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Risk Scenario Analysis

November 2022

OFFICE OF THE PARLIAMENTARY BUDGET OFFICER
BUREAU DU DIRECTEUR PARLEMENTAIRE DU BUDGET

The Parliamentary Budget Officer (PBO) supports Parliament by providing economic and financial analysis for the purposes of raising the quality of parliamentary debate and promoting greater budget transparency and accountability.

This report provides a risk scenario analysis to help parliamentarians gauge potential economic and fiscal implications of central banks over-tightening monetary policy.

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Summary

This report provides a scenario analysis to help parliamentarians gauge potential economic and fiscal implications of central banks over-tightening monetary policy, which was flagged as a key risk in PBO's October Economic and Fiscal Outlook (EFO).

The scenario under consideration is but one of many possible outcomes. **We stress that this scenario is not a most-likely forecast. It is an illustrative scenario of one possible outcome**. The risk scenario we examine does not incorporate any new economic data released after September 30 or any fiscal measures incremental to our October EFO.

In our October outlook we indicated that the global economy was slowing as major central banks were increasing their policy rates to reduce high inflation, and that there was a risk that central banks would over-tighten monetary policy. Policymakers and international institutions have also expressed concerns about monetary policy over-tightening.

In our risk scenario we assess the impacts of the U.S. Federal Reserve and the Bank of Canada continuing to rapidly raise their policy interest rates, bringing them to 5.25 per cent (top of the target range) and 5.0 per cent, respectively, in early 2023. In such a scenario, we assume that policy rates will remain elevated at this level through 2023 before the Federal Reserve and Bank of Canada begin to lower them in early 2024.

In addition to the temporary increase in policy rates (of 100 basis points) above our October EFO levels, we incorporate weaker consumer and business confidence, as well as lower commodity prices resulting from a more severe global economic downturn. We assume that the Government does not introduce or undertake any new measures in response to the economic downturn in our risk scenario.

Key results

- With the over-tightening of monetary policy in our risk scenario, real GDP in Canada begins to contract in the fourth quarter of 2022 and declines further over the course of 2023.
    - Annual real GDP growth in 2023 and 2024 is -0.3 per cent and 1.3 per cent, respectively, which is 1.5 and 1.0 percentage points lower compared to our October outlook.
- Employment growth essentially stalls in late 2022 and over the course of 2023. Employment falls below levels projected in our October outlook, resulting in a loss of 177,000 (net) jobs by the end of 2024 (compared to the October EFO).

  - The unemployment rate rises to 6.2 per cent in early 2024 in our risk scenario, which is 0.5 percentage points above our October outlook.

- Despite the decline in commodity prices and increased excess supply in the economy, inflation as measured by the Consumer Price Index (CPI) only gradually returns to its 2 per cent target in our risk scenario.

  - Relative to our October outlook, CPI inflation is largely unchanged over 2023 to 2025 as the impact of excess supply is offset by the impact of a weaker Canadian dollar.

  - Relative to our October outlook, the level of nominal GDP is $75 billion lower annually, on average, over 2023 to 2027.

- Due to weaker economic activity and higher interest rates in 2023 and 2024 under our risk scenario, the budgetary deficit reaches $42.9 billion in 2023-24 (1.5 per cent of GDP) and $36.5 billion in 2024-25 (1.3 per cent of GDP).

  - As the Bank of Canada lowers its policy rate and the economy begins to rebound, the budgetary deficit gradually declines, reaching $12.8 billion (0.4 per cent of GDP) in 2027-28.

  - Compared to our October outlook, the budgetary deficit is $15.6 billion higher per year, on average, over 2023-24 to 2027-28.

- Under our risk scenario, the federal debt-to-GDP ratio increases to 43.2 per cent of GDP in 2023-24 and remains elevated before gradually falling to 39.2 per cent in 2027-28. The debt service ratio (that is public debt charges relative to tax revenues) reaches 14.3 per cent in 2024-25 and then declines to 12.0 per cent in 2027-28.

