Canada Macro–Financial Stress Index

Author: William Driscoll

1. Objective

The objective of this project is to construct a monthly macroeconomic financial stress index for Canada that captures periods of elevated economic strain and financial tightening. The index is designed as an early-warning indicator, not a recession forecasting model, and aims to build information from multiple public data sources into a single, interpretable measure of stress.

2. Data Sources

The index combines seven monthly indicators grouped into macroeconomic and financial components:

Macroeconomic indicators

- CPI inflation (year-over-year, Canada, all-items) | Statistics Canada
- Unemployment rate (seasonally adjusted) | Statistics Canada
- Real GDP growth (monthly, proxy via GDP by industry) | Statistics Canada
- Consumer confidence index | OECD

Financial indicators

- Policy interest rate (target for the overnight rate) | Bank of Canada
- Yield curve slope (10-year minus 2-year benchmark yields) | Bank of Canada
- Equity market volatility (VIX, monthly average) | Federal Reserve Economic Data (FRED)

All data are publicly available and retrieved using the Python programming language via APIs or bulk CSV endpoints.

3. Stress Alignment

Each indicator is transformed so that higher values correspond to higher economic or financial stress: Inflation, unemployment, policy rate, and equity volatility enter positively. GDP growth and consumer confidence enter with a negative sign. Yield curve slope enters negatively so that curve inversion increases stress. This alignment ensures consistent interpretation across components.

4. Standardization and Index Construction

All stress-aligned variables are standardized using full-sample z-scores, allowing indicators with different units and volatilities to be combined.

Two sub-indices are constructed:

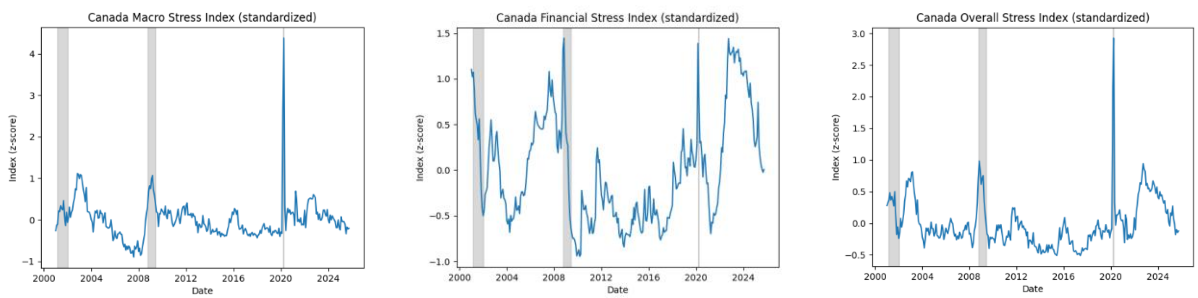
Macro stress index: average of standardized macroeconomic indicators

Financial stress index: average of standardized financial indicators

The overall stress index is computed as an equally weighted average of the macro and financial sub-indices, which facilitates comparability across indicators but may amplify regime shifts.

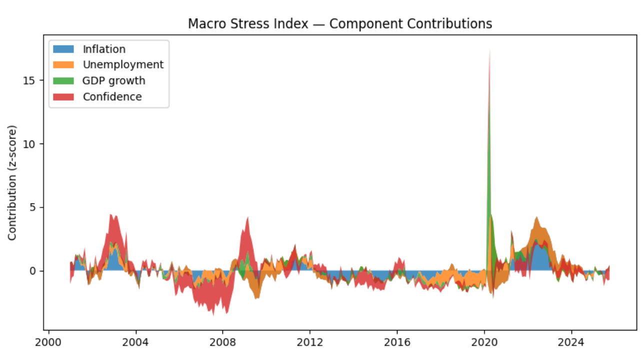
5. Results

Figures 1-3: Macro and Financial Stress Sub-Indices, Canada Macro-Financial Stress Index (Monthly)



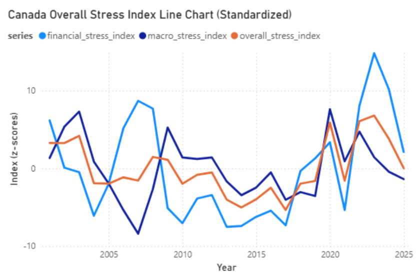
Note: Shaded regions indicate periods of economic recession. The overall index rises during known downturns and remains elevated during the post-pandemic tightening cycle.

Figure 4: Stress Index Component Contributions,



Note: Stacked areas show standardized contributions of individual components. The composition of stress differs across episodes, with policy rates and yield curve inversion contributing more in recent years.

Figure 5: Indices Displayed Side-By-Side in a Combined Line Chart



The resulting overall index (Figures 3) exhibits the following characteristics:

Elevated stress during known downturns such as the 2008-09 Global Financial Crisis and 2020 COVID-19 shock.

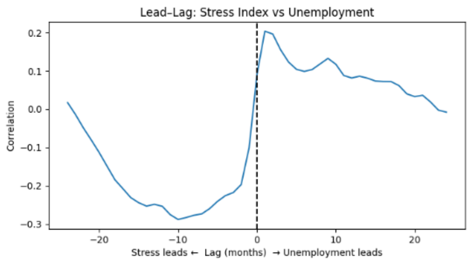
A sharp short-term spike during the COVID-19 pandemic, driven by extreme macroeconomic disruption.

Sustained elevated stress in 2022-2024, primarily driven by restrictive financial conditions rather than systemic financial failure.

Decomposition shows that recent stress is dominated by financial tightening (high policy rates, yield curve inversion, elevated volatility), while macroeconomic deterioration has been more moderate.

6. Validation

The validation approach used was recession shading, which shows that stress rises before or during historically identified Canadian recessions. In addition, a cross-correlation lead-lag analysis suggests that increases in stress tend to precede labor market deterioration, consistent with early-warning behavior.



This result suggests the index captures meaningful macro-financial dynamics.

7. Limitations

This index is intentionally simple and is distinct from other stress indices in that linear aggregation rather than correlation-weighted or non-linear methods are used, there are no explicit banking-sector or funding-market indicators, and full-sample standardization may exaggerate regime shifts.

Accordingly, the index should be interpreted as a measure of macro-financial tightness, not systemic crisis risk.

8. Conclusion

This Canada Macro-Financial Stress Index provides a transparent and interpretable summary of economic and financial strain. While simpler than institutional indices, it captures key stress episodes and highlights the unusually restrictive conditions of the post-pandemic tightening cycle.