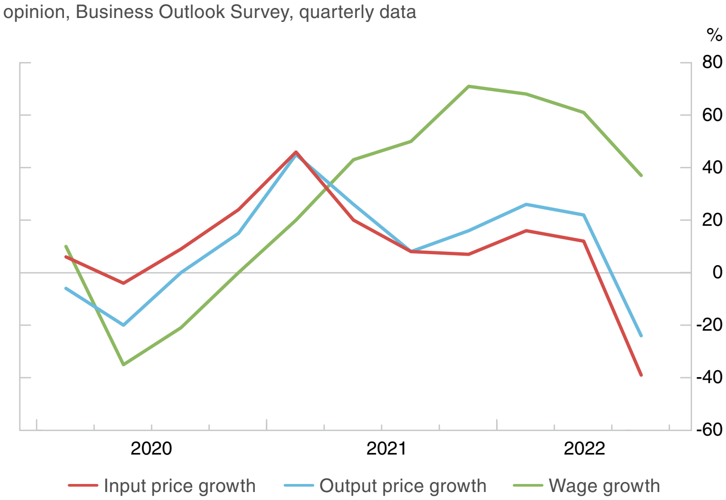
Note: The estimates are based on firms' responses to the BOS question, "Over the next two years, what do you expect the annual rate of inflation to be, based on the consumer price index?" Lines on the chart represent fitted skewed normal distributions of inflation expectations.

Sources: Bank of Canada and Bank of Canada calculations

Last observation: 2022Q3

Chart 10: Businesses' own price and wage growth expectations are softening

Balance of opinion, Business Outlook Survey, quarterly data



Note: Percentage of respondents to the Business Outlook Survey that expect the growth rate of their input prices, output prices or labour costs to be higher over the next 12 months than over the past 12 months minus the percentage that expect the growth rate to be lower.

Source: Bank of Canada

Last observation: 2022Q3

Significant excess demand

The strong labour market and persistent capacity constraints indicate that there is still substantial excess demand in the Canadian economy. The labour market continues to be tight across a broad range of measures, suggesting that it has surpassed maximum sustainable employment (**Chart 11**). The unemployment rate in September was 5.2%, one of the lowest rates in 40 years. A historically high number of firms responding to the BOS stated that they are facing more intense labour shortages than they were a year ago. The ratios of vacancies and job postings to unemployed workers also remain close to their all-time highs. Over the last six months, wage growth has increased and broadened across sectors (**Chart 12**).

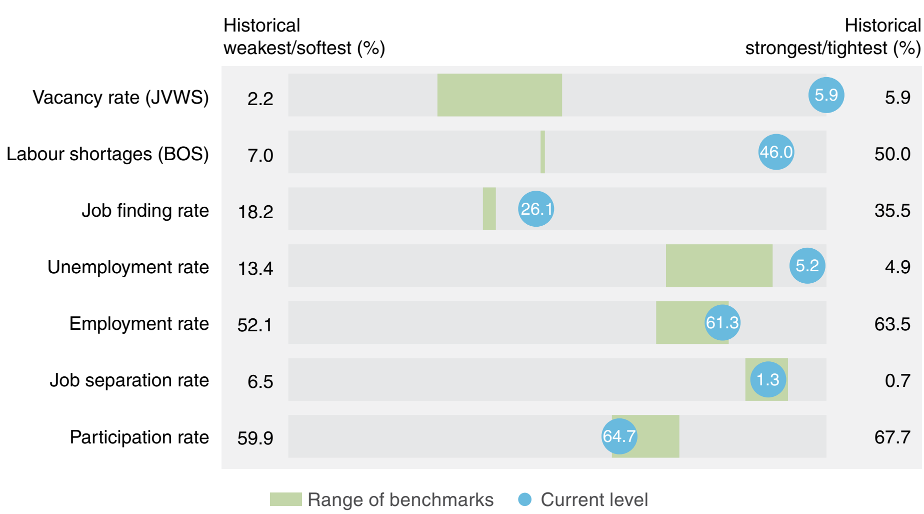
Employment, however, has been softening in recent months, particularly in some sectors that are sensitive to interest rates, such as manufacturing and construction. This moderation also reflects an overall decline in the labour force participation rate since the beginning of the year, partly due to the increased number of retirements.

Capacity constraints remain significant. Results from recent business surveys suggest that supply chain bottlenecks persist (**Chart 13**). In the BOS, firms report some reductions in lead times and increases in the availability of materials.

The Bank estimates that the output gap was between 0.25% and 1.25% in the third quarter of 2022, similar to the estimate for the second quarter.

Chart 11: The labour market is tight

Selected labour market measures compared with their historical strongest/tightest and historical weakest/softest



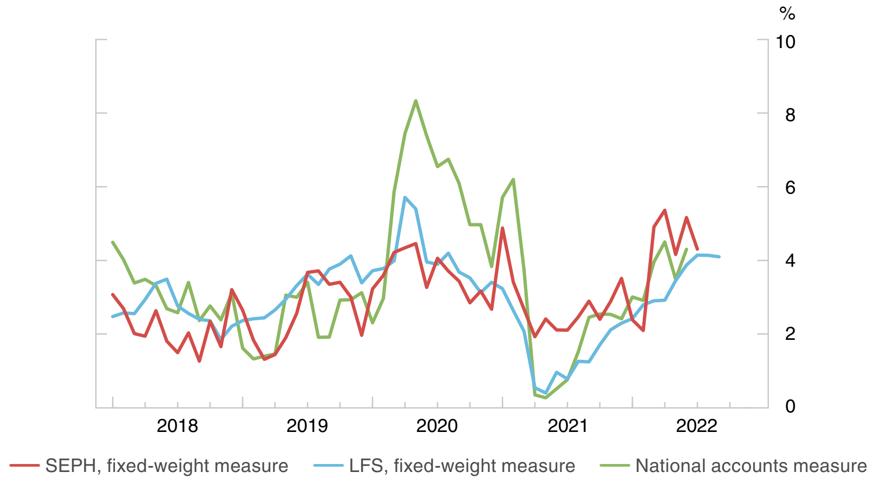
Note: JVWS is the Job Vacancy and Wage Survey; BOS is the Business Outlook Survey. For details on the benchmarks included, see E. Ens, C. Luu, K. G. See and S. L. Wee, "Benchmarks for assessing labour market health," Bank of Canada Staff Analytical Note No. 2022-2 (April 2022). Data for all series are from Statistics Canada's Labour Force Survey (LFS) unless otherwise noted. LFS data are seasonally adjusted.