  - Higher budgetary deficits and lower nominal GDP increase the federal debt-GDP-ratio by 2.8 percentage points, on average, over 2023-24 to 2027-28 compared to our October outlook.

  - Over the same period, the debt service ratio is 1.8 percentage points higher, on average, than our October outlook.

1. Key assumptions

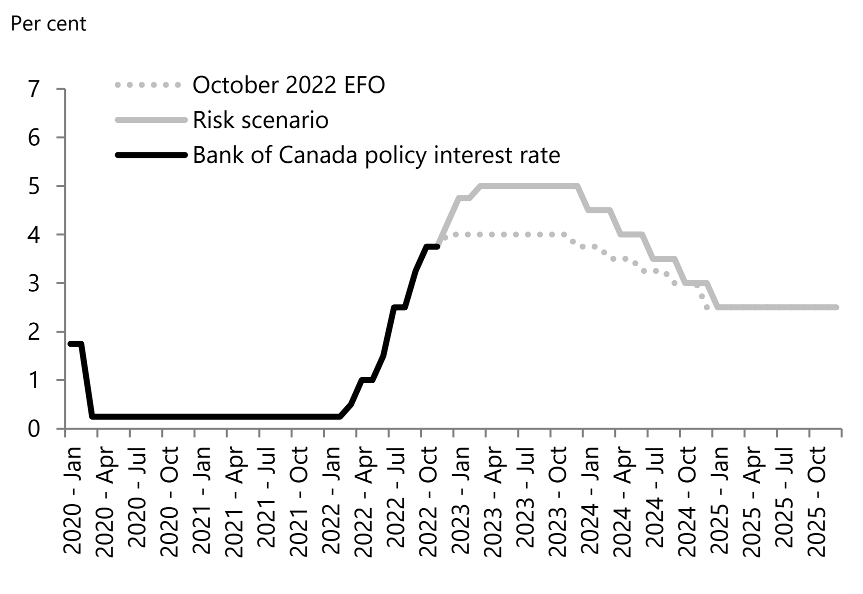
In our October Economic and Fiscal Outlook[1] (EFO), we identified the over-tightening of monetary policy as a key risk to the outlook.

Policymakers and international institutions have also expressed concerns about monetary policy over-tightening. In his October 26 remarks, the Governor of the Bank of Canada indicated that the Bank was "trying to balance the risks of under- and over-tightening".[2] In its October World Economic Outlook, the International Monetary Fund noted that, among other factors, the "global economy's future health rests critically on the successful calibration of monetary policy" and that "[m]onetary policy could miscalculate the right stance to reduce inflation".[3]

The scenario under consideration is but one of many possible outcomes. **We stress that this scenario is not a most-likely forecast. It is an illustrative scenario of one possible outcome**. The risk scenario we examine does not incorporate any new economic data released after September 30 or any fiscal measures incremental to our October EFO.[4]

In our risk scenario, we assess the impacts of the U.S. Federal Reserve and the Bank of Canada continuing to rapidly raise their policy interest rates, bringing them to 5.25 per cent (top of the target range) and 5 per cent, respectively, in early 2023 (Figure 1-1).[5] For the Federal Reserve and Bank of Canada, this results in an increase of 125 basis points in their policy rates from current levels (and 100 basis points above our October outlook).

Figure 1-1 Risk scenario: monetary policy over-tightening



Sources: Statistics Canada and Office of the Parliamentary Budget Officer.

Note: Monthly series are the last Wednesday of each month.
The projection period covers December 2022 to December 2025.

In our scenario, we assume that policy rates will remain elevated through 2023 before central banks begin to lower them in early 2024 and return to neutral levels in early 2025. The increase in the policy rate relative to October EFO levels is assumed to flow (one for one) to treasury bill and government bond rates.

In addition to the increase in policy rates and government bond yields above October EFO levels, we incorporate weaker consumer and business confidence, as well as lower commodity prices resulting from a more severe global economic downturn.

