From models to communications: strengthening risk management in monetary policy at the Bank of Canada[1]

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1. Introduction

The Bank of Canada has a long tradition of developing and applying economic models to inform monetary policy. This practice began in the 1960s and has steadily evolved, shaped by new insights and emerging frameworks.

Most recently, as outlined in Coletti (2023), the Bank has embarked on building its fourth-generation projection and policy analysis models. This initiative is anchored by two priorities: first, the development of a new Canadian workhorse model that provides a richer modelling of the supply side and a deeper inflation narrative; second, a heightened focus on understanding and managing the risks and uncertainties that shape the economic outlook and guide policy decisions.

The overarching goal is to embed risk identification, scenario analysis and the consideration of uncertainty more systematically into both the Bank's modelling and policy processes. By doing so, the Bank aims to build a more resilient foundation for decision-making in a constantly changing environment.

Risk management recognises that monetary policy is inherently shaped by uncertainty (Kozicki and Vardy (2017), Poloz (2020), Macklem (2020)). Policymakers must identify key risks and uncertainties, weigh the consequences of policy missteps, and choose a course that balances those risks and uncertainties. The Bank has long viewed monetary policy as risk management rather than precision engineering (Poloz (2013)). Staff routinely present risk scenarios alongside the base case projection, layering expert judgment to explore how the outlook could shift. These scenarios help inform policy discussions.

However, in times of extreme uncertainty – also known as Knightian or radical uncertainty – the Bank fundamentally shifts its approach. The importance for the economic outlook of conditioning assumptions related to the source of uncertainty is emphasised. Rather than relying on a single base case and its associated risks, the Bank often considers a range of possible scenarios to help illustrate the high degree of unpredictability in the economic environment.

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Although the Bank's policy framework incorporates risk management, recent advances in modelling provide opportunities to introduce greater structure and systematically assess the implications of uncertainty.

2. Current practice: structure and process

Standard practice

The Bank's standard risk assessment process begins with staff preparing a base case economic projection, typically interpreted as the mean and mode of the forecast distribution. Judgment is then layered on to account for factors the model might miss and to balance risks around the projection.

Staff then present and discuss several risks, focusing mainly on shock uncertainty. These risks are run through a linear (or linearised) workhorse model. At meetings with the Bank's Governing Council, staff not involved in preparing the base case and risk scenarios weigh in on the balance of risks, and the relevance of the scenarios.

Policy discussions are anchored by the interest rate path consistent with the mean inflation outlook, derived from an estimated Taylor-type rule that is embedded in the projection model.

Adapting to Knightian uncertainty

As noted earlier, the approach changes in periods of radical or Knightian uncertainty. For example, during the pandemic – when it was impossible to predict the evolution of the virus or public health measures – the Bank used scenarios built on different assumptions to illustrate a spectrum of possible economic recoveries, rather than a single forecast (Bank of Canada (2020)). More recently, facing uncertainty about US trade policy, scenario analysis has helped gauge the potential economic impacts and the trade-offs monetary policy might face (Bank of Canada (2025a,b), Macklem (2025)).

3. Limitations and challenges in current practices

While the current approach has served the Bank well, three key areas for improvement have emerged:

3.1 Achieving a better balance between base case and risk analysis

Currently, there is considerable emphasis on developing and fine-tuning the base case projection. While base case projections are easy to communicate, they can create a false sense of precision and security. Even with frontier models and expert judgment, large and persistent forecast errors can occur. Internally, this focus on the base case can undermine risk-sensitive thinking; externally, it can tie the Bank's credibility too closely to its forecasting ability. For example, the sharp rise in inflation in the post-pandemic period exposed limitations in the workhorse model and resulted in persistent forecast errors. Overemphasising the base case in uncertain times can end up weighing on central bank credibility.

3.2 Being more modest about models

Another area for improvement is fostering greater modesty about models and their assumptions. Economic models are indispensable tools for policy analysis, but they are built on simplifications and may not fully capture the complexities of the economy – especially during periods of rapid change or unexpected shocks (Gosselin and Kozicki (2023)). When preparing policy advice, it is essential to routinely question the assumptions underlying the existing models and to recognise that their predictions are only one perspective among many.

By adopting a more humble and critical approach to model use, policymakers can avoid overconfidence in any single framework and remain open to alternative interpretations of economic developments. This mindset encourages staff to challenge model outputs, supplement them with expert judgment, and clearly communicate the conditional nature of policy recommendations. Ultimately, integrating model uncertainty into the Bank's narratives helps ensure that policy advice is robust, transparent and better suited to navigating uncertainty.