Sources: Statistics Canada, Bank of Canada and Bank of Canada calculations

Last observations: LFS, September 2022; BOS, 2022Q3; JVWS, 2022Q2

Chart 12: Wage growth has been trending up

Wage growth measures, year-over-year percentage change, monthly data



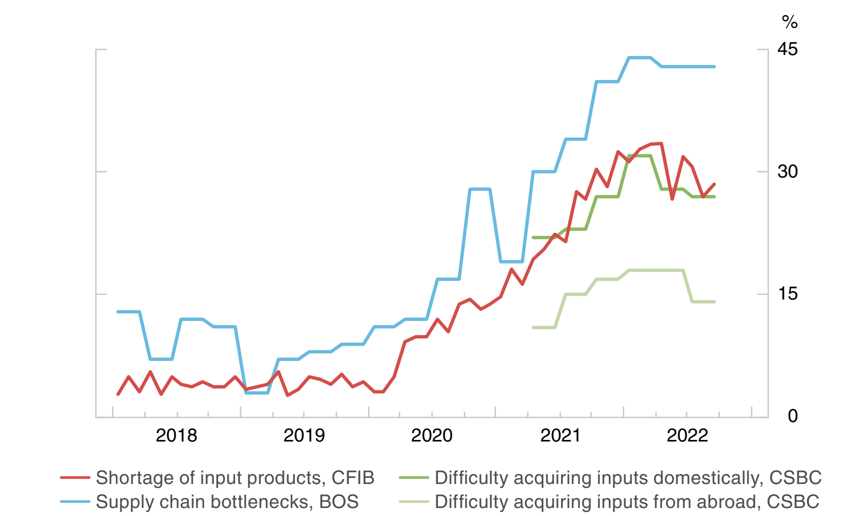
Note: SEPH is the Survey of Employment, Payrolls and Hours; LFS is the Labour Force Survey. The LFS fixed-weight measure is constructed using 2019 employment weights. The national accounts measure is constructed as total wages and salaries from the Canadian System of Macroeconomic Accounts divided by total hours worked from SEPH.

Sources: Statistics Canada and Bank of Canada calculations

Last observations: SEPH, July 2022; LFS, September 2022; national accounts measure, June 2022

Chart 13: Canadian businesses continue to experience supply chain constraints

Percentage of business survey respondents, quarterly and monthly data



Note: BOS (Business Outlook Survey) respondents were asked, "What would be the most important obstacles or bottlenecks to being able to meet an unexpected increase in demand?" Respondents to the CFIB's (Canadian Federation of Independent Business) Business Barometer were asked, "What factors are limiting your ability to increase sales or production?" In the CSBC (Canadian Survey of Business Conditions), firms were asked, "Over the next three months, which of the following are expected to be obstacles for this business or organization?"

Sources: CFIB, Statistics Canada and Bank of Canada

Last observations: BOS, 2022Q3; CFIB and CSBC, September 2022

Slowing demand growth and rising supply

Growth was robust in the first half of 2022 as the Canadian economy reopened. High commodity prices and the easing of public health restrictions were boosting economic activity.

In the spring, rising mortgage rates contributed to a sharp slowing of housing resales, and, by the middle of the year, economic activity started showing signs of moderation. Growth is estimated to have eased to around 1½% in the third quarter. GDP growth is then projected to slow to between 0% and ½% through the end of 2022 and the first half of 2023 (**Table 3** and **Chart 14**). This suggests that a couple of quarters with growth slightly below zero is just as likely as a couple of quarters with small positive growth.

Table 3: Summary of the quarterly projection for Canada*

	2022				2021	2022	2023	2024
	Q1	Q2	Q3	Q4	Q4	Q4	Q4	Q4
CPI inflation (year-over-year percentage change)	5.8 (5.8)	7.5 (7.6)	7.2 (8.0)	7.1	4.7 (4.7)	7.1 (7.5)	2.8 (3.2)	2.0 (2.0)
Real GDP (year-over-year percentage change)	2.9 (2.9)	4.6 (4.7)	3.6 (3.9)	2.1	3.2 (3.2)	2.1 (2.6)	1.0 (1.8)	2.3 (2.7)
Real GDP (quarter-over-quarter percentage change at annual rates)†	3.1 (3.1)	3.3 (4.0)	1.5 (2.0)	0.5				