The U.S. economic outlook in the risk scenario is informed by the range of projections by Federal Reserve Board members and Federal Reserve Bank presidents in the Summary of Economic Projections[6] from the September 2022 Federal Open Market Committee (FOMC) meeting.

With the slowdown in global economic activity due to monetary policy overtightening by major central banks, demand for energy and non-energy commodities is assumed to weaken and put downward pressure on commodity prices. In our risk scenario, we assume that commodity prices fall by 15 per cent below levels projected in our October outlook by the end of 2023 and then return to October EFO levels in mid-2025.[7]

As monetary policy over-tightens later this year and into next year, we assume that consumer and business confidence in Canada will deteriorate rapidly, falling to levels in early 2023 that are broadly consistent with previous pre-pandemic economic downturns. Consumer and business confidence is then assumed to gradually improve, rebounding to levels projected in the October EFO by the end of 2024.

We assume that the Government does not introduce or undertake any new measures in response to the economic downturn in our risk scenario. Automatic stabilizers such as Employment Insurance provide benefits to the additional unemployed individuals who qualify for the program, as well as to those receiving benefits in our October outlook.

2. Economic results

Table 2-1 presents a summary of key economic indicators in our risk scenario compared to our October outlook. Appendix A presents our detailed economic scenario.

Table 2-1 Monetary policy over-tightening risk scenario: key economic indicators

% unless otherwise indicated	2022	2023	2024	2025	2026	2027
Real GDP growth						
Risk scenario	3.1	-0.3	1.3	2.5	3.0	2.3
October 2022 EFO	3.1	1.2	2.3	2.1	2.0	1.9
	-0.1	-1.5	-1.0	0.4	1.0	0.3
Nominal GDP level ($ billions)						
Risk scenario	2,781	2,806	2,883	3,042	3,199	3,334
October 2022 EFO	2,782	2,878	3,002	3,125	3,253	3,382
	-2	-72	-119	-83	-54	-48
Employment (thousands)						
Risk scenario	19,537	19,558	19,729	19,975	20,258	20,488
October 2022 EFO	19,542	19,673	19,907	20,109	20,307	20,493
	-5	-115	-177	-133	-49	-6
CPI inflation						
Risk scenario	6.6	3.4	2.3	2.0	1.7	1.9
October 2022 EFO	6.6	3.5	2.3	2.0	2.0	2.0
	0.0	-0.1	0.0	0.0	-0.3	-0.1
Bank of Canada policy rate						
Risk scenario	4.25	5.00	3.00	2.50	2.50	2.50
October 2022 EFO	4.00	3.75	2.50	2.50	2.50	2.50
	0.25	1.25	0.50	-	-	-

Source: Office of the Parliamentary Budget Officer.

Note: Employment and the Bank of Canada policy rate are end of period values. Totals may not add due to rounding.

With the over-tightening of monetary policy in our risk scenario, real GDP in Canada begins to contract in the fourth quarter of 2022 and declines further over the course of 2023. In addition to higher interest rates, this contraction reflects a deterioration in consumer and business confidence, lower commodity prices and weaker U.S. GDP growth. The decline in economic activity in our risk scenario is spread across consumer spending, business and residential investment, as well as the trade sector. Annual real GDP growth in 2023 and 2024 is -0.3 per cent and 1.3 per cent, respectively, which is 1.5 and 1.0 percentage points lower compared to our October outlook.

Under our risk scenario, growth in employment essentially stalls in the last quarter of 2022 and over the course of 2023 as the output gap (that is, real GDP relative to potential output) widens and the economy enters into excess supply. Employment falls below levels projected in our October outlook, resulting in a loss of 177,000 (net) jobs by the end of 2024 (compared to the October EFO). The unemployment rate rises to 6.2 per cent in early 2024 under our risk scenario, which is 0.5 percentage higher than the 5.7 per cent rate projected in our October outlook.

Despite the decline in commodity prices and increased excess supply in the economy, inflation as measured by the Consumer Price Index (CPI) only gradually returns to its 2 per cent target. This sluggishness reflects a gradual resolution of supply disruptions (over the course of 2023), higher import prices (resulting from a weaker Canadian dollar), as well as the muted impact of economic slack on core inflation.

