

# HIGHER FOR LONGER: STRUCTURAL INFLATION AND REAL RATE TRENDS IN THE 2020S

MARCH 2023

**Author:** James K. Stewart, *Executive In Residence, Global Risk Institute*



Financial markets are understandably focused on the next steps for the Bank of Canada (BoC) as it continues its conditional pause after 425 basis points (bps) of rate hikes, and the US Federal Reserve (Fed) as it continues with rate increases after 450 bps of hikes. Headline inflation is clearly decelerating more in Canada than the US, but is still far above target. Economic growth is slowing, but labour markets remain robust. It is timely to examine structural trends in inflation and real (inflation-adjusted) interest rates. Surging prices in 2021 and 2022 resulted from cyclical forces, global shocks, policy stimulus, and secular factors. This paper explores the secular drivers putting upward pressure on inflation and real interest rates. Our main theme is that these longer-term, slower-moving factors will create an upward bias to inflation and real rates during 2023-2026 and likely beyond, especially relative to the pre-pandemic era.

Looking first at inflation, 2021 marked a decisive break from the disinflationary forces that dominated the mid-1980s to 2010s as inflation jumped to four-decade highs. Inflation's further rise in 2022 proved even more transformational as ultra-easy monetary policy ended. While headline inflation decelerated during the second half of 2022 and as 2023 began, albeit more clearly in Canada than the US, multiple structural factors constitute ongoing negative supply shocks. They include the end of large-scale labour surpluses worldwide, and regionalism and resiliency supplanting globalization in a range of goods industries. Domestically, structural labour supply weaknesses continue to raise costs. Other adverse supply shocks, such as the increasing

frequency and intensity of climate events, are causing rising secular inflation pressures. Short and medium-term demand factors, including active Canadian fiscal and US industrial policies, are further bolstering pressures.

The shift in savings and investment, and the resulting upward bias to real rates, are fundamental changes globally and in Canada from the 1990s-2010s. Aging populations in advanced economies and China, and the end to excess worldwide savings are crucial secular shifts. Most important, greater public and private sector demand for funds in Canada and globally is projected to boost average real rates this decade. Greater demand for funds reflects surging investment needs to address climate events, military spending, healthcare, and infrastructure requirements. Policy lessons from the side effects of minimal or negative real rates during the pre-pandemic decade and from the wrenching asset pricing adjustment during policy normalization in 2022 merit emphasis.

While monetary policy's role in containing inflation is widely accepted, the crucial impact of monetary policy regimes on interest rates is much less recognized. Bank for International Settlements (BIS) studies show that monetary approaches materially influence real rates, and the financial cycle.<sup>1</sup> The BoC's policy rates decisively shape shorter-term interest rates in Canada, and Fed policy has an outsized and, at times, the dominant influence on Canadian and global long-term rates. The BoC's and Fed's end to the ultra-easy policy since the Great Financial Crisis (GFC) is crucial. If the policy normalization of both is sustained, real rates will likely stay higher during 2023-2026 and beyond.

### 1. MACROECONOMIC POLICY AND INFLATION DURING 2020 - 2022

A brief review of Canadian and US macroeconomic policy during 2020-2022 offers important context for the medium-term inflation and real rates outlook. After actively maintaining ultra-low nominal and minimal/negative real policy rates during the post-GFC decade, the BoC and Fed eased aggressively in early 2020. Huge monetary assistance helped contain the most severe economic contraction since WWII from the onset of COVID-19 and widespread lockdowns. Swift policy rate cuts to near zero plus massive injections of liquidity helped stabilize financial markets, kept credit flowing, and crucially supported business and consumer cash flows and confidence.

Fiscal policy's pivot from a secondary macroeconomic role in the 2010s to the extraordinary stimulus with the onset of the pandemic was also decisive. Like most advanced nations, government support for firms and individuals in Canada and the US soared in 2020. Enormous monetary and fiscal stimulus helped offset much of COVID-19's economic shock, and was essential to the rapid, strong rebound in the second half of 2020.

#### Inflation Returns, Reaching Multi-Decade Highs

By 2021, however, clear and rising price pressures had emerged from (i) extreme supply shocks (COVID-19), (ii) cyclical and policy-driven demand and supply causes, and (iii) secular factors. Together they spurred much higher inflation in 2021. Combined with the Ukraine War's energy and food price shocks, they boosted overall prices even more in the first half of 2022. On the supply side, global production difficulties led to large price hikes for consumer goods and large cost increases for many product inputs. The effects of supply chain disruptions and rising production costs for goods were exacerbated by skilled labour shortages in Canada, the US and Europe.

Massive monetary and fiscal stimulus in 2021 continued despite robust demand for goods. Services demand was constrained and more volatile as pandemic restrictions were re-imposed and then eased multiple times. Yet, after the remaining major COVID-19 restrictions were lifted in 2022, pent-up excess demand for many services overwhelmed supply. Combined with labour supply constraints in a range of service industries, increasing inflation in goods spread to services. Four-decade highs in inflation occurred in the first half of 2022, while wages and wage demands rose.

#### Delayed Normalization of Macroeconomic Policy

Canadian and US fiscal policy failed to adjust to the economy's transition in 2021 to a robust recovery and overheated financial and housing markets. Canada's and US stimulus supporting demand extended far into 2021 despite the merits of focusing on boosting the supply of goods and services, and better-targeted demand stimulus ([Transitioning from the Pandemic](#)). Active Canadian<sup>2</sup> and US fiscal policy continued in 2022, with spending still rising materially, albeit at a slower pace of increase.

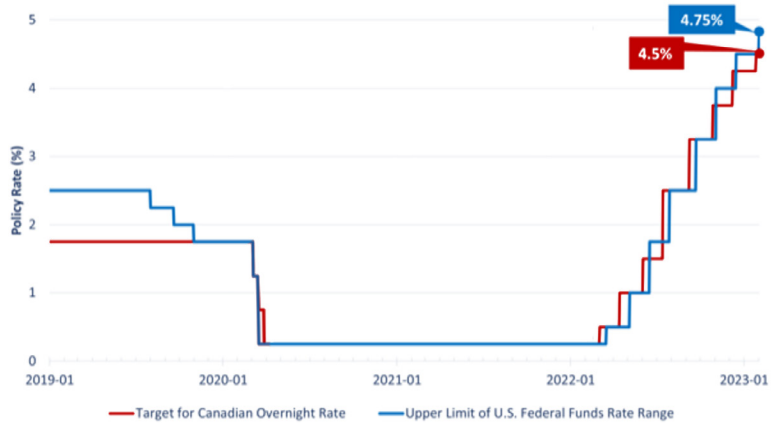
Ultra-loose monetary policy also continued for too long. Delays in normalizing policy arose from the mistaken view that rising inflation in 2021 was temporary and from insufficient focus on surging financial and house prices ([BoC Policy Normalization](#) and [Fed Policy in Transition](#)). The excessive stimulus was evident in Canada's money supply growth, doubling its 20-year trend rate in 2020 and early 2021, while US money supply growth soared at multi-decade highs.<sup>3</sup>

Having been slow to recognize these trends and then too cautious initially in unwinding stimulus, both the BoC and Fed moved to more aggressive policy rate hikes in mid 2022, and started quantitative tightening (QT) at a moderate pace. They shifted rapidly from ultra-easy policy with cumulative hikes

in policy rates of 425+ basis points (bps) [Chart 1] by early 2023. The Fed and BoC consistently provided clear guidance that elevated policy rates would continue until inflation declined materially. Even with the BoC's shift to a conditional pause in rate increases in early 2023 and the Fed's different path for rate hikes, both continued to stress that policy rates would stay higher for longer until inflation slowed sustainably to levels much closer to their targets of 2%.

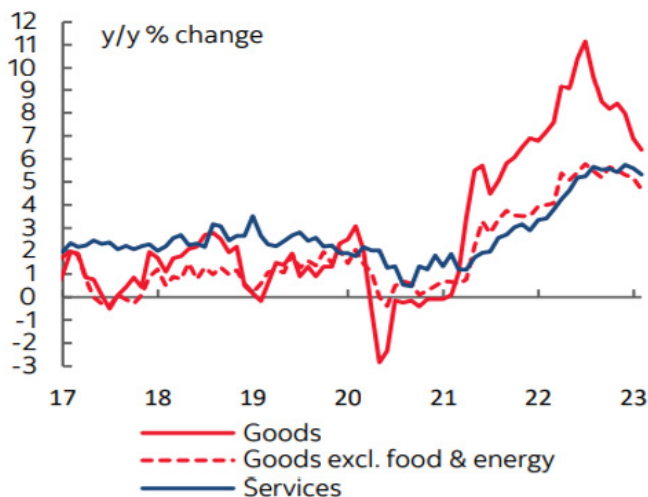
Encouragingly, decelerating goods inflation was evident by late 2022. Oil and gas prices fell back to late 2021 levels and many supply chains unsnarled. Overall inflation in Canada and the US subsided notably from their mid-2022 peaks by year-end, albeit with a mixed picture in the US in early 2023. However, progress in sufficiently containing services inflation and wage demands was slower. [Charts 2&3] Robust labour demand surprised markets and central banks alike through very early 2023 and may depend upon a further economic slowdown this year.