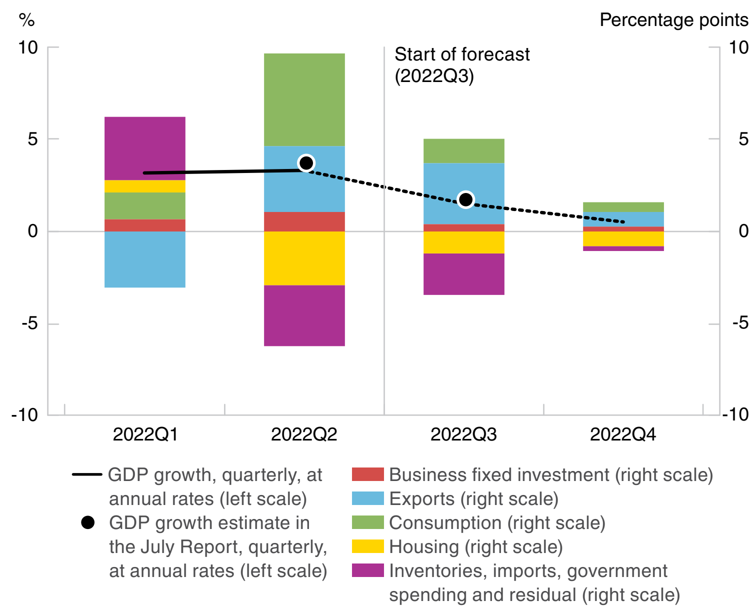
* Details on the key inputs to the base-case projection are provided in **Box 2**. Numbers in parentheses are from the projection in the previous Report.

† Over the projection horizon, 2022Q3 and 2022Q4 are the only quarters for which some information about real GDP growth was available at the time the projection was conducted. For longer horizons, fourth-quarter-over-fourth-quarter percentage changes are presented. They show the Bank's projected growth rates of CPI and real GDP within a given year. As a result, they can differ from the growth rates of annual averages shown in **Table 2**.

Sources: Statistics Canada and Bank of Canada calculations and projections

Chart 14: Growth is expected to slow in the second half of 2022

Contribution to real GDP growth, quarterly data



Sources: Statistics Canada and Bank of Canada calculations, estimates and projections

Last data plotted: 2022Q4

The slowdown reflects tighter financial conditions that are weighing heavily on household demand and business investment. As the boost from pent-up demand for in-person services fades, consumption growth softens. Weaker foreign demand, particularly in the United States, leads to a decline in export growth. The recent depreciation of the Canadian dollar partially offsets this impact.

Starting in the second half of 2023, GDP growth picks up as the effect of interest rate increases subsides and potential output recovers. Robust immigration also supports a pickup in housing demand in 2024. Quarterly growth in exports increases following a resumption of economic growth in the United States.

Growth in potential output rises from around ¾% in 2022 to about 2% in 2023 and 2024. Record immigration, fewer supply chain issues and easing of other pandemic-related factors, such as public health measures, support potential output growth (**Box 4**).

With soft demand growth and solid potential output growth, excess demand in the Canadian economy turns into excess supply in early 2023.

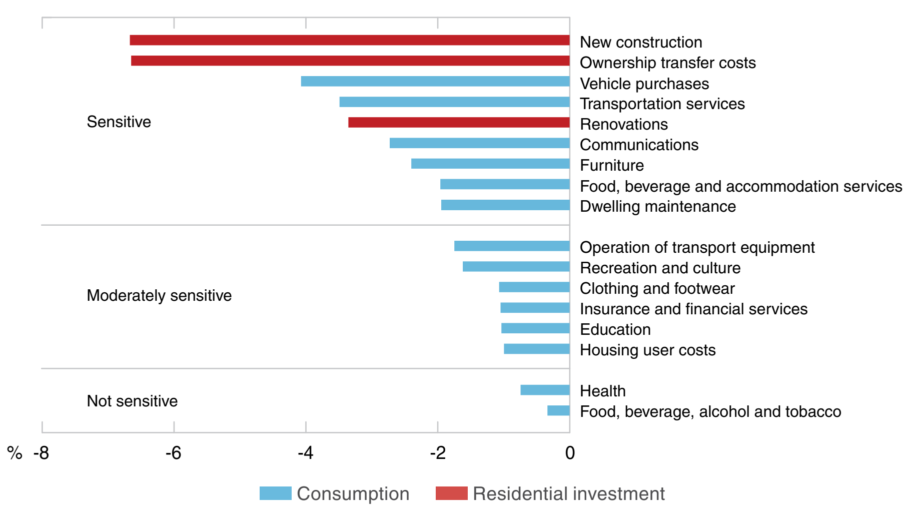
Lower household spending growth

Household spending is expected to contract modestly in the fourth quarter of 2022 and through the first half of 2023. Higher interest rates weigh on household spending, with housing and big-ticket items being the most affected (**Chart 15**). Decreasing house prices, financial wealth and consumer confidence also restrain household spending.

Borrowing costs have risen sharply. The costs for those taking on a new mortgage are up markedly. Households renewing an existing mortgage are facing a larger increase than has been experienced during any tightening cycle over the past 30 years. For example, a homeowner who signed a five-year fixed-rate mortgage in October 2017 would now be faced with a mortgage rate that is 1½ to 2 percentage points higher at renewal.

Chart 15: Rising rates affect spending on housing and big-ticket consumption items

Estimated peak-level impact of a 100-basis-point contractionary monetary policy shock



Note: For more details, see T. Chernis and C. Luu, "Disaggregating household sensitivity to monetary policy by expenditure category," Bank of Canada Staff Analytical Note No. 2018-32 (October 2018).

Sources: Statistics Canada and Bank of Canada calculations and estimates

Box 4

Potential output in Canada

Growth in potential output is expected to pick up from about 0.7% in 2022 to just over 2% in 2023 and 2024. It has been revised down by 0.5 percentage points, on average, in 2023 and 2024 compared with the July Report (**Table 4-A**).[1] The downward revision reduces the size of the rebound in potential output growth over the projection.

Trend labour productivity growth over the forecast has been revised down. Supply challenges have proved to be quite persistent, which suggests that larger restructuring and reallocation issues are at play. The Bank of Canada's consultations reveal that businesses will continue to adjust—for example, by sourcing from new suppliers, rearranging their global value chains or holding more inventories. Consequently, supply chains, in the medium term, will not return to their pre-pandemic form as previously assumed.