Relative to our October outlook, CPI inflation is largely unchanged over 2023 to 2025 as the (disinflationary) impact of excess supply is offset by the (inflationary) impact of a weaker Canadian dollar. Over the medium term, the Canadian dollar appreciates more rapidly under the risk scenario, as commodity prices rebound more sharply, which results in lower CPI inflation in 2026 and 2027 compared to our October outlook.

As the Federal Reserve and Bank of Canada begin to unwind their over-tightening and lower policy rates in early 2024, consumer and business confidence are assumed to recover and commodity prices and U.S. demand are assumed to rebound, which combined boost Canadian real GDP growth over 2025 and 2026.

Relative to our October outlook, the level of nominal GDP in our risk scenario is $75 billion lower annually, on average, over 2023 to 2027.

3. Fiscal results

Table 3-1 presents a summary of key fiscal indicators in our risk scenario compared to our October outlook.[8] Appendix B presents our detailed fiscal results and Appendix C provides a detailed comparison to our October outlook.

Table 3-1 Monetary policy over-tightening risk scenario: key fiscal indicators

$ billions	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
Budgetary revenues						
Risk scenario	432.0	432.0	450.7	478.2	503.3	525.7
October 2022 EFO	434.7	448.3	469.4	489.6	510.9	531.3
	-2.6	-16.3	-18.7	-11.4	-7.6	-5.6
Program expenses						
Risk scenario	421.8	430.3	438.5	453.8	467.7	485.1
October 2022 EFO	421.9	429.7	439.1	455.2	469.5	486.6
	-0.1	0.6	-0.5	-1.3	-1.8	-1.5
Public debt charges						
Risk scenario	31.7	47.3	53.4	50.9	50.5	51.7
October 2022 EFO	31.2	42.0	44.8	45.0	46.3	47.6
	0.5	5.3	8.6	5.9	4.2	4.1
Net actuarial losses						
Risk scenario	7.4	-2.7	-4.7	1.6	0.0	1.8
October 2022 EFO	7.4	2.1	0.1	0.1	-1.5	0.2
	0.0	-4.8	-4.8	1.5	1.5	1.5
Budgetary balance						
Risk scenario	-28.9	-42.9	-36.5	-28.1	-14.9	-12.8
October 2022 EFO	-25.8	-25.6	-14.6	-10.7	-3.4	-3.1
	-3.0	-17.3	-21.9	-17.5	-11.5	-9.7
Federal debt-to-GDP (%)						
Risk scenario	42.1	43.2	43.3	42.0	40.4	39.2
October 2022 EFO	42.0	41.5	40.2	39.0	37.6	36.2
	0.1	1.8	3.1	3.0	2.9	3.0

Source: Office of the Parliamentary Budget Officer.

Note: Totals may not add due to rounding.

Due to weaker economic activity and higher interest rates in 2023 and 2024, the budgetary deficit reaches $42.9 billion in 2023-24 (1.5 per cent of GDP) and $36.5 billion in 2024-25 (1.3 per cent of GDP) under our risk scenario, assuming no new policy measures. As the Bank of Canada lowers its policy rate and the economy begins to rebound in our risk scenario, the deficit gradually declines, reaching $12.8 billion (0.4 per cent of GDP) in 2027-28.