**Chart 1: Bank of Canada and US Federal Reserve Policy Rates**



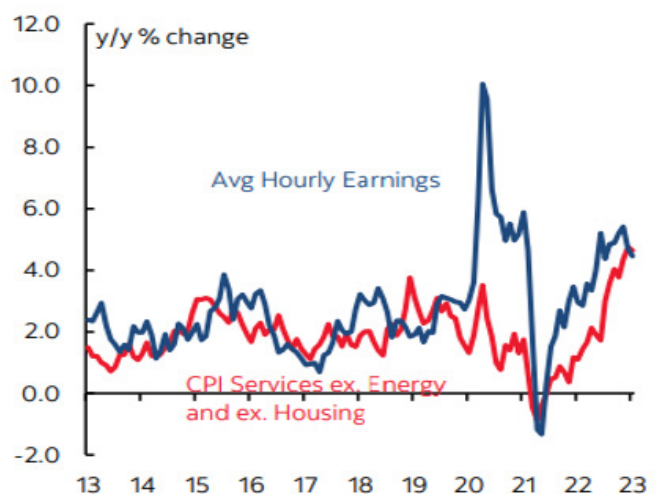
**Source:** Bank of Canada, US Federal Reserve

**Chart 2: Canada: Divergence in Goods vs. Services Inflation**



**Source:** Scotiabank Economics, Statistics Canada

**Chart 3: Canadian Service Inflation vs. Wage Growth**



**Source:** Scotiabank Economics, Bloomberg

The sea change in BoC and Fed policy in 2022 had sweeping effects on the financial cycle, especially the end to the “Fed put” for asset prices and borrowing. Despite the largest bond market losses in many decades and major equity market declines last year, the Fed did not intervene to assist asset prices. It reversed its post-GFC approach of reacting quickly and decisively to financial market declines while moving slowly and much less actively when elevated market levels and robust conditions occurred.<sup>4</sup> The end of Fed-supported asset prices and ultra-low borrowing costs for housing marked a turning point in the financial cycle.

## 2. KEY GLOBAL AND DOMESTIC SOURCES OF DISINFLATION DIMINISH OR REVERSE

### Supply Shocks: Moving from an Abundance of Cheap Goods to Upward Price Risks

Distinguishing among the (i) shocks, policy, and cyclical causes of inflation and (ii) structural sources of upward inflation pressure this decade is vital. Cyclical and other short-term factors led to slowing overall inflation in late 2022, with further declines in Canada at the start of 2023 and more mixed price data in the US. Yet, a series of secular forces is creating an upward bias to inflation this decade.

Understanding these slower-moving structural factors is important, given the view in mainstream economics that monetary policy independence was the dominant factor in achieving sustained low inflation from the 1990s through the 2010s. While significant, and clearly beneficial in designing and implementing policy, increased central bank independence from the early 1990s onward was not the decisive factor in disinflation.<sup>5</sup>

Instead, positive supply-side shocks were crucial. The combination of progress in and adoption of technology, rapidly increasing globalization of many goods’ production, and the excess supply of labour worldwide led to large declines in inflation from the mid-1980s onward. These factors caused and sustained disinflation after the Volcker-led Fed’s monetary discipline in the early 1980s reversed the high inflation era of the 1970s. They underpinned the Great Moderation<sup>6</sup> era of low inflation from the mid-1980s until 2007 and subsequent ultra-low inflation in the 2010s.

### Reversal of Excess Labour Supply

In stark contrast to the past three decades, recent years have seen the reversal of the global excess labour supply as well as partial deglobalization in a range of goods.<sup>7</sup>

As the seminal work of Goodhart and Pradhan shows,<sup>8</sup> the global excess supply of labour was central to the disinflation of the 1990s to 2010s. The “effective labour supply force for the world’s advanced trading system more than doubled” during 1991-2018. This surge was led by China, where growth in the working-age population added over 240 million people to the potential world labour supply, four times greater than the combined contributions of Europe and the US in the same period. Adding China’s huge workforce dramatically expanded the already large-scale increase in the effective world labour supply that followed the Soviet Union’s collapse and integration of Eastern Europe into the global trading system.

The reality in recent years is that these positive growth and disinflation shocks in the global labour supply have reversed.<sup>9</sup> China’s working age population is declining, and the internal migration from rural to urban/industrial zones that underpinned the staggering jump in its labour force no longer provides a net benefit. No massive

additions to the world's eligible workforce, akin to Eastern Europe's inclusion in the global trading system are underway, while other factors such as increased female participation in the workforce have slowed dramatically. Moreover, the baby boom-driven increase in workers in advanced economies from the mid-1960s through the 2000s is now having the reverse effects with its retirement wave.

### **Partial Deglobalization: Near-shoring and Re-shoring**

Accelerating globalization of production and trade during the 1990s to 2010s amplified the enormous positive shocks from the rising global labour supply. China's accession to the World Trade Organization in 2001 was particularly important in this regard. Globalization reduced real wages in advanced economies directly through actual shifts of production from these countries to Asia and Eastern Europe, and indirectly through the potential to do so. Combined with the world's excess supply of labour, globalization sharply reduced labour's bargaining power in advanced economies, suppressing real wages for unskilled and semi-skilled labour.<sup>10</sup> It also led to unskilled and semi-skilled labour's share of national income falling relative to skilled labour, capital and profits in these countries.

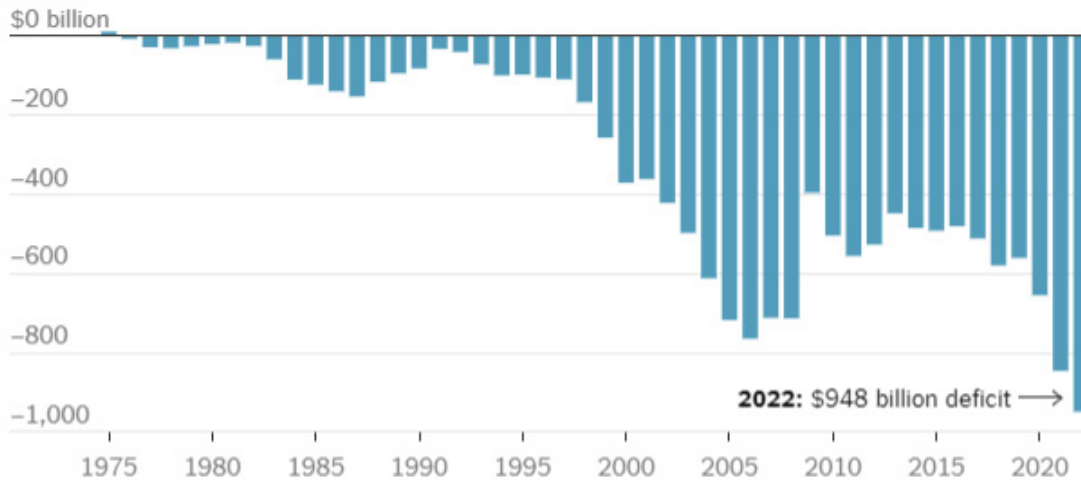
The rise of globalization in goods and services was crucially dependent upon the dominance of neoliberal policy from the 1980s until the GFC. Neoliberalism's "light-touch" regulation,

and other policies fostered and sustained the international freedom of movement of capital, goods and services.<sup>11</sup> However, the retreat of neoliberalism began with the GFC, increased with the Trump Administration and Brexit in 2016, and accelerated strongly with pandemic-driven supply chain problems and the war in Ukraine. Global trade and finance have experienced disorderly episodes, partial deglobalization, and growing concern about neoliberalism's distributional impacts.<sup>12</sup>

The strong US political consensus around strategic competition with China reinforces this trend away from neoliberalism. It is reflected in the fundamental US shift to active industrial policy through "friend-shoring," "re-shoring" and other major initiatives. The US government's funding support is facilitating decoupling in technology, pharmaceuticals, energy, critical minerals and other strategic goods sectors as are its increasing investment and trade barriers with China and Russia including pressure on European and Asian allies to erect similar restrictions. US initiatives are spurring new production facilities and private capital investment in the US, Canada and other advanced "friendly" economies, and in selected "friendly" emerging economies. Re-shoring and near-shoring will boost costs and prices as efficiency is partly supplanted by national security and industrial policy in various industries through the mid-2020s.

Admittedly, the impact on globalization of the rise of US industrial policy and neoliberalism's retreat in recent years should not be overstated.<sup>13</sup>



**Chart 4: US Goods and Services Trade Deficit Reaches New Peak**

Note: Goods and services, seasonally adjusted, not adjusted for inflation • Source: U.S. Census

Source: New York Times

Globalization's ongoing effects are evident in the rising volume of international trade in goods overall since the GFC and the increasing US trade deficit in goods and services [Chart 4]. Trade in services continues to rise, with its increase accelerating during the pandemic, notably in digital services and data. Yet, the stalling or partial unwinding of globalization in various goods sectors is reversing the disinflationary impacts of these product prices that were so dominant during the 1980s-2010s.

### Increasing Resiliency and Redundancy

The combination of firms addressing supply chain vulnerabilities, pursuing greater resilience, and US policy initiatives are shifting corporate investment and management approaches. Diversification of supply sources and building capacity buffers with redundancies are evident in a range of industries.<sup>14</sup> Prominent examples include electric vehicles, rare earth minerals and semi-conductors globally, and energy supplies in Europe. This trend is spreading across other sectors. While China remains a major global parts supplier, American and European car manufacturers have begun a concerted effort to reduce their reliance on Chinese components. Ninety-two percent of global supply chain executives polled in a 2021 McKinsey survey had

started increasing their supply chain redundancies and making them more local and regional. US trade data for 2022 show notable signs of these shifts with the decline in China's share and the rise in deficits with a range of "friendly" trading partners.<sup>15</sup> More resiliency and redundancy will increase the capacity to weather geopolitical, health, weather, and other disruptions. Yet, higher costs will also result.

### Climate Change Pressures

The increasing occurrence of extreme heat events, droughts and floods already this decade is a further source of negative supply shocks. The reality of more frequent and intense weather events was demonstrated again in 2022.<sup>16</sup> For the second straight year, drought substantially increased grain and other food prices from lower US crop sizes, and hampered transportation systems (e.g., the Mississippi River's low level). Drought and extreme heat in 2022 caused European renewable energy supplies to plunge. Low water and wind levels materially increased Europe's cost and supply pressures that were already severe with Russia's sharp curtailment of natural gas supplies. A crippling heat wave in China during mid-2022 seriously disrupted supply chains, decreased crop yields, and caused energy supply shortfalls.