In addition, trend labour input growth is lower in 2023 than assumed in the July Report. Labour market mismatch—the gap between the skills, interests and experience of job seekers and the types of workers employers are looking for—is assumed to have more persistent impacts on the ability of firms in many industries to hire workers. Furthermore, illness-related absences appear to be more frequent than before the pandemic. These factors are partially offset by upward revisions to net immigration flows.

1 The pandemic has had both temporary and lasting effects on the supply side of the economy. Recent issues of the Report distinguished between supply and potential output to account for the episodic nature of some decreases in supply caused by pandemic-related factors, such as public health measures and supply chain disruptions. Elevated uncertainty about the likely persistence and timing over which these factors could dissipate makes this distinction artificially precise. The impact of these factors on potential output is now included in estimates of trend total factor productivity and trend labour input.

The rebound in potential output growth in 2023 and 2024 is supported by strong immigration and a recovery in trend labour productivity growth. After declining sharply at the height of the pandemic, net immigration surged by about 270,000 people in the second quarter of 2022—by far the highest single-quarter increase in Canadian history. In line with the federal government's target to welcome 1.3 million permanent residents over 2022–24, net immigration accounts for more than two-thirds of potential output growth.

(*continued…*)

Table 4-A: Contributions to annual potential output growth in Canada
Percentage points*†

	2000 to 2019 average	2022	2023	2024
Trend labour productivity	**1.0**	**-0.5 (-0.5)**	**0.7 (0.8)**	**0.8 (1.6)**
Capital deepening	0.5	-0.3	0.0	0.1
Trend total factor productivity	0.6	-0.1	0.7	0.7
Trend labour input	**1.1**	**1.2 (1.2)**	**1.4 (1.7)**	**1.3 (1.2)**
Trend employment rate	0.0	0.3	0.0	0.0
Trend average hours worked	-0.2	-0.5	-0.1	-0.2
Working-age population	1.3	1.4	1.6	1.5
Contribution of net immigration	0.9	1.1	1.3	1.2
Potential output	**2.2**	**0.7 (0.7)**	**2.1 (2.5)**	**2.2 (2.8)**
Range		0.5–2.0	1.4–3.3	1.4–3.5

* Numbers in parentheses are from the projection in July.
† Numbers may not add to total due to rounding.

Box 4 (*continued*)

Trend labour productivity growth recovers to just below 1% in 2023 and 2024. This largely reflects an improvement in total factor productivity growth as the drag from supply challenges and other pandemic-related factors fades.

Growth of potential output in Canada is assumed to exceed that in the United States in 2023 and 2024. Over that period, potential output grows by about 2.1% on average in Canada, 0.4 percentage points higher than in the United States (**Table 4-B**). Over the projection, net immigration flows of working-age individuals make up on average 1.2 percentage points of potential output growth in Canada, compared with 0.3 percentage points in the United States.[2] In contrast, trend labour productivity growth is assumed to be lower in Canada than in the United States, much as it has been over the past two decades.

2 In addition to contributing to working-age population growth, immigration supports potential output growth by increasing trend employment rates. This is because the proportion of prime-age workers among working-age people is larger for immigrants than it is for the general Canadian population. These figures do not include these secondary effects on potential output.

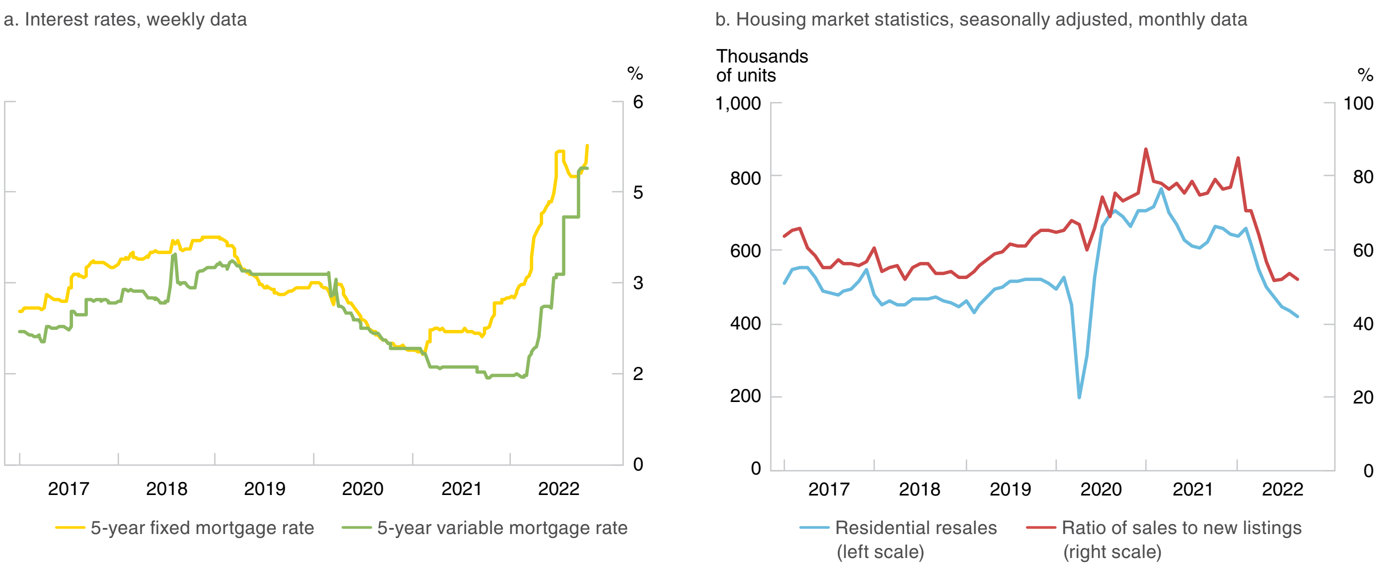
Table 4-B: Contributions to annual potential output growth, Canada and the United States

Percentage points*

	2000 to 2019 average	2022	2023	2024
Canada				
Potential output	**2.2**	**0.7**	**2.1**	**2.2**
Trend labour productivity	1.0	-0.5	0.7	0.8
Trend labour input	1.1	1.2	1.4	1.3
United States				
Potential output	**2.1**	**1.7**	**1.7**	**1.8**
Trend labour productivity	1.3	1.5	1.4	1.3
Trend labour input	0.8	0.2	0.3	0.5

* Numbers may not add to total due to rounding.