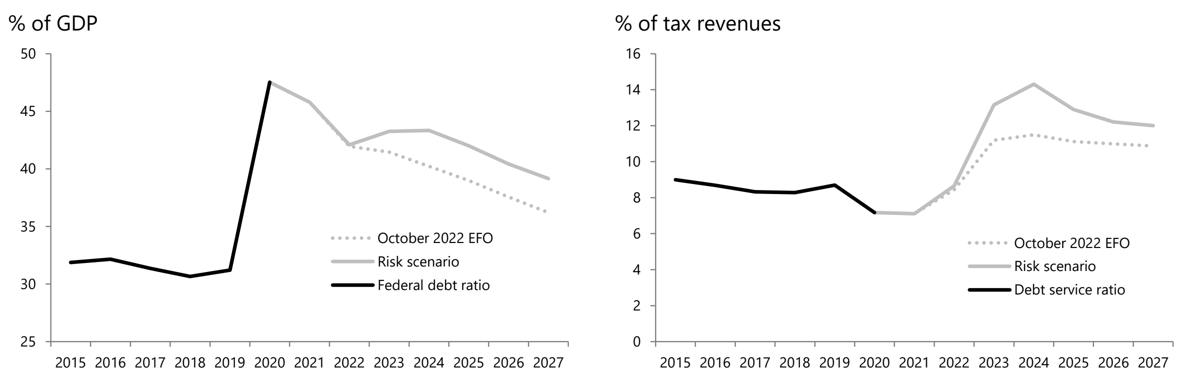
Under our risk scenario, the federal debt-to-GDP ratio increases to 43.2 per cent of GDP in 2023-24 and remains elevated before gradually falling to 39.2 per cent in 2027-28. The debt service ratio (that is public debt charges relative to tax revenues) reaches 14.3 per cent in 2024-25 and then declines to 12.0 per cent in 2027-28, as growth in public debt charges moderates and interest rates return to their neutral levels.

Compared to our October outlook, the budgetary deficit is $15.6 billion higher per year, on average, over 2023-24 to 2027-28. Over the same period, budgetary revenues are $11.9 billion lower per year, on average, mainly due to lower household incomes and corporate profits. Program spending is $1.9 billion lower annually, on average, largely due to lower transfer payments linked to nominal GDP growth (such as the Canada Health Transfer and Equalization payments) that are partly offset by higher Employment Insurance benefits.

Public debt charges are $5.6 billion higher per year, on average, over 2023-24 to 2027-28 compared to our October outlook due to a larger stock of debt and higher interest rates. However, higher interest rates reduce (on balance) expenses related to the valuation of federal employee pension and other future benefits over the same period.

Compared to our October outlook, higher budgetary deficits and lower nominal GDP increase the federal debt-GDP-ratio by 2.8 percentage points, on average, over 2023-24 to 2027-28 (Figure 3-1). Over the same period, the debt service ratio is 1.8 percentage points higher, on average, than our October outlook.

Figure 3-1 Federal debt and debt service ratios



Sources: Finance Canada, Statistics Canada and Office of the Parliamentary Budget Officer.

Note: Data are in fiscal years (2021 corresponds to fiscal year 2021-22). The projection period covers 2021-22 to 2027-28.

Appendix A: Detailed economic results

% unless otherwise indicated	Projection					
	2022	2023	2024	2025	2026	2027
Real GDP growth						
Risk scenario	3.1	-0.3	1.3	2.5	2.9	2.2
October 2022 EFO	3.1	1.2	2.3	2.1	2.0	1.9
Potential GDP growth						
Risk scenario	1.4	1.6	1.3	1.4	1.7	1.9
October 2022 EFO	1.4	1.7	1.8	1.9	1.9	1.9
GDP inflation						
Risk scenario	8.2	1.2	1.5	2.9	2.1	1.9
October 2022 EFO	8.2	2.2	2.0	1.9	2.0	2.0
Nominal GDP growth						
Risk scenario	11.5	0.9	2.8	5.5	5.2	4.2
October 2022 EFO	11.6	3.4	4.3	4.1	4.1	4.0
Nominal GDP ($ billions)						
Risk scenario	2,781	2,806	2,883	3,042	3,199	3,334
October 2022 EFO	2,782	2,878	3,002	3,125	3,253	3,382
3-month treasury rate						
Risk scenario	2.4	5.0	3.7	2.5	2.5	2.5
October 2022 EFO	2.4	3.9	3.0	2.5	2.5	2.5
10-year government bond rate						
Risk scenario	2.9	4.5	4.0	3.3	3.3	3.3
October 2022 EFO	2.8	3.4	3.3	3.3	3.3	3.3
Exchange rate (US¢/C$)						
Risk scenario	77.7	74.9	73.3	77.5	80.4	81.3
October 2022 EFO	77.7	78.9	80.4	81.2	81.6	81.8
Unemployment rate						
Risk scenario	5.4	5.9	6.2	5.9	5.6	5.4
October 2022 EFO	5.4	5.7	5.7	5.5	5.5	5.4
CPI inflation						
Risk scenario	6.6	3.4	2.3	2.0	1.7	1.9
October 2022 EFO	6.6	3.5	2.3	2.0	2.0	2.0
U.S. real GDP growth						
Risk scenario	1.5	-0.6	0.9	1.3	2.4	2.2
October 2022 EFO	1.6	1.0	2.1	1.8	1.8	1.8
WTI oil price ($US)						
Risk scenario	96	78	71	79	83	84
October 2022 EFO	96	86	81	81	83	84