Recognising the limitations of models is a necessary foundation for effective risk management. However, humility alone is not enough. To fully address the challenges of uncertainty, it is also important to broaden the scope of risk analysis – actively seeking out and evaluating a wider range of plausible scenarios that may fall outside the boundaries of the standard models in use.

3.3 Expanding risk analysis to include more plausible scenarios

A related but distinct area for improvement involves broadening the scope and imagination of risk analysis. Traditionally, risk scenarios have been developed primarily through the lens of the baseline model, which can constrain the range of possibilities and limit the effectiveness of policy responses. For instance, after the pandemic, many risk scenarios focused narrowly on how quickly inflation surprises would fade, rather than exploring alternative models or mechanisms that might explain the baseline model misses and drive inflation. As a result, the baseline model often suggested no major policy response was needed, even in the face of significant uncertainty.

However, there have been positive steps towards more imaginative scenario analysis. Notably, in the July 2022 *Monetary Policy Report*, the Bank explicitly analysed the risk of a wage-price spiral – a scenario in which rising wages and prices reinforce each other, threatening persistent inflation. This analysis moved beyond the workhorse model to consider a disruptive risk that could significantly alter the inflation outlook. By incorporating such alternative scenarios, policymakers are better equipped to anticipate and prepare for a wider range of plausible outcomes, strengthening the Bank's ability to respond effectively to uncertainty.

4. Advancing risk management: new tools and approaches

Effective risk management requires identifying the most important risks and uncertainties, understanding the consequences of policy errors, and choosing actions that strike the right balance. To support this, Bank staff are building a suite of models for the Canadian economy.

The suite will feature variants of the workhorse model, each designed to explore a single change in the key assumptions. Initial variants will challenge the behavioural foundations of inflation dynamics – exploring alternative approaches to price-setting (eg Harding et al (2022, 2023), Gasteiger and Grimaud (2023)) and the formation of inflation expectations (eg Gabaix (2020), Beaudry et al (2022)) – areas where the workhorse model may be overly simplistic.[3] Many variants incorporate non-linearities, such as non-linear Phillips curves, which can push the economy into costly "dark corners" (Blanchard (2014)). For example, persistent inflation surprises may cause expectations to become extrapolative, risking de-anchoring (Hommes and Lustenhouwer (2019), Kostyshyna et al (2024), Ozden (2025)). Other variants will examine different representations of the supply side, including the labour market and production networks.

Beyond this, the suite will also include models with different economic structures. These might focus on the interplay between monetary policy, financial vulnerabilities and the real economy or on uncertainties tied to climate change.

With this improved toolkit, staff are exploring several ideas to make risk assessment more systematic and more central to policy decisions:

- **Spending less time fine-tuning the base case.** Focusing the narrative on the major macro forces driving inflation and the economy – a "thick-line macro" approach. Time spent perfecting details with little impact on policy could be better used for deeper risk analysis.
- **Richer alternative scenarios** (Bernanke (2024), recommendation 7). By reallocating time from base case fine-tuning, staff can use the suite of models to develop richer alternative scenarios, addressing uncertainty about how the economy works and how inflation might evolve.
- **Shifting towards a baseline outlook that is more *mode* than *mean*.** Balancing multiple risks in the base case can be complicated, especially when important non-linearities and skewed risks are involved. Focusing on the most likely scenario – the mode – and exploring risks through alternative scenarios (including those based on alternative models) can keep projections transparent and narratives coherent.
- **Integrating scenario-based insights into policy recommendations in a disciplined, transparent way.** This means going beyond judgment alone. Staff are exploring new approaches to objectively weigh scenarios and assess whether the risks considered truly span the possible outcomes. Recent research offers promising techniques, such as the ideas of Deák et al (2025) for assigning weights

[3] Adding additional complexity has its own costs. For example, while models with state-dependent pricing offer important realism, they are more difficult to estimate, take longer to simulate and can be challenging to operate in a fast-paced policy-setting environment.

to the forecasts from alternative models, and Adrian et al (2025) using Bayesian decision theory to weigh scenarios and check coverage against a reference statistical forecasting model.[4]

Ultimately, the goal is to map insights from different scenarios – and their likelihood – into policy decisions. In exceptional times, where uncertainty is radical and probabilities cannot be assigned, the objective is to avoid the worst outcomes without imposing heavy costs in the less dire scenarios (see Brock et al (2003) and Kuester and Wieland (2010)).

5. Communication and public trust

The Bank's evolving approach to risk management is shaping how it works internally but also placing new demands on external communications, as greater emphasis on uncertainty adds complexity to messaging.