Chart 16: As mortgage rates rise, housing market activity contracts



Note: Residential resales are seasonally adjusted at annual rates.

Sources: Canadian Real Estate Association, Lender Spotlight and Bank of Canada

Last observations: panel a, October 18, 2022; panel b, September 2022

The rise in mortgage rates contributed to a sharp pullback in resales beginning in March. Resales have continued to decline and are now below pre-pandemic levels (**Chart 16**). Renovation activity has also weakened. The contraction in residential investment that began in the second quarter of the year is projected to continue through the first half of 2023, although to a lesser degree. House prices, which rose by just over 50% between February 2020 and February 2022, have declined by just under 10%.[4] They are projected to continue to decline, particularly in those markets that saw larger increases during the pandemic.

4 These figures use the MLS Home Price Index®, which provides a measure of real estate prices that adjusts for the quality of the home.

Higher borrowing costs are affecting spending on big-ticket items. Spending on automobiles, furniture and appliances is the most sensitive to interest rates and is already showing signs of slowing. As higher interest rates work their way through the economy, disposable income growth and the demand for services will also slow. Past experience suggests that the demand for travel, hotels, meals at restaurants and communications services will be impacted the most.

Household spending strengthens beginning in the second half of 2023 and extends through 2024. Population growth and rising disposable incomes support demand as the impact of the tightening in financial conditions wanes. For example, new residential construction is boosted by strong immigration in markets that are already particularly tight.

Slowing business investment

Business investment growth is projected to slow markedly from about 6¾% in 2022 to around 1½% in 2023 before increasing modestly to 2¼% in 2024 (**Chart 17**).

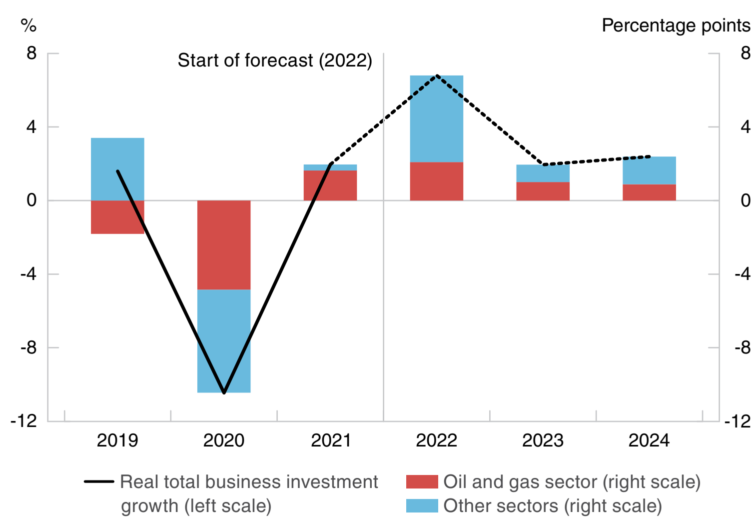
According to results of the BOS, investment intentions are positive partly because capacity constraints remain significant for many businesses. In 2023, growth in business investment spending is expected to slow due to higher financing costs, softening demand and moderating capacity constraints.

Rising bank lending rates, widening corporate spreads and falling equity markets have contributed to substantial increases in financing costs for many businesses. For example, the average borrowing rate for new business loans has risen by about 3 percentage points over the past year. The recent depreciation of the Canadian dollar, which makes investment in machinery and equipment more expensive, also weighs on business investment.

Growth picks up in 2024 when demand strengthens across the economy. Projects such as the development of electric vehicle production facilities also contribute to the uptick.

Chart 17: Business investment growth is expected to slow markedly in 2023

Contribution to real total business investment growth, annual data



Sources: Statistics Canada and Bank of Canada calculations and projections

Investment growth in the oil and gas sector is anticipated to be solid due to relatively high energy prices. However, investment will be restrained by ongoing uncertainty about long-term demand and the transition to a low-carbon economy.

Inventory investment is projected to moderate in 2023 following exceptional strength. The easing in global supply chain disruptions will gradually help efforts to restock, particularly by retailers, following pandemic-related shortages. Firms are assumed to hold more inventories to buffer themselves against future supply disruptions and build resilience in their production chains.

Moderate export growth

Exports grow moderately over the projection horizon. Growth of non-commodity exports through 2023 slows because of weakening foreign demand. The recovery in international travel, the continued easing of global supply chain disruptions and the recent depreciation of the Canadian dollar provide a partial offset. As foreign demand stabilizes through 2024, non-commodity exports gradually strengthen (**Chart 18**).