Source: Office of the Parliamentary Budget Officer.

Appendix B: Detailed fiscal results

	Projection					
$ billions	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
Personal income tax	201.8	209.3	216.6	228.4	241.1	253.4
Corporate income tax	85.4	68.0	71.5	78.5	81.5	83.0
Non-resident income tax	12.1	12.0	12.0	12.5	13.1	13.6
Excise taxes/duties	67.1	70.0	71.5	73.8	76.1	78.7
Other taxes	0.2	0.4	1.5	1.7	1.9	2.1
Fuel charge proceeds	8.4	10.8	13.0	15.1	17.1	19.0
EI premium revenues	26.6	28.1	29.6	31.8	34.5	37.0
Other revenues	30.3	33.3	35.0	36.4	38.0	39.0
Total budgetary revenues	432.0	432.0	450.7	478.2	503.3	525.7
Elderly benefits	69.1	74.3	78.6	82.9	87.2	91.6
Employment Insurance	25.0	26.8	26.6	26.7	27.1	27.6
COVID-19 income support for workers	0.2	0.0	0.0	0.0	0.0	0.0
Children's benefits	25.5	27.3	28.9	30.0	30.6	31.1
Major transfers to other levels of government	90.0	97.1	102.3	106.4	110.4	114.9
Fuel charge proceeds returned	8.2	12.6	13.1	15.2	17.1	19.0
Transfer payments	87.4	78.2	76.4	77.4	76.7	78.1
Operating and capital expenses	116.5	113.9	112.6	115.2	118.7	122.8
Total program expenses	421.8	430.3	438.5	453.8	467.7	485.1
Public debt charges	31.7	47.3	53.4	50.9	50.5	51.7
Net actuarial losses	7.4	-2.7	-4.7	1.6	0.0	1.8
Budgetary balance	-28.9	-42.9	-36.5	-28.1	-14.9	-12.8
Federal debt	1,170.4	1,213.3	1,249.8	1,278.0	1,292.9	1,305.7
Per cent of GDP						
Budgetary revenues	15.5	15.4	15.6	15.7	15.7	15.8
Program expenses	15.2	15.3	15.2	14.9	14.6	14.5
Public debt charges	1.1	1.7	1.9	1.7	1.6	1.6
Budgetary balance	-1.0	-1.5	-1.3	-0.9	-0.5	-0.4
Federal debt	42.1	43.2	43.3	42.0	40.4	39.2

Source: Office of the Parliamentary Budget Officer.