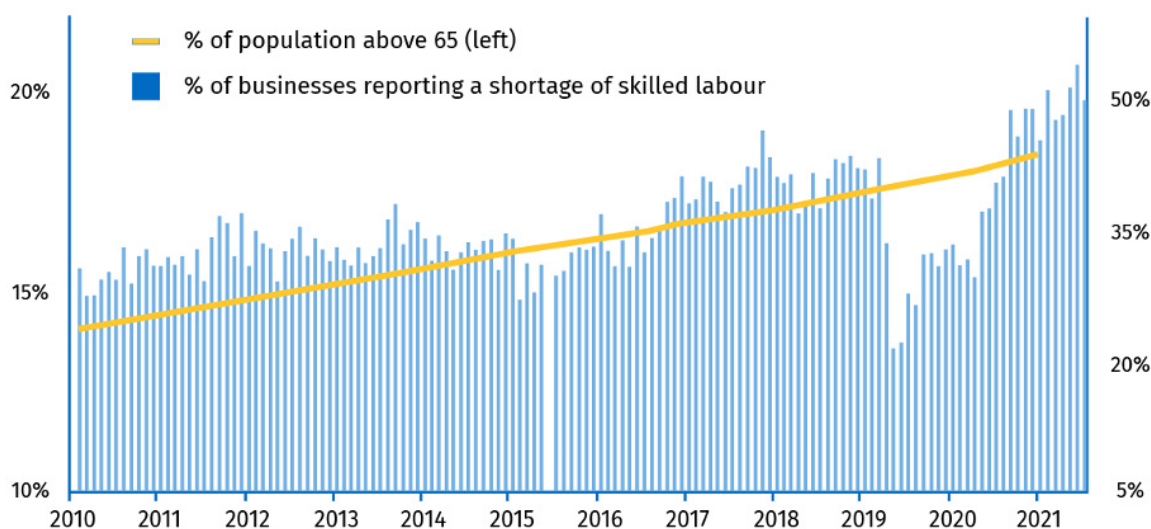
Much greater investment in climate change mitigation and adaptation could lessen future cost and price vulnerability arising from extreme weather events. Yet, there are significant time lags before such capital spending takes effect, and serious uncertainty about whether sufficient investment will occur. The costs of various goods and services necessary for climate change mitigation and adaptation may also boost inflation until they are truly at scale. In sum, extreme weather events will add secular upward pressure on inflation, albeit in uncertain fashion in terms of the timing and magnitudes.

### Canada's Labour Supply Pressures

One of the many economic surprises that occurred during COVID-19 was the decline in Canada's labour supply growth and the shortages that continue in an array of work, whether it is unskilled, semi or highly skilled. Multiple factors led to this inadequate supply starting with the drop in immigration in 2020 and the very generous income transfers from governments to individuals during 2020-2021 that helped cushion the effects of job losses or sharply curtailed work hours.

Structural problems that started well before COVID-19 will constrain Canada's labour supply this decade. Secular declines in the share of population actively working or looking for work started in the 2010s when the post-WWII baby boom generation began reaching retirement age [Chart 5]. Canada is only part way through this demographic shift. Labour force participation rates are projected to

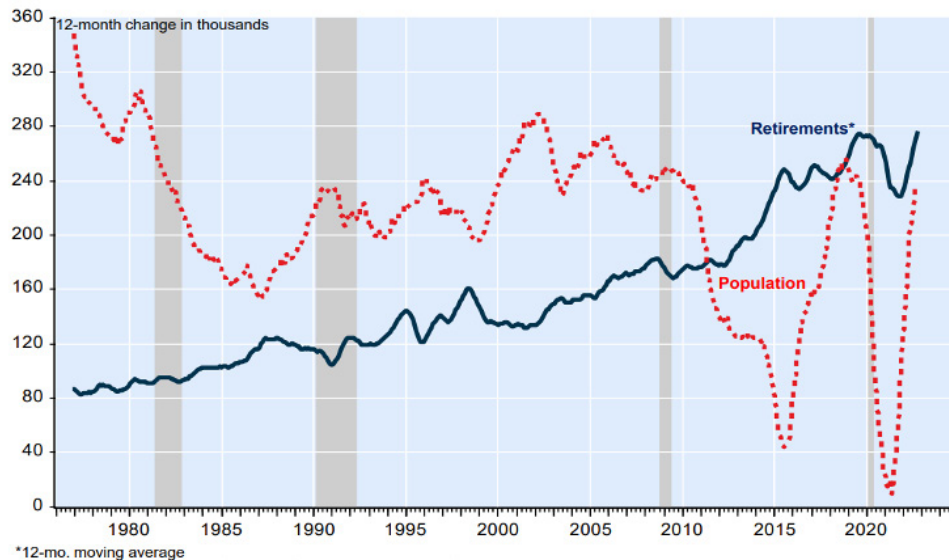
**Chart 5: Aging Population Tightening Labour Squeeze in Canada**



**Source:** Statistics Canada, Canadian Federation of Independent Business, RBC Economics

**Chart 6: New Retirements Exceed Growth in Working-age Population**

Job leavers that left the labour force in the previous 12 months for retirement vs. population aged 15-64



**Source:** National Bank Financial

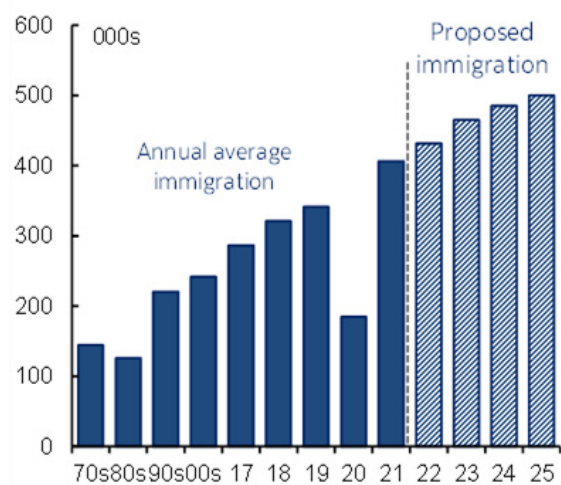
decline by 2029 to levels last seen in the 1970s, and new retirements are outpacing growth in Canada's working-age population<sup>17</sup> [Chart 6]. Shortages are particularly pronounced for workers with skills in science, technology, engineering and mathematics (STEM), digital, and construction. These long predated the pandemic,<sup>18</sup> and are projected to continue through the 2020s.

There are important mitigating factors helping to improve Canada's future labour supply. Affordable national child care should help sustain and may increase female participation in the workforce over time. Rising immigration levels from already high levels will be important in boosting Canada's labour supply this decade [Chart 7].

Yet, much-increased immigration, while a necessary condition to increase Canada's labour supply, is not sufficient on its own to address the shortage of workers overall.<sup>19</sup> Bolstering immigrant workers' language skills and addressing barriers to recognition of their credentials and experience are vital to realize the full supply benefits of foreign labour sources. Enhancing the supply of domestic labour entrants with digital and STEM skills, and in the skilled trades, will also be

critical to bridging supply gaps. Adverse trends in Canada's business capital investment overall, and per worker, since 2015 will need to turn around significantly to materially enhance the supply of skilled workers and raise their productivity.

**Chart 7: Rising Immigration for Canada**



**Source:** Scotiabank Economics, Statistics Canada, Ministry of Immigration, Refugees & Citizenship Canada



## Positive Demand Shocks

From a cyclical perspective, Canada's economic deceleration in the second half of 2022, and further slowing expected in 2023, should help reduce excess labour demand in the near term. Yet, two secular factors are increasing Canadian and US labour demand versus the pre-pandemic era.

One is activist fiscal policy in Canada and the US. Fiscal assistance, while extraordinary during the GFC, was much smaller in scale than during 2020 and 2021. Moreover, in the US and Europe, a significant share of fiscal support during the GFC was in backstopping the financial system. The five years after the GFC were also characterized by fiscal restraint in Canada, more restraint in the US, and even greater restraint or fiscal austerity in Europe. In contrast, the fiscal stances during the pandemic involved much greater initial support for individuals and huge subsequent stimulus relative to the GFC.

During 2020-2021, fiscal programs in Canada and the US also focused on better distribution of incomes and benefits. These Canadian and American initiatives had strong social equity merits but also increased demand relative to supply. Ongoing social equity programs will also likely help keep consumption at higher average levels throughout the current economic cycle. In addition, although overall fiscal demand stimulus lessened in 2022, the US industrial policy's generous fiscal initiatives since late 2021 have been enormous through the Infrastructure Act, CHIPS Act and Inflation Reduction Act. The stimulus to domestic and foreign investment in the US has already been large and will likely continue to boost investment and hiring in North America.

For Canada, the demand boost from immigration is too often little recognized. This demand increase occurs immediately upon newcomers' arrival, unlike the rise in the labour supply that can lag and/or be partial initially given the workforce integration barriers. Canada's immigration exceeded 400,000 permanent residents in 2021 and 2022, up from 260,000 in 2015. With further increases planned for 2023-2025, immigration will raise consumption of goods and services already subject to cost and availability strains (e.g., housing, medical care, transit) as well as those of other products on an ongoing basis, increasing the demand for workers and adding to labour market pressures.

## Outlook: 2% Inflation Will Be Tougher to Achieve Apart from Economic Slowdowns

This combination of global and domestic factors may prolong the time to achieve 2% inflation in 2023-2024. Our analysis suggests a bias to Canadian and US inflation being in the upper half of the 1-3% band during the mid-2020s. It will also likely make it tougher to stay at the 2% inflation rate barring sustained economic growth well below potential.