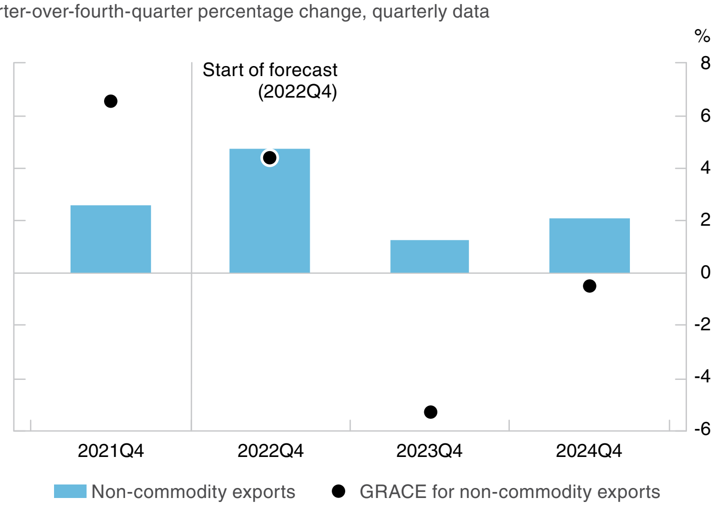
Non-energy commodity exports grow moderately in 2023, partly reflecting the anticipated return of crop yields to normal levels as well as fewer effects from global supply chain disruptions.

Over the projection horizon, energy exports are supported by high prices and increased transportation capacity. In 2024, growth should pick up due to the expected completion of key projects such as the Trans Mountain Expansion pipeline.

A gradual recovery in business investment spending and ongoing restocking by firms will support imports of goods.

Chart 18: As foreign demand stabilizes in 2024, non-commodity exports should gradually strengthen

Fourth-quarter-over-fourth-quarter percentage change, quarterly data



Note: For more information on the foreign demand indicators, including GRACE (global real activity for Canadian exports), see Box 3 in the January 2017 Report.

Sources: Statistics Canada and Bank of Canada calculations and projections

Declining inflation in 2023, return to target in 2024

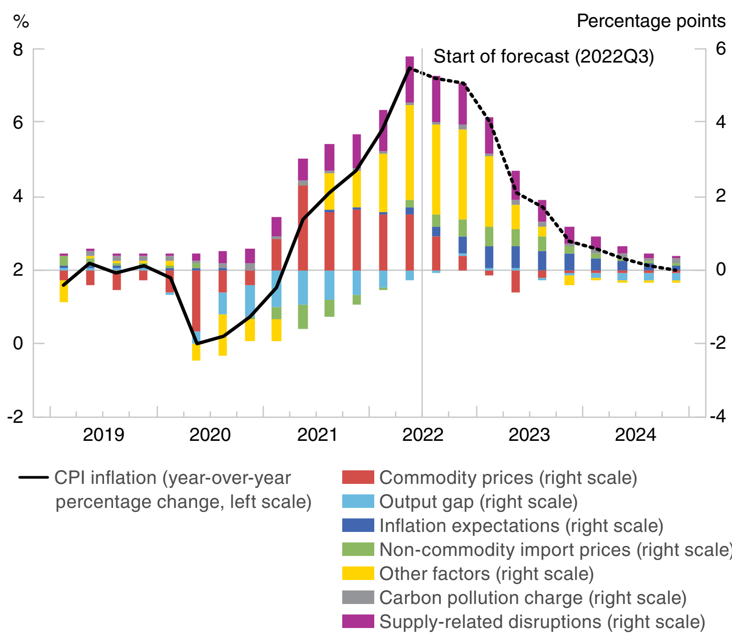
CPI inflation is forecast to decline from around 7% in the fourth quarter of 2022 to within the 1%–3% target range by the end of 2023 and to return to the 2% target by the end of 2024 (**Chart 19**). Inflation falls as the effects of past increases in commodity prices dissipate and the inflationary pressures from global supply disruptions fade. Other factors (**Chart 19**, yellow bars) are also expected to ease. These potentially include the pass-through of elevated energy costs to the prices of other goods and services as well as elevated shelter costs. Specifically, high energy costs seem to have passed through to inflation much more than is usual. It will take some time for these unusually large impacts to fully recede.

The rise in interest rates slows spending, reduces demand and helps return inflation back to target. In particular, moderating demand leads to a softening of inflation of services prices. This includes lower house prices and declining shelter price inflation through mid-2023. Shelter price inflation, however, remains positive due to the lasting effect of increased mortgage interest costs and strong growth in rent.[5]

The recent depreciation of the Canadian dollar provides a modest boost to import prices and inflation in 2023.

Chart 19: CPI inflation is forecast to return to target in 2024

Contribution to the deviation of year-over-year inflation from 2%, quarterly data



Note: *Other factors* could be due to underestimated demand pressures, such as from large imbalances in the housing market, or to previously unobserved factors, such as greater pass-through from oil or import prices. *Non-commodity import prices* include the impact of the Can$/US$ exchange rate. Numbers may not add to total due to rounding.

Sources: Statistics Canada and Bank of Canada calculations, estimates and projections

5 The increase in mortgage interest costs is projected to add an average of around 0.6 percentage points to inflation over 2023–24.

Risks to the inflation outlook

The global economy faces a growing set of complex challenges and risks. In most countries, inflation remains high and widespread. Many central banks have rapidly raised interest rates, and some have begun to shrink their balance sheets. Financial conditions have tightened sharply in 2022, increasing financial stresses. Russia's invasion of Ukraine and rising geopolitical tensions remain major sources of uncertainty.

Some of the risks identified in previous issues of the Report have been partially incorporated into the projection. The base-case scenario includes weaker global growth, lower commodity prices and transportation costs, tighter global financial conditions and a sharper near-term decline in Canadian housing activity.

The Bank sees two main risks to the outlook for inflation. On the upside, inflation may remain higher for longer than anticipated in the base case. One way this could occur is if inflation expectations do not adjust downward as expected. In this case, the wage-price spiral risk scenario described in the July Report could be realized. Other factors could also lead to stickier inflation than projected in the base case. On the downside, the slowdown in the global economy could be even more severe and inflation would fall further than projected.