Communicating uncertainty creates a natural tension between two responsibilities: maintaining the Bank's credibility in anticipating and influencing economic outcomes and being transparent about what it doesn't know. Uncertainty itself can have disparate implications for policy: sometimes it calls for caution, but if the risk of inaction is high, it might require bold action even when evidence is incomplete (Wilkins (2017), Mendes et al (2017)). In any case, it is essential to convey that the inflation outlook is fraught with risks and will be updated as new information emerges, while reassuring the public that this does not constrain the Bank's ability to act decisively.

This tension between providing transparency and upholding public confidence in the Bank is particularly acute in periods of heightened uncertainty. The public looks to central banks for reassurance, yet it is precisely at these moments that acknowledging the limitations of models and explaining the conditionality of projections becomes most important.

Reassurance can be provided by affirming the Bank's commitment to delivering price stability and explaining how policy decisions are working to achieve it. The Bank must also position itself as a source of clear, transparent and objective information about evolving circumstances. Scenarios can be a valuable tool for illustrating uncertainty without undermining credibility. They can be used to explain how the economic outlook could change under different assumptions for a key unknown parameter (eg a tariff rate) or to illustrate how a shock could propagate through the economy (eg an OPEC announcement of increased oil supply). Using scenarios can be effective in public communications when accompanied by efforts to explain the approach to their development and analysis. The Bank has been providing extensive support to the media with briefings and access to experts to ensure accurate interpretation and reporting to the public.

4 The reference statistical model is important because workhorse macro models often rely on simplifying assumptions, such as linearity and normally distributed shocks. These assumptions make the models tractable and easier to communicate, but they often result in underestimating the range of possible outcomes, especially during periods of economic stress or rapid change (see case studies in Adrian et al (2025)).

There is an inherent trade-off between clarity and comprehensiveness in monetary policy communications, particularly if communications are delivered in a "one-size-fits-all" format. Whereas expert audiences appreciate the subtleties in complex analysis and value conditional statements, providing intricate details in communications to the public can lead to confusion and misinterpretation.

This trade-off is increasingly difficult when the policy environment grows more complex, such as in situations of heightened uncertainty. Investing in a layered communications approach – where the depth of information is tailored to the audience's level of sophistication – can help achieve balance, provided that critical nuances are not inadvertently lost in the process.

Maintaining a coherent narrative throughout episodes of high uncertainty is also essential, as consistent communications build trust and credibility. The narrative should be anchored by key reference points while messaging on key themes evolves with developments. In recent periods of uncertainty, the Bank has achieved this by repeatedly emphasising its commitment to price stability, listing the variables it monitored to assess the outlook, and describing how they evolved over time.

The introduction of the Bank's new macroeconomic policy model is not only a technical milestone but also a communications opportunity. The new model will increase the types of scenario analyses that can be examined, enhancing the Bank's ability to take a risk management approach to monetary policy decisions. To help the public better understand the risks being weighed by the Bank, risk scenarios could be presented in its *Monetary Policy Report*, the primary vehicle for communicating base case projections and risks to the outlook. A richer risk discussion by the Governing Council would also be repeated in the summaries of deliberations.

Done well, this approach can strengthen the credibility of the Bank's work and reinforce trust by demonstrating its commitment to informed decision-making. Yet, communicating complex analyses clearly and effectively and aligning public interpretation with institutional intent will remain a challenging endeavour.

6. Conclusion

The Bank of Canada's journey in risk management and economic modelling reflects a continuous commitment to strengthening the foundations of monetary policy in an uncertain world. As the global economic environment grows more complex and unpredictable, the Bank's evolving approach – anchored in richer models, systematic scenario analysis and a heightened focus on uncertainty – positions it to respond with greater resilience and adaptability.

This chapter has highlighted three key areas for improvement: (i) achieving a better balance between base case projections and risk analysis; (ii) further integrating uncertainty about how the economy functions into economic narratives; and (iii) expanding the scope of risk analysis to encompass a wider range of plausible scenarios. Addressing these challenges is essential not only for robust policy formulation but also for maintaining public trust and credibility.

The development of a suite of models, the adoption of innovative scenario-based techniques and a renewed emphasis on transparent communication all serve to embed risk management more deeply into the Bank's policy process. By systematically weighing risks and uncertainties – and clearly conveying these considerations to the public – the Bank aims to make monetary policy both more effective and more understandable.

Ultimately, the Bank of Canada's experience underscores the importance of embracing uncertainty, fostering intellectual humility and remaining open to new approaches. As central banks around the world confront similar challenges, ongoing dialogue and shared learning will be vital for advancing the practice of risk management in monetary policy.

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