Importantly, some major factors will constrain inflation. The most significant of these is technology. It remains largely and importantly disinflationary with its advances and adoption, especially in the potential future impacts of artificial intelligence (AI), particularly generative AI, as well as quantum computing and 3D printing. Yet, the combination of other secular factors (see table) will provide an upward bias to inflation other than during significant economic slowdowns or recessions. Other drivers, such as adverse climate events, will exert upward pressures irrespective of the economic cycle.

## Selected Structural Forces Influencing Inflation

Secular Factor	Impact during 1990s – 2010s	2020s' Impact
Technology	Major Downward Pressure	Continues
Global Labour Supply	Huge Excess: Major Downward Pressure	Upward as Excess Ends
Globalization	Transformational Downward Pressure	Mixed: Partial Reversal
Climate Change	Modest Upward but Increasing by 2010s	Increasing Upward
Domestic Labour Supply	Shifts to Retirement wave by 2010s	Increasing Upward
Immigration	Rising levels throughout: net downward	Mixed: Net Upward
Fiscal Policy	Constrained Spending excluding GFC	Upward

## 3. FUNDAMENTAL SHIFTS IN GLOBAL AND DOMESTIC SAVINGS-INVESTMENT BALANCES

### Sharp Declines in Real Yields during the Pre-Pandemic Era

A brief review of real yields during the 1992-2019 disinflation era provides useful perspective for secular changes in savings and investment shaping the 2020s.

Long-term real yields plunged by 350 bps during the three decades before the pandemic. There were two phases to this fall in real rates. The initial phase of 1992-2006 saw a decline of about 150 bps, while the second during 2007-2019 witnessed an even greater fall of 200 bps. Two competing narratives describe this disinflation era's two phases. One cites the "global savings glut" during 1992-2006, whereby excess savings arose from inadequate consumption to absorb available supply.<sup>20</sup> This narrative highlights the role of capital exports from countries with large and rapidly increasing current account surpluses starting with Japan and South Korea, and then with the Middle East's recycling of petrodollars. Global savings outside the US and Europe were further boosted by the massive increase in China's current account surpluses and domestic savings. Current account surpluses in Asia were also increased by strategies to sustain

*de facto* currency pegs. These strategies generated huge US\$ holdings that enabled central banks and sovereign wealth funds to buy vast amounts of US Treasuries given these institutions' strong preference for liquidity and safety.

In contrast, the competing narrative emphasizes the sharp decline in investment. The GFC and post-GFC decade witnessed a large-size plunge in US domestic investment and the significant drop in the demand for funds. Leading explanations for the resulting fall in long-term real yields during 2007-2019 included the secular stagnation thesis given this period's low levels of business and government capital spending.<sup>21</sup> Explanations of the decline in US domestic investment during the post-GFC decade include the far smaller requirements for new plant and equipment of technology growth companies, relative to manufacturing firms and commodity producers. Soaring stock buybacks and dividend payouts, given ultra-low policy rates and bond yields, and favourable tax rates also contributed. Other analyses, including a study of US investment during 1970-2004, showed lesser capital spending to be a longer-term trend.<sup>22</sup> Both the secular stagnation thesis and multi-decade analyses emphasized that the fall in US domestic investment swamped savings trends, resulting in much lower long-term real yields.

## Supply and Demand for Funds during the Pandemic

Our approach to real rate trends in the 2020s starts with the surge in public and private debt worldwide and in Canada in the pre-pandemic era. The rise of debt globally before the pandemic was immense. Very high debt levels meant that soaring government borrowing to fund the extraordinary fiscal stimulus of Canada and the US [Chart 8] and other developed economies in 2020 and 2021 occurred on top of already large funding needs before COVID-19.

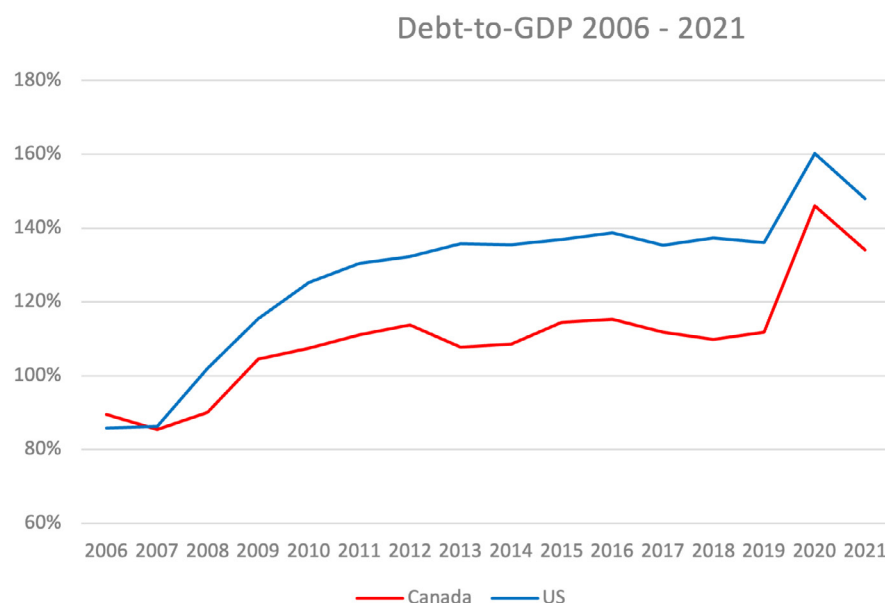
Yet, central banks' gigantic supply of funds through quantitative easing (QE) more than matched the surging demand for funds from the public sector. Enormous buying of their respective governments' debt by the BoC, the Fed, the European Central Bank (ECB), and the Bank of England was crucial in alleviating the pandemic's emergency phase for financial markets in March-April 2020. These central banks' QE policy shifted from crisis support to ongoing monetary stimulus from mid-2020

through late 2021. The sheer scale of their respective programs absorbed the huge additional public debt issuance during this time. QE helped keep real rates at ultra-low and/or negative levels, and diverted investment by private, sovereign and other investor flows to other assets in 2020 and 2021. In summary, central bank buying of government debt sharply reduced the importance of other savings in determining real rates during the pandemic.

QE also bought time for the funding needs of governments to decline sharply as economies improved, tax revenues recovered, and social safety net spending dropped. Large government revenue windfalls from the rapid growth rebound from the second half of 2020 onward, and the jump in inflation during 2021 and 2022, substantially reduced Canadian and US public sector borrowing.

As 2023 unfolds, however, various factors will weigh upon Canadian and American public sector balances. These include less economic growth, and the automatic upward rebasing of tax brackets and

**Chart 8:** Canada and US Gross General Government Debt to GDP



**Source:** OECD, Gross general debt of government as a percentage of GDP.

social benefits for inflation. Much higher interest rates will boost government borrowing costs. The supply of, and demand for, public sector debt will also be affected by the increasing impacts of QT. Both the BoC's and the Fed's QT began modestly in mid-2022 and became more substantive by late 2022. The amount of QT is scheduled to be greater still in 2023 and 2024. This makes the pace and magnitude of declines in the BoC's and Fed holdings of government debt important versus the trend in government borrowing. Through very early 2023, the speed and size of the BoC and Fed's reduction in government debt holdings occurred at a lesser pace than the decline in public sector issuance (demand for funds). Thus far, QT has been gradual and less-than-disruptive for debt markets in Canada<sup>23</sup> and in the US.

### Longer-Term Drivers of Savings and Investment

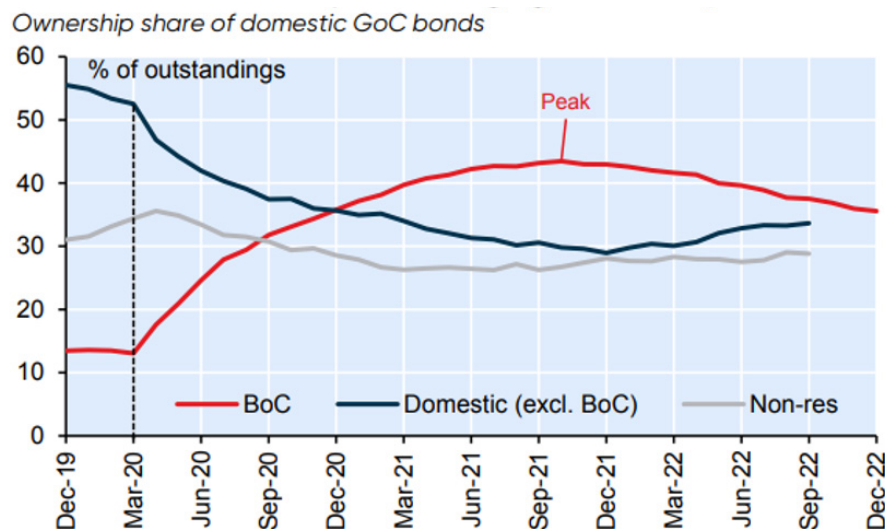
As central banks' QT normalizes their balance sheets, savings, and investment flows from other domestic sources and foreign investors are increasingly important<sup>24</sup> [Chart 9]. They will be even more significant as 2023 unfolds and beyond. The BoC's and Fed's balance sheet normalization makes

the classical economics view of capital markets equilibrium relevant again whereby long-term real interest rates are primarily determined by secular trends in savings and investment.<sup>25</sup>

Our narrative framework and focused analysis of long-term real interest rates highlight changes in several secular factors fundamentally altering the trends in global and domestic savings and investment this decade. We look at underlying shifts in the 2020s for savings and investment<sup>26</sup> relative to the 1990s to 2010s. Assessing these factors involves numerous aspects,<sup>27</sup> and our approach is neither all-encompassing nor exhaustive in its depth in examining long-term drivers of real rates. For example, our analysis does not examine the effect of potential long-term economic growth and equilibrium real interest rates. Various studies show that long-term growth is not the dominant factor determining long-term interest rates.<sup>28</sup>

Our approach emphasizes the demographic impacts on global and domestic savings, and, particularly, the multiple sources creating a strong upward bias to investment demand. In our framework, the combination of demographic pressures on

**Chart 9: Bank of Canada Ownership of Government of Canada Bonds**



**Source:** National Bank Financial, Bank of Canada

savings and the multiple crises necessitating huge investment outlays this decade will likely lead to higher average real yields in 2023-2026 and potentially beyond.