While the Bank views the risks around its inflation outlook as roughly balanced, the upside risk is of greater concern because inflation is persistently high.

Main upside risk: High inflation that is more persistent

Inflation could persist at a rate higher than expected in the base case. This risk could arise through either global or domestic channels.

Some global factors responsible for recent high inflation could last longer than assumed in the base case or have a greater impact on consumer prices than anticipated. For example, an intensification of the supply disruptions related to Russia's invasion of Ukraine could trigger spikes in the prices of oil, natural gas and agricultural products. More broadly, an increase in geopolitical tensions could prolong disruptions to supply chains, risking higher prices on internationally traded goods.

Domestic factors could also keep inflation high for longer than anticipated. Short-term inflation expectations have increased considerably since the onset of the pandemic. If these expectations prove to be more persistent than anticipated in the base case, inflation will remain higher for longer.

Another risk is that households may tap into their elevated levels of savings more than anticipated in the base case. This would lead to increased household spending and greater upward pressure on inflation.

Main downside risk: Severe global slowdown

As monetary policy tightens in many countries, long-standing global financial vulnerabilities could amplify the impacts on the global economy. Many countries have high levels of sovereign, non-financial corporate and household debt. Significant external and US-dollar borrowing is an additional vulnerability for several EMEs. Some funding markets have become more fragile due to lower levels of liquidity. An abrupt repricing of risk could trigger funding strains for higher-risk borrowers and a prolonged period of deleveraging. The result could lead to a more severe global slowdown and lower commodity prices.

The Canadian economy could be affected through weaker foreign demand, lower terms of trade and spillovers into its financial system. The resulting tighter financial conditions and higher unemployment could undermine homebuyer sentiment and lead to a larger-than-expected drop in house prices. This in turn could reduce household wealth, access to credit and consumer confidence.

The base case assumes that the spike in goods prices since the beginning of the pandemic will persist. These prices could decline, however, if the slowdown in global growth proves to be more severe than anticipated. A sharper slowdown in growth, notably in the United States, could push down goods prices if retailers who find themselves with too much inventory offer deep discounts.

Appendix: Measuring core inflation

Inflation can be quite volatile. To help see through the excess volatility in inflation data, central banks often use measures of core inflation. Because no core measure is clearly superior, the Bank of Canada considers multiple approaches, each of which has its strengths and weaknesses. CPI-trim and CPI-median have both proved to be reliable indicators of underlying inflation throughout the pandemic. In contrast, CPI-common has become unreliable in real time because it has been subject to large revisions. Consequently, the Bank will focus on CPI-trim and CPI-median as its preferred measures of core inflation.

Several measures of core inflation

Since 2016, the Bank has used three measures of core inflation: CPI-trim, CPI-median and CPI-common. CPI-trim recalculates inflation after excluding the most extreme (high and low) price changes each month. Similarly, CPI-median represents the midpoint of the distribution of monthly price changes. CPI-common isolates common price changes across the CPI basket and recalculates inflation by giving more importance to the components that moved closely together over history.

The Bank chose these measures, among many alternatives, mainly because they:

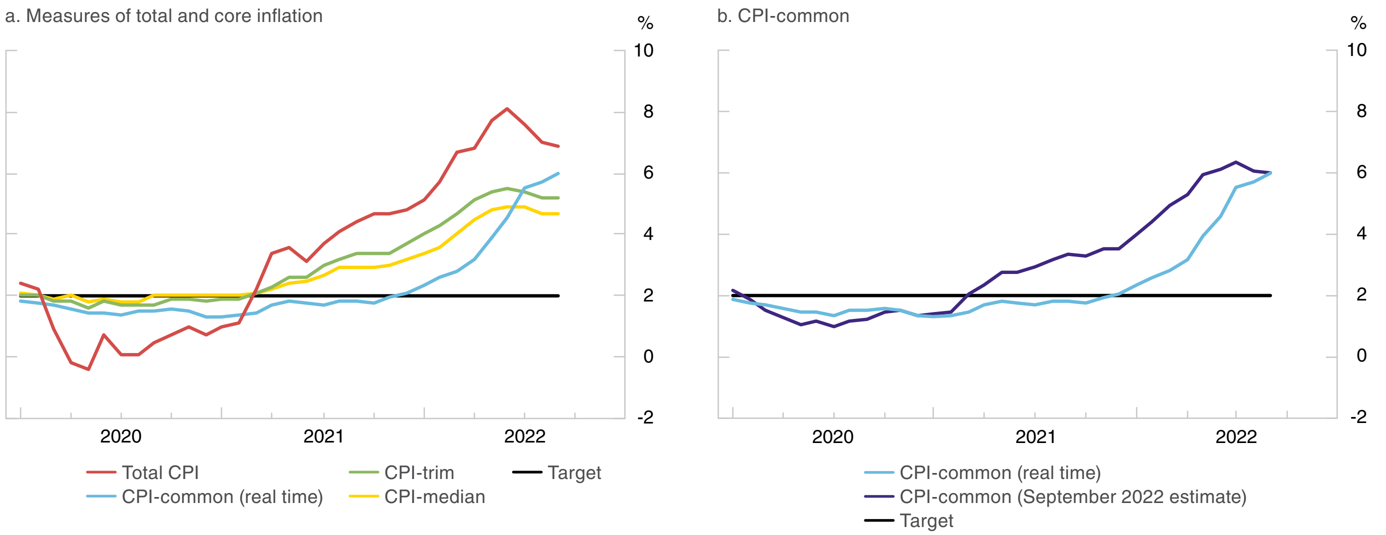
- have moved most closely with the key macroeconomic factors behind inflation
- have best captured underlying inflation after seeing through temporary fluctuations

Mixed signals throughout the pandemic

The pandemic presented an unprecedented and complex shock that has challenged conventional economic models and indicators, including measures of core inflation. Importantly, these measures sometimes gave mixed signals about underlying inflation.