Appendix C: Comparison to October 2022 outlook

$ billions	Projection 2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
Personal income tax	-0.1	-4.0	-6.9	-5.7	-4.5	-3.5
Corporate income tax	-2.6	-10.6	-8.0	-2.7	-1.2	-1.7
Non-resident income tax	0.0	-0.2	-0.4	-0.3	-0.2	-0.2
Excise taxes/duties	-0.2	-1.0	-1.2	-1.4	-1.5	-1.4
Other taxes	0.0	0.0	0.0	0.0	0.0	0.0
Fuel charge proceeds	0.0	0.0	0.0	0.0	0.0	0.0
EI premium revenues	0.0	-0.2	-0.7	-0.7	0.0	1.4
Other revenues	0.2	-0.3	-1.4	-0.6	-0.2	-0.2
Total budgetary revenues	-2.6	-16.3	-18.7	-11.4	-7.6	-5.6
Elderly benefits	0.0	-0.1	-0.1	-0.1	-0.4	-0.5
Employment Insurance	0.2	1.6	1.5	0.9	0.4	0.1
COVID-19 income support for workers	0.0	0.0	0.0	0.0	0.0	0.0
Children's benefits	0.0	0.0	0.1	0.3	0.4	0.5
Major transfers to other levels of government	0.0	-0.5	-1.6	-2.3	-2.2	-1.5
Fuel charge proceeds returned	0.0	0.0	0.0	0.0	0.0	0.0
Transfer payments	0.0	0.0	0.0	0.0	0.0	0.0
Operating and capital expenses	-0.3	-0.4	-0.5	-0.2	-0.1	0.0
Total program expenses	-0.1	0.6	-0.5	-1.3	-1.8	-1.5
Public debt charges	0.5	5.3	8.6	5.9	4.2	4.1
Net actuarial losses	0.0	-4.8	-4.8	1.5	1.5	1.5
Budgetary balance	-3.0	-17.3	-21.9	-17.5	-11.5	-9.7
Federal debt	3.0	20.4	42.3	59.8	71.3	81.1
Per cent of GDP						
Budgetary revenues	-0.1	-0.2	0.0	0.1	0.0	0.1
Program expenses	0.0	0.4	0.6	0.4	0.2	0.2
Public debt charges	0.0	0.2	0.4	0.2	0.2	0.1
Budgetary balance	-0.1	-0.6	-0.8	-0.6	-0.4	-0.3
Federal debt	0.1	1.8	3.1	3.0	2.9	3.0

Source: Office of the Parliamentary Budget Officer.

Notes

1. Available at: https://www.pbo-dpb.ca/en/publications/RP-2223-018-S--economic-fiscal-outlook-october-2022--perspectives-economiques-financieres-octobre-2022.

2. Available at: https://www.bankofcanada.ca/2022/10/opening-statement-2022-10-26/.

3. The IMF's October 2022 World Economic Outlook is available at: https://www.imf.org/en/Publications/WEO/Issues/2022/10/11/world-economic-outlook-october-2022.

   The Organisation for Economic Co-operation and Development's September 2022 Economic Outlook notes that, "[c]areful monitoring will be required to guard against the risk that policy rates could be tightened excessively, or for longer than necessary to bring down inflation." See: https://www.oecd.org/economic-outlook/september-2022/.

4. The risk scenario is constructed as a simulation of our economic and fiscal model that incorporates higher interest rates, weaker U.S. GDP growth, lower commodity prices and deterioration in consumer and business confidence in Canada as economic "shocks". These shocks are introduced into our October EFO projection simulation, which serves as the "baseline" scenario.

5. Although not explicitly captured in our model, our risk scenario assumes that in addition to the U.S. Federal Reserve and the Bank of Canada, other major central banks would synchronously over-tighten monetary policy.

6. The FOMC September 2022 projection materials are available at: https://www.federalreserve.gov/monetarypolicy/fomcprojtabl20220921.htm.

   The upper end of the federal funds rate range at the end of 2023 is 4.75-5.00 per cent, which is slightly lower than the 5.00-5.25 per cent in our risk scenario. U.S. real GDP growth and inflation in the risk scenario are based on the lower end of the range in 2023 and 2024.

7. The decline in commodity prices assumed in the risk scenario (33 per cent from their peak in the second quarter of 2022) is much smaller than the 52 per cent decline from peak levels (in the second quarter of 2008) in during the global financial crisis.

8. See Note 4. In addition, we applied judgement in some cases to better capture the impact of the economic downturn on certain revenue and spending components.