### Global and Domestic Demographics Reshape Savings Trends

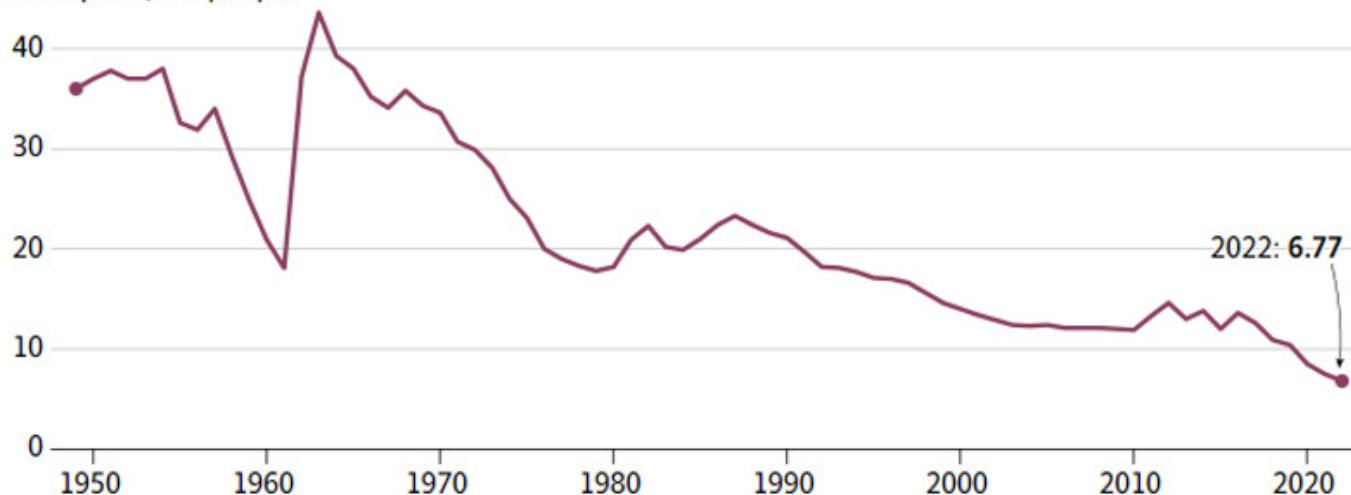
The favourable dependency ratio in advanced economies was a crucial contributor to excess global savings in the pre-pandemic era.<sup>29</sup> The dependency ratio refers to the number of people not in the workforce (defined as people aged 0-14 and 65+) relative to the number of workers (defined as people aged 15-64). This ratio's importance arises from people under 15 years old not contributing to savings and from most of those aged 65+ reducing savings. During 1970-2010, the number of dependents relative to workers fell as birth rates declined, and baby boomers had not yet begun to retire. The dependency ratio improved substantially and bolstered savings significantly.

The wave of baby boomer retirements began in the 2010s and will rise further in advanced economies through the 2020s, especially versus the number of workers. The growing wave of retirees in the US and Europe will reduce total savings from the increasing dependency ratio.<sup>30</sup> While Canada's outlook is better given its large immigration inflows, its rapidly increasing number of retirees will also pressure savings.

China's lesser future role in the supply of global savings is also critical. China's capital exports loomed large during the 2000s through 2015, and its current account surplus is still the highest in absolute terms in the world (Germany is second, Japan third). The sharp slowdown in China's rural-to-urban migration combined with increasing longevity and a rising dependency ratio is materially decreasing China's savings trend.<sup>31</sup> China's population declined in 2022, its elderly population share is rising, and its working-age population has peaked.<sup>32</sup> Last year was the first time since the 1960s that the number of births was less than the number of deaths [Chart 10]. The number of Chinese over 65 is projected to increase from almost 15% of its population in 2022 to over 25% by 2035. Its working

**Chart 10: China's Annual Birth Rate's Decelerating Trend**

Births per 1,000 people



**Source:** Reuters, Globe and Mail



age population is estimated to fall to 766 million in 2040 from 880 million in 2023 [Chart 11]. Rising domestic consumption – also a policy priority for the Chinese government despite the challenges in reducing the economy’s dependence on investment and exports -- is expected to reinforce dissaving. The ongoing shift of manufacturing to lower-wage countries and the industrial policy and investment restrictions of the US and increasingly Europe on Chinese firms in various sectors will further alter China’s significance in global savings and future capital exports.

### The Turnaround in Global and Domestic Investment Demand

Turning to the medium and long-term outlook for investment, the occurrence of multiple crises simultaneously in the early 2020s has led to a “polycrisis”<sup>33</sup> in advanced economies. The systemic shocks of COVID-19 and then the Ukraine War piled on to existential problems (climate change) and severe, longstanding weaknesses (healthcare system capacity and resiliency) to generate overlapping crises reinforcing each other. The resulting polycrisis has structurally altered the investment outlook for the 2020s.

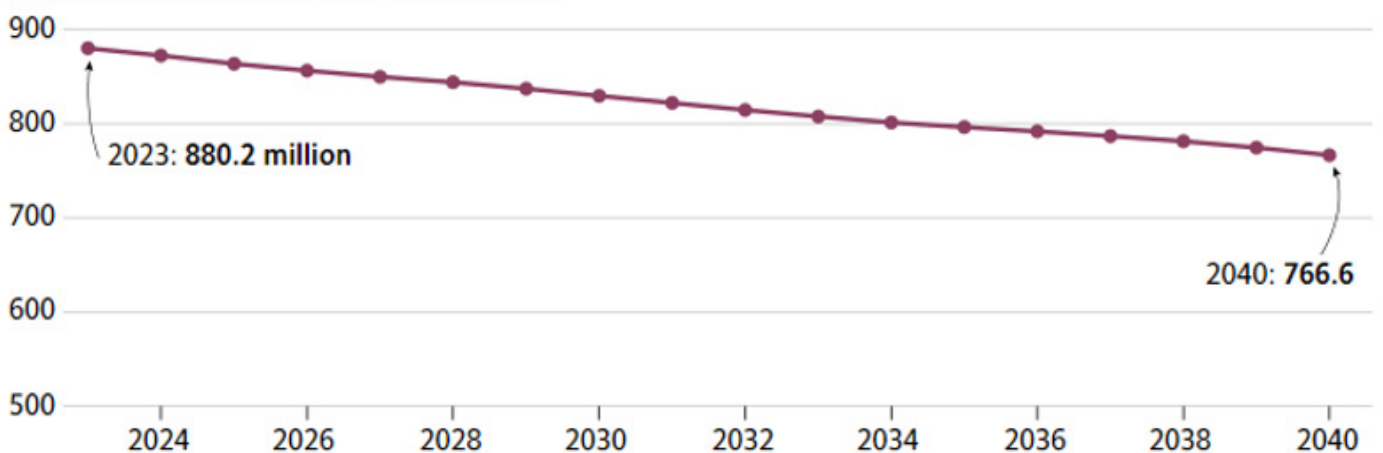
Extraordinary increases in government outlays and investments have already occurred in response to the seismic shift in defense risks arising from Russia’s invasion of Ukraine and mounting security concerns in Asia given China’s initiatives. Much greater spending and investment outlays will be needed to meet these rising challenges to military and energy security. These large-scale expenditures and capital spending will be on top of those required to address climate change mitigation and adaptation, restore healthcare resiliency, and increase and enhance critical infrastructure. Despite uncertainty about the scale and timing of public and private investment in these areas, their combined funding needs are creating an upward bias to real rates this decade.

### Military Spending and Future Reconstruction of Ukraine

Russia’s invasion of Ukraine and increasing US-China tensions over Taiwan and the South/East China Seas have transformed defense spending in Europe and Asia.<sup>34</sup> Representative examples include Germany’s pledge to increase military spending by US\$100 billion, and the commitment of Japan to boost its current defense expenditures 1.5 times for a total

**Chart 11:** China's Projected Working-age Population Declines

Millions of people in the 18-to-60 age group



**Source:** Reuters, Globe and Mail

over the next five years of \$318 billion. Large-scale increases in military outlays elsewhere in Europe will raise government spending on average by almost 1.0% of Gross Domestic Product (GDP). There is also a huge and rising future investment needed to rebuild Ukraine as that war continues.<sup>35</sup>

Canada's need for greater military outlays is also sizable. To meet its NATO obligations, defense spending would need to rise from 1.45% to 2.0% of Gross Domestic Product (GDP). For example, reaching this target by 2027 using 2022 GDP figures would require total outlays over the next five years of more than \$40 billion, an average of at least \$8 billion annually. This figure understates the total investment required to upgrade Canada's planes, ships, submarines, tanks and other military equipment (given their current state of repair and readiness).<sup>36</sup> Additional investments are needed to address growing threats to Canada's arctic sovereignty and expanding cyber-security risks.

### Meeting Energy Security & Climate Change Mitigation & Adaptation Needs

European and UK governments have made major investments to diversify energy sources beyond their enormous spending increases to subsidize individual and business energy costs in 2022 and 2023. This capital spending includes funding liquefied natural gas terminals, storage facilities, renewable power installations, and nuclear facilities. These investments will add to the substantial new public sector debt for the energy cost subsidies incurred in 2022 and continuing in 2023.