Chart A-1: CPI-trim and CPI-median provided a more timely gauge of underlying inflationary pressures than CPI-common did

Year-over-year percentage change, monthly data



Note: Real time refers to the initial unrevised reading of CPI-common.

Source: Statistics Canada

Last observation: September 2022

CPI-trim and CPI-median

CPI-trim and CPI-median appear to have provided an accurate gauge of underlying inflation during the pandemic (**Chart A-1, panel a**).[6] The reason is that, unlike other core measures that rely on the past behaviour of prices, these measures are based on the distribution of price changes each month. Their relative flexibility made CPI-trim and CPI-median well suited to deal with the unfamiliarity of the pandemic and capture important changes in the behaviour of inflation.

Many of the CPI components that were most volatile at the onset of the pandemic had not typically been so volatile before. Extreme price movements on the high side and low side were also more common.

As a result, CPI-trim and CPI-median eased modestly below the 2% target as the economy weakened at the beginning of the pandemic, but they did not fall as much as other measures of core inflation. By early 2021, CPI-trim and CPI-median both slightly exceeded 2%, providing an earlier warning than other core measures that underlying inflation was rising. By mid-2021, high inflation continued to broaden across the CPI basket. This was clearly reflected in the subsequent behaviour of CPI-trim and CPI-median. In 2022, the two measures continued to rise, reaching well above the 2% target. At the same time, total inflation reached highs not seen in decades, and inflationary pressures became unambiguously widespread.

CPI-common

CPI-common was relatively slow to show a lasting increase in inflation (**Chart A-1, panel b**).[7] One reason for this was how it treated price changes of internationally traded goods. Before the pandemic, these prices tended

6 For more, see T. Macklem, "What's happening to inflation and why it matters" (speech to the Halifax Chamber of Commerce, Halifax, October 6, 2022). See also M. Khan and E. Sullivan, "Core inflation over the COVID-19 pandemic," Bank of Canada Staff Analytical Note (forthcoming).

7 For a review of recent revisions to CPI-common, see E. Sullivan, "Examining recent revisions to CPI-common," Bank of Canada Staff Analytical Note No. 2022-15 (October 2022).

not to move much with the rest of the components of the CPI basket. As a result, CPI-common did not place much emphasis on the strong inflationary pressures coming from internationally traded goods prices in 2021. The resulting real-time estimate of CPI-common was notably lower than the estimate provided by CPI-trim and CPI-median. With the common price movements in the CPI components becoming more widespread than in the pre-pandemic period, the estimated weight on traded goods prices in CPI-common increased. Consequently, estimates of CPI-common during the pandemic have been revised up substantially, and these revised estimates are similar to those for CPI-trim and CPI-median throughout the pandemic.

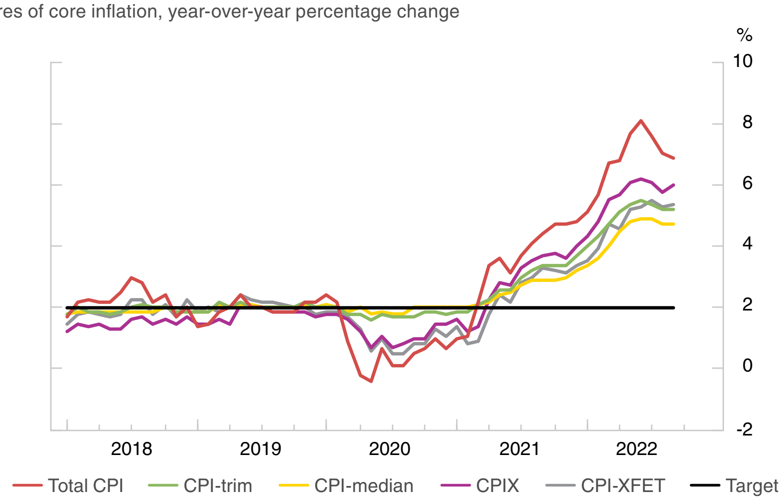
Alternative measures of core inflation

The Bank also monitors alternative measures of core inflation, notably CPIX and CPI-XFET.[8] These exclusion-based measures remove a fixed group of CPI components that have historically tended to be more volatile. For example, CPI-XFET excludes food and energy. This approach differs from that used in CPI-trim and CPI-median, which exclude different components each month.

At the onset of the pandemic, CPIX and CPI-XFET fell sharply toward the lower end of the Bank's inflation-control range, suggesting less underlying inflation than CPI-trim and CPI-median did. This happened because the exclusion-based measures did not reflect the changes in the most volatile components that occurred at the beginning of the pandemic. CPIX and CPI-XFET then remained below the 2% target for about one year before moving largely together with CPI-trim and CPI-median (**Chart A-2**).

Chart A-2: Exclusion-based measures pointed to lower underlying inflation early in the pandemic

Measures of core inflation, year-over-year percentage change



Note: For details about these measures of core inflation, see the Bank of Canada's website.

Source: Statistics Canada

Last observation: September 2022

8 For details on the measures and their evaluation, see H. Lao and C. Steyn, "A comprehensive evaluation of measures of core inflation in Canada: An update," Bank of Canada Staff Discussion Paper No. 2019-9 (September 2019).

Core inflation increasingly important

Measures of core inflation can help detect important and lasting changes in inflation. CPI-common is no longer informative in real time because it has been subject to large historical revisions. In contrast, CPI-trim and CPI-median better capture changes in price behaviour. These measures appear to have performed well during the pandemic and are subject to much smaller revisions. Going forward, the Bank’s focus will be on these two measures.