Fiscal outlays to mitigate price shocks and increase energy security, apart from renewable power installations, do not address the urgent need for greater and more effective climate change adaptation and mitigation. (Indeed, they may work at cross purposes when short-term energy needs lead to increasing coal use, such as in 2022.) While the split between the public sector and business

will vary by country, estimates range from 0.6% to 0.9% of global GDP for the combined higher investment by firms and governments worldwide to achieve net zero by 2050.<sup>37</sup>

### Improving Healthcare Systems and Upgrading Infrastructure

COVID-19 seriously exacerbated existing healthcare weaknesses and revealed major new deficiencies in Canada, the UK, US, and selected other advanced economies. Inadequate capacity to handle surges in hospitalizations, and to provide other critical medical services, during the pandemic showed the need for many more healthcare workers, and more and better medical infrastructure.

The requirement for large-scale new investments and much-increased outlays in Canada is growing rapidly. Aging populations have led to increasing strains on healthcare for more than a decade now.<sup>38</sup> Canada spends barely 1.3% of GDP on long-term care and homecare for the elderly -- well below the OECD average of 1.7% -- and its very modest support for homecare is a fraction of what most other OECD countries provide. The cost estimate for Canada, just to meet the international standard of 8.2 caregivers per 100 seniors, would be at least \$9 billion annually. Other major future healthcare spending needs include those to address structural shortages in family doctors, nurses, and personal support workers. Funding alone is also not sufficient. More money must be combined with better working conditions and other key non-financial supports.

Infrastructure spending in North America has significantly lagged behind growing populations, particularly in the US, where there are major gaps resulting from overdue maintenance and insufficient repairs. Despite Canada's better general condition of infrastructure relative to the US, it is facing severe strains from its transit and other transportation systems not keeping

pace with operating and maintenance needs and the need for new investments in most of its major urban and regional areas. Canada has long lagged behind its peer countries in investments in energy, transportation, and utilities infrastructure. Conservative estimates of Canada's infrastructure gap before the pandemic, ranged from \$50 billion to \$123 billion,<sup>39</sup> and these did not reflect Canada's inadequate outlays on digital infrastructure. Population growth will add substantially to these pressures on Canada's physical and digital infrastructure in the rest of this decade.

### A Return to Large-Size Business Capital Spending

Various studies have documented Canada's lagging business investment since 2015. Canadian business capital spending has fallen behind US levels, with significant under-investment overall and per worker.<sup>40</sup>

Increased future business investment in Canada, with its resulting rise in the demand for funds, however, is expected to arise from multiple sources. One is the strong drive for greater energy security, led by Europe, that creates robust export opportunities for Canadian and US energy producers. Having focused upon dividend payouts and stock buybacks in 2021 and 2022, various major Canadian energy firms have capital spending plans that, taken together, will lead to multi-billion dollar increases in 2023 and likely beyond.<sup>41</sup>

Other factors supporting higher business investment in the 2020s include US industrial policy and corporations' desire to diversify supply sources and improve operational resiliency. Near-shoring and re-shoring are already leading to significant electric vehicle, semi-conductor, and other new manufacturing investments in North America and Europe. Climate change mitigation and adaptation will also drive firms' operational and capital outlays, given the business opportunities and benefits of minimizing energy costs.

Further boosts to private sector capital spending are projected from greater investment in workers. Capital deepening by firms investing in labour force training, retraining, technology, and other equipment reflects scarcer supplies of labour overall in advanced economies, and inadequate supplies of STEM, skilled trades, and digital workers.

### Upward Pressures on Long-Term Real Rates

Greater government outlays to address the polycrisis in advanced economies, and the drivers pushing corporate investment will likely lead to much larger projected borrowing by the public and private sectors through at least the mid-2020s. Together with aging populations reducing savings rates in advanced economies and China, real rates of 0-1.0% are too low in our assessment. Misallocated investments and excessive risk-taking in the post-GFC decade reflected minimal/negative Canadian and US real rates during the 2010s. Canada has experienced multiple periods of house price surges when real rates were too low, including 2015-2017 and early 2020-early 2022.<sup>42</sup> The wrenching adjustment in financial and housing markets in 2022 to policy normalization again demonstrated the effects of real and nominal rates that were too low previously.

In our view, real policy rates should be in the range of 1.0-2.0%.<sup>43</sup> A real policy rate of 1.0-2.0% would reflect the lessons from the (i) side effects of ultra-low real rates during the 2010s, (ii) re-pricing of asset markets in 2022, and (iii) investment needed to address the polycrisis.

## 4. MONETARY POLICY NORMALIZATION AND OPEN QUESTIONS

Structural factors putting upward pressure on inflation and real rates this decade add to the range of issues facing the BoC and the Fed, given their most aggressive rate hiking campaigns in decades. There is significant uncertainty regarding

the lagged impacts of 425 bps (BoC) and 450 bps (the Fed) of rate hikes by early March 2023. Despite lower headline inflation, overall Consumer Price Index (CPI) and core price increases are still far above-desired levels, and excess labour demand continues.

The BoC's and Fed's forward guidance has consistently reinforced their priority of reducing inflation since mid-2022. Each has made it clear that declines in policy rates should not be expected until there are sustained reductions in inflation to levels near the 2% target rate and the large excess labour demand has ended. Both have done so while acknowledging the effects of monetary tightening and the risks of a greater-than-forecast slowdown. Their efforts reflect the importance of re-establishing strong monetary policy credibility in subduing inflation and the risks of too-rapid-a-rebound in financial conditions given excess price and jobs momentum through very early 2023.

From a policy perspective, the goal of appropriate monetary tightening is achieved when interest rates and QT are sufficiently restrictive to fundamentally reverse inflation's excessive path without triggering a prolonged and undue economic contraction. Public statements of the BoC and Fed rightly stress caution in determining when this desired policy setting has been achieved. Their stance reflects the uncertainty over the lags and ultimate impacts of tightening in 2022 and the serious problems of models in estimating growth, inflation, and jobs during 2020-2022. Additional uncertainties include major international risks of potential new supply shocks, such as the ongoing Ukraine War, especially if there is an escalation in that conflict.

Other difficulties include the intense debate among practitioners and academics regarding whether nominal and real policy rates in early 2023 are where they need to be to subdue inflation. Choosing the best indicator of inflation is difficult, as is gauging inflation expectations with precision

or certainty. Expectations of future inflation, and thus the level of real rates, differ among the core segments of consumers, business, and financial markets, further complicating the choice of policy rate level to bring overall price rises back to target. Issues surrounding indicators of inflation and expectations, and the uncertainty in measuring output gaps, given the potential for large future revisions to data, heighten these challenges.

### Neutral Rate Concept and Benchmark

Another approach is to assess the current setting and peak policy rate relative to the neutral rate. This concept merits closer examination as it is used by central banks and many mainstream economists. The neutral rate is the equilibrium rate that would prevail when the inflation rate returns to its policy target and the economy's actual output is at its potential output.<sup>44</sup> It is composed of the target rate for inflation and the optimal policy real rate known as  $r^*$ , the rate after inflation consistent with the stable economic conditions of output being at its potential. In theory, the neutral rate's value arises as a gauge of the relative tightness or ease of the current policy stance and as the desired benchmark for future policy rates once normalization is completed.

The BoC views the neutral rate as "a medium-to long-run concept that evolves in response to slow-moving foreign and domestic factors, including demographic trends, the rate of technological progress and secular shifts in the level of macroeconomic risk."<sup>45</sup> Various annual BoC studies have attempted to gauge Canada's neutral rate, with its 2022 estimate raising this rate by 25 basis points (bps) to the 2.0-3.0% range.<sup>46</sup> Given the BoC's inflation target of 2%, this estimate implies an average 0-1.0% real policy rate or  $r^*$  level.

Accurately determining the neutral policy rate and where current policy is versus its optimal ongoing setting is a formidable challenge for central banks.

Measuring and tracking the neutral interest rate is problematic.<sup>47</sup> Estimates “are highly uncertain, strongly model-dependent, and subject to large revisions.” They are decisively shaped by the underlying assumptions and model used, and the division in conceptual and empirical approaches is noteworthy. Mainstream economics sees neutral real rates as the equilibrium rates where the desired supply of savings matches the demand for investment. In contrast, financial cycle policy advocates view monetary regimes as the leading determinant of neutral rates.<sup>48</sup> The potential for major future data revisions complicates and lessens confidence in estimates of the output gap.

For our purposes, using the neutral rate as a guide for policy in 2023 and beyond faces additional issues. As an array of analysts and the BoC have explained, central bank models, as well as those of most academic and other forecasters, did not accurately gauge demand and supply during 2020-2022.<sup>49</sup> The reality is that complexity, ambiguity, volatility, and uncertainty seriously hampered models’ accuracy before and during COVID-19. Secular factors creating an upward bias to inflation and real rates this decade are also problematic for gauging and using the neutral rate to assess current policy and in determining the optimal policy setting after the peak in policy rate hikes is reached.

**Chart 12: Dramatic Reversal in Negative Yielding Debt**



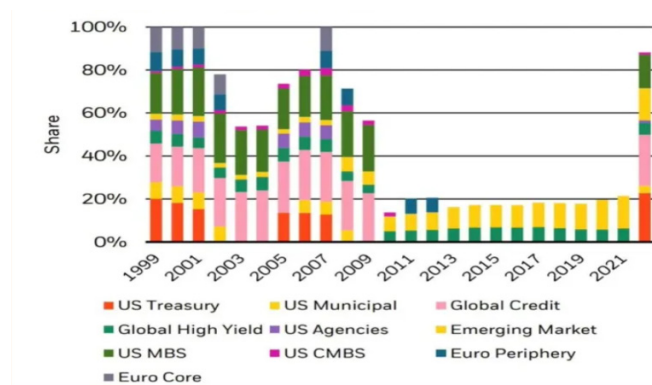
Source: Bloomberg, Financial Times

## Monetary Policy and the Financial Cycle

Monetary policy’s role in shaping borrowing costs and investment returns further complicates determining the optimal peak for policy rates and subsequent path. Analyses by former senior central bankers, the BIS and others show that the financial cycle and monetary policy’s role are critical.<sup>50</sup> BIS studies examining data for 19 countries from the 1870s to 2010s show that monetary policy has medium and long-term impacts on growth and real rates. Persistent shifts in real rates coincide with changes in monetary regimes. These analyses show the role of monetary policy in anchor countries (led by the US, but with Europe and Japan also significant) as more significant than global saving-investment determinants.

The BoC’s and Fed’s shift to normalizing monetary policy has clear implications for the future financial cycle, economic growth, and real rates if it is sustained in 2023 and beyond. The end to the Fed put and the sharp escalation in the BoC’s and Fed policy rates led Canadian and US debt markets in 2022 to their worst year in decades. The restoration of policy rates to the 4% range recalibrated debt yields globally, including the striking end to trillions of dollars of negative-yielding debt by December 2022 and restoration of 4% market debt yields<sup>51</sup> [Charts 12&13]. The Fed’s and other leading central

**Chart 13: Return of Fixed Income Yields of 4% or More: Share of Fixed Income Indices**



Source: Bloomberg, Financial Times



bank rate hikes re-priced US and international equity markets, housing, crypto-currency and an array of other assets that had reached excessive valuations by the end of 2021.

To summarize, the monetary policy regime can exert persistent influence on the economy's evolution, including on real rates. Whether the future BoC and Fed policy stance after peak rates will reflect the lessons from the side effects of policy-driven minimal or negative real interest rates from the GFC through mid-2022 is an open question. Given monetary policy's ability to depress nominal and real rates, the impact of secular pressures on inflation, savings and investment will be fundamentally shaped by the stance of the BoC, Fed, ECB and other major central banks globally.

Financial cycle advocates stress the dangers of higher nominal and real yields from early 2023 levels, given the very high levels of domestic and global debt and the risks from excess leverage, inappropriate investments, and financial instability prior to and during the pandemic. The BIS and Edward Chancellor emphasize the ongoing role of interest rates in achieving sustainable growth and financial stability.<sup>52</sup> As the BIS observes, interest rates are a "speed regulator" for borrowing and lending. In Chancellor's words, the critical role of interest rates includes the "cost of leverage and the price of risk. When it comes to regulating financial markets, the existence of interest discourages bankers and investors from taking excessive risks."

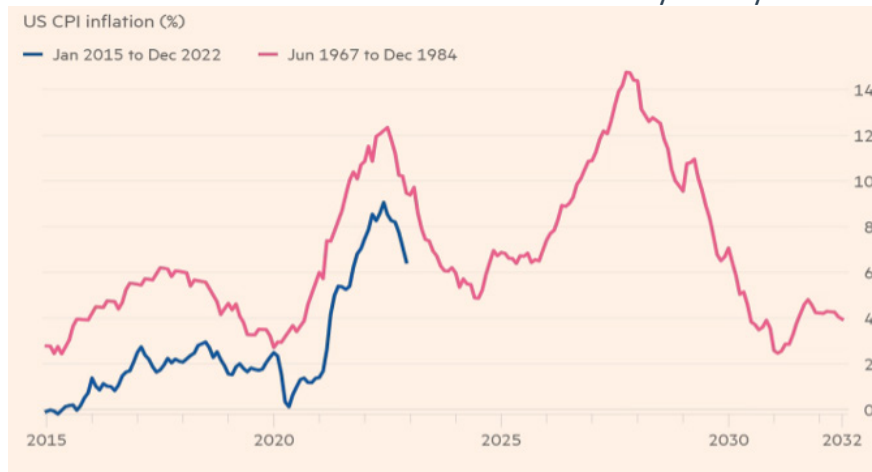
## CONCLUSION

A range of secular drivers is putting upward pressure on inflation and real interest rates this decade. The combination of secular factors and the setting of monetary policy will determine how much higher inflation and real yields will be throughout the

2020s versus the 1990s-2010s. Materially higher policy rates relative to the 2010s would reflect the (i) structural drivers pushing inflation to the BoC target of 2% (with a range of 1-3%) and potentially higher, and (ii) need for increased real policy rates consistent with sustained economic growth, better investment allocations and discouraging excessive risk in asset markets.

Our analysis of inflation and real rate pressures suggests Canadian policy rates with a central tendency of the 3.0-4.0% area for 2023-2026 within a broader range of 2.0-5.0%. With the BoC's policy rate at 4.5% in early 2023, policy normalization would be complete with 1.0-2.0% real rates if inflation subsides to the 3% area by year-end. Nominal policy rates below 3.0% would occur during substantial growth slowdowns (well below that during major recessions) when inflation is less than 2%. Rates above 4.0% would reflect excess demand conditions and well above-target inflation. For the US, the rate hikes appear to be in their late stage, but not yet finished. The Fed Chair and various Fed Governors in early 2023 have stressed that policy rates at 4.5-4.75% will need to increase further, given the excess US labour demand and strength of other economic data.

As of early March 2023, both central banks have successfully navigated the initial stages of policy normalization. Yet, interest rate changes have their full impact over 1½-2 years, and the BoC's and Fed's major hikes and QT will have their full effects over the course of 2023 and the first half of 2024. Money supply growth has also dramatically reversed its excessive pace in 2020-2021. The open question is whether the BoC and/or the Fed will choose 1.0-2.0% real policy rates barring a major recession or financial system instability. There are also political pressures if the economy slows too sharply in 2023.

**Chart 14:** US inflation tracks the 1970s remarkably closely so far

**Source:** Jesper Rangvid, US Federal Reserve, Financial Times

Continued success with policy normalization faces at least two other significant risks identified by Martin Wolf and William White.<sup>53</sup> Wolf highlights the potential for monetary policy to loosen too quickly and too much in response to lower inflation in 2023. The Fed and the BoC need to resist repeating this 1970's error when interest rates were reduced too soon after inflation started falling [Chart 14]. The other risk arises if inflation does not return to target. In this environment, as White states, central banks will have to choose between (i) holding down nominal rates and letting inflation rise and thus depressing real rates or (ii) letting nominal rates increase, inflation fall, and real rates rise. Choosing the latter course is crucial for sustainable economic growth. Yet, this policy would face greater financial and fiscal instability risks and political pressures.

© 2023 Global Risk Institute in Financial Services (GRI). This "Higher for Longer: Structural Inflation and Real Rate Trends in the 2020s" is a publication of GRI and is available at [www.globalriskinstitute.org](http://www.globalriskinstitute.org). Permission is hereby granted to reprint the "Higher for Longer: Structural Inflation and Real Rate Trends in the 2020s" on the following conditions: the content is not altered or edited in any way and proper attribution of the author(s) and GRI is displayed in any reproduction.

**All other rights reserved.**

## Endnotes

- 1 C. Borio, P. Disyatat, M. Juselius & P. Rungcharoenkitkul, “Why so low for so long? A long-term view of real interest rates”, Bank for International Settlements (BIS), BIS Working Papers, No. 685, 2017; and C. Borio, P. Disyatat, & P. Rungcharoenkitkul, “What anchors for the natural rate of interest?”, BIS Working Papers, No. 777, 2019.
- 2 Warren Lovely, Taylor Schleich & Daren King, “Ottawa shows stronger fiscal hand, though downside risks mount”, National Bank of Canada Financial Markets, November 3, 2022.
- 3 Bank of Canada, <https://www.bankofcanada.ca/rates/banking-and-financial-statistics/selected-monetary-aggregates-and-their-components-formerly-e1/>; Jeremy Siegel, *Stocks for the Long Run: The Definitive Guide to Financial Returns & Long-Term Investment Strategies*, 6th edition (2022: McGraw Hill, 2022), ch. 24; and Martin Wolf, “Lessons from the Great Reflation”, *Financial Times*, February 7, 2023.
- 4 John Authers, “The Fed’s Stocks Policy is Exuberantly Asymmetric”, *Bloomberg Opinion*, August 4th, 2020.
- 5 See William White’s “Foreword” in Graeme Wheeler & Bryce Wilkinson, “How Central Bank Mistakes After 2019 Led To Inflation”, *The New Zealand Initiative*, (July 2022); and Charles Goodhart & Manoj Pradhan, *The Great Demographic Reversal: Ageing Societies, Waning Inequality, and an Inflation Revival* (London: Palgrave Macmillan, 2020), p. 32.
- 6 Ben Bernanke, *The Great Moderation*, Remarks to the Eastern Economic Association, Washington DC, February 20, 2004; and Adam Tooze, *Crashed: How a Decade of Financial Crises Changed the World*, (New York: Penguin Books, 2019), pp. 10, 44.
- 7 Identified and examined extensively in early 2020 by Goodhart & Pradhan, *The Great Demographic Reversal*.
- 8 *Ibid*, pp. 2-3.
- 9 *Ibid*, pp. 32-33; and James Griffiths, “China’s first population decline in decades points to looming demographic crisis”, *Globe and Mail*, January 17, 2023.
- 10 Goodhart & Pradhan, *The Great Demographic Reversal*, pp. 4-5.
- 11 Adam Tooze, *Shutdown: How Covid Shook the World’s Economy* (New York: Penguin Random House, 2021), pp. 2-3.
- 12 Martin Wolf, “In an era of disorder, open trade is at risk”, *Financial Times*, June 28, 2022; Rana Farooqar, “After Neoliberalism: All Economics is Local”, *Foreign Affairs*, November/December 2022; and Raghuram G. Rajan, “The Gospel of Deglobalization: What’s the Cost of a Fractured World Economy?”, *Foreign Affairs*, January/February 2023.
- 13 Martin Wolf, “Globalisation is not dying, it’s changing”, *Financial Times*, September 13, 2022; and Rana Farooqar, “Digital trade must not become a zero-sum game”, *Financial Times*, November 28, 2022.
- 14 Farooqar, “After Neoliberalism: All Economics is Local”; Gillian Tett, “Executives are only now waking up to their collective blind spots”, *Financial Times*, November 3, 2022; and Peter Campbell, Eri Sugiara & Edward White, “Carmakers quietly cut ties with China in supply chain shake-up”, *Financial Times*, December 21, 2022.
- 15 Ana Swanson, “America’s Trade Deficit Surged in 2022, Nearing \$1 Trillion”, *New York Times*, February 7, 2023.
- 16 Aaron Goertzen, “North American Harvest: Drought Still a Drag”, *BMO Economics, Focus*, November 25, 2022; and Sunil Kardam, “China’s Heat Wave Is the Biggest Supply Chain Disruption of the Year: So, What’s the Solution?”, *SupplyChainBrain*, December 9, 2022.
- 17 Nathan Janzen, Claire Fan & Naomi Powell, “Proof Point: Canada’s labour shortages will outlive a recession”, *RBC Thought Leadership*, July 22, 2022; and Stefane Marion, “Canada: New retirements exceed growth in the working-age population”, *National Bank of Canada Financial Markets*, December 12, 2022.

- 18 Parisa Mahboubi, “The Knowledge Gap: Canada Faces A Shortage in Digital and STEM Skills”, Commentary 626, C.D. Howe Institute, August 2022; for skilled trades shortages, see BuildForce Canada, “Construction and Maintenance Looking Forward: Ontario 2020-2029 Highlights,” February 2020.
- 19 Mahboubi, “The Knowledge Gap: Canada Faces A Shortage in Digital and STEM Skills”.
- 20 Ben Bernanke, “The global savings glut and the US current account deficit”, Federal Reserve Governor’s remarks, Virginia, 2005; and Ben S. Bernanke, Carol Bertaut, Laurie Pounder DeMarco & Steven Kamin, “International capital flows and returns to safe assets in the United States, 2003-2007,” Federal Reserve Board, International Finance Discussion Papers, (2011).
- 21 Lukasz Rachel & Lawrence H. Summers, “On secular stagnation in the industrialized world”, Brookings Papers on Economic Activity, Vol. 50, No. 1, Spring 2019, pp. 1-54.
- 22 John B. Taylor, “The financial crisis and the policy responses: An empirical analysis of what went wrong”, National Bureau of Economic Research, working paper, No. 14631, January 2009.
- 23 Warren Lovely, “Draining Canada’s bond holding tank”, National Bank of Canada Financial Markets, December 14, 2022.
- 24 Ibid.
- 25 Robert Barsky & Matthew Easton, “ The global saving glut and the fall in U.S. real interest rates: A 15-year retrospective”, Economic Perspectives, 1/2021, Federal Reserve Bank of Chicago, p. 1.
- 26 Broadly speaking, two analytical frameworks are used to assess real interest rates. The first focuses on observed real interest rates and relates these to the evolution of the economy’s balance between savings and investment. The second focuses on the equilibrium or natural real rate, estimated as an unobserved variable in a filtering system. C. Borio et al, “Why so low for so long?”, BIS (2017) p. 1.
- 27 For example, Michael Heise, *Inflation Targeting and Financial Stability: Monetary Policy Challenges for the Future*, (Cham, Switzerland: Springer, 2019) looks at eight driving factors in four categories. See excerpts in Goodhart & Pradhan, *The Great Demographic Reversal*, pp. 87-88.
- 28 Hamilton et al, “The Equilibrium Real Funds Rate: Past, Present and Future”, 2015; and Rachel & Summers, “On Falling Neutral Real Rates: Fiscal Policy, and the Risk of Secular Stagnation”, 2019, cited in Goodhart & Pradhan, *The Great Demographic Reversal*, p. 89.
- 29 Goodhart & Pradhan, *The Great Demographic Reversal*, pp. 3-4. Note that people aged under 15 and those aged 65 and older also add to cost and price pressures as they increase aggregate demand without adding to aggregate supply.
- 30 Ibid, p. 12, pp. 90-93; “Europe holds on to its workers”, *The Economist*, January 9, 2023; “The age of the grandparent has arrived”, *The Economist*, January 12, 2023.
- 31 Goodhart & Pradhan, *The Great Demographic Reversal*, pp. 92-93.
- 32 Griffiths, “China’s first population decline in decades points to looming demographic crisis”.
- 33 Jean-Claude Juncker used this term from French complexity theorist Edgar Morin to describe the coincidence of multiple crises confronting Europe during 2010 – 2016. Greater and more far-reaching crises during 2020-2022 made the term applicable globally. Tooze, *Shutdown: How Covid Shook the World’s Economy*, pp. 6-8.
- 34 Olaf Scholz, “The Global Zeitenwende: How to Avoid a New Cold War in a Multipolar Era, *Foreign Affairs*, January/February 2023, p. 28; Mari Yamaguchi, “Japan aims to boost 5-year defense spending to \$318 billion”, *The Associated Press*, December 5, 2022; and “Adding up the fiscal drag from ageing, energy and defence”, *The Economist*, October 5, 2022.
- 35 Dave Skidmore, David Wessel & Elijah Asdourian, “Financing and governing the recovery, reconstruction, and modernization of Ukraine”, Brookings Institution, *Up Front*, November 3, 2022.
- 36 For example, Canada’s official estimate in January 2023 of the total cost for the purchase, operation and maintenance of 88 new F-35 military jets was \$70 billion over these planes’ lifespan. Ian Bailey, “Canada finalizes \$19 billion purchase of F-35 fighter jets”, *The Globe and Mail*, January 9, 2023.

- 37 See the McKinsey Global Institute and the International Energy Agency estimates cited in “The energy transition will be expensive”, *The Economist*, October 5, 2022.
- 38 Don Drummond, Duncan Sinclair & Rebekah Bergen, *Aging Well*, Queen’s University, School of Policy Studies, November 2020, p. 4; and Don Drummond, *Remarks to Canadian Association of Business Economists*, January 12, 2023.
- 39 “15 Things to Know about Canada’s Infrastructure”, BCG Centre for Canada’s Future, Boston Consulting Group, January 2020.
- 40 William Robson & Mawakina Bafale, “Decapitalization: Weak Business Investment Threatens Canadian Prosperity”, C.D. Howe Institute, Commentary 625, August 2022.
- 41 See for example, the major investment increases announced by Canadian Natural Resources, Cenovus, and Suncor in late 2022 for 2023 and beyond after several years of constrained capital spending.
- 42 For an incisive assessment of the role of monetary policy in both of these housing market booms and earlier episodes going back to the 1980s, see Robert Kavcic’s presentation, “Housing Outlook: Testing the Foundation”, Global Risk Institute (GRI) in Financial Services, Webinar, February 22, 2023.
- 43 The merits of  $r^*$  or the real policy rate being 2% is supported by various analysts and long-time practitioners. Recent advocates include Bill Gross, “The Fed needs to stop raising interest rates”, *Financial Times*, December 19, 2022.
- 44 “We define the neutral rate as the policy rate needed to maintain economic output at its potential level and inflation at target after the effects of all cyclical shocks to the economy have dissipated”, R. R. Mendes, “The Neutral Rate of Interest in Canada” Bank of Canada, Staff Discussion Paper, 2014. See also C. Borio et al, “Why so low for so long?”, BIS (2017) p. 1.
- 45 D. Matveev, J. McDonald-Guimond & R. Sekkel, “The neutral rate in Canada: 2020 update Bank of Canada, Staff Discussion Paper, 2020.
- 46 G. Faucher, C. Hajzler, M. Kuncl, D. Matveev, Y. Park & T. Taskin, “Potential output and the neutral rate in Canada: 2022 reassessment”, Bank of Canada, Staff Discussion Paper, 2022.
- 47 C. Borio et al, “Why so low for so long?”, BIS (2017) pp. 22-23; and Wheeler & Wilkinson, “How Central Bank Mistakes After 2019 Led To Inflation”, p. 8.
- 48 Neutral rates are also referred to as natural or equilibrium rates. C. Borio et al, “What anchors for the natural rate of interest”, BIS (2019), p. 1; and C. Borio et al, “Why so low for so long?”, BIS (2017) p. 1.
- 49 Wheeler & Wilkinson, “How Central Bank Mistakes After 2019 Led To Inflation”; William White, “The Future of Policy Modelling”, Panel Remarks, 25th Central Bank Macroeconomic Modelling Workshop, November 9, 2022; and Timothy Lane, “Expecting the unexpected: Central bank decision making in turbulent times”, Remarks at School of Public Policy, University of Calgary, February 16, 2022, pp. 8-9.
- 50 William White, “Is Price Stability Enough”, BIS Working Papers, April 2006; Raghuram Rajan, *Fault Lines: How Hidden Fractures Still Threaten the World Economy* (Princeton: Princeton University Press, 2011); Borio et al, “Why so low for so long?” and Borio et al, “What anchors for the natural rate of interest?”; and Edward Chancellor, *The Price of Time* (Princeton: Princeton University Press, 2022).
- 51 Robin Wigglesworth, “End of the sub-zero bond yield era”, *Financial Times*, January 5, 2023.
- 52 Borio et al, “What anchors for the natural rate of interest?”, p. 1; and Chancellor, *The Price of Time*, p. xxv.
- 53 Wolf, “Lessons from the Great Reflation”; and William White, “The New Macroeconomic Paradigm: Pandemic Lessons and Policy Needs”, GRI, Webinar, January 24, 2023.