# A Fiscal Decomposition of Unexpected Inflation: Cross-Country Estimates and Theory

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## Introduction: The Fiscal Sources of Unexpected Inflation

- The Valuation Equation of Public Debt

$$\frac{\text{Market Value of Public Debt}}{\text{Price Level}} = \text{Discouted Surpluses}$$

- Unexpected inflation $\Delta E_t \Pi_t$ must nowcast/forecast:
  - Bond prices $Q_t$
  - Real surpluses $\{s_{t+k}\}$
  - Real discounting $\{R_{t+k}\}$

$$\Delta E_t \Pi_t = \Delta E_t \left[ Q_t - \{s_{t+k}\} + \{R_{t+k}\} \right]$$

- Central question: **What are these forecast?**
  - How do they change from country to country?
  - What drives unexpected inflation variance?
  - How can theory match empirical estimates?

# Introduction: Exercises, Motivation, Results

- This paper
    1. Estimate a Bayesian-VAR to measure the terms of the decomposition given different reduced-form shocks
        - 25 countries (developed and developing)
        - Variance decomposition and a Recession Scenario
    2. Estimate a New-Keynesian, Fiscal Theory of the Price Level model to reproduces B-VAR decompositions

- Motivation depends on how to read Debt/Price = Discounted Surpluses
    ◦ Active monetary: *"How should fiscal policy adjust to unexpected inflation?"*
    ◦ Active fiscal: *"How does inflation react to changes in fiscal policy?"*

- Main results
    ◦ Real discounting quantitatively as important as surpluses
    ◦ Contribution of surpluses often stem from GDP growth, not surplus-to-GDP ratios
    ◦ In simple NK models, productivity shocks alone can rationalize these patterns
    ◦ Differences in policy rules alone go a long way in explaining different decompositions

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# Introduction: Related Literature

- **Fiscal Theory of the Price Level.** Cochrane (2022a) and Cochrane (2022b).
  - Analysis of multiple countries + more general debt instruments
  - NK model estimated to reproduce decompositions

  Leeper (1991), Sims (1994), Cochrane (1998), Cochrane (2005), Leeper and Leith (2016), Bassetto and Cui (2018), Cochrane (2022c), Brunnermeier et al. (2022).

- **Monetary-Fiscal Interaction.**
  Cagan (1956), Sargent and Wallace (1981), Hall and Sargent (1997), Hall and Sargent (2011), Jiang et al. (2019), Corsetti et al. (2019), Sunder-Plassmann (2020), Du et al. (2020), Akhmadieva (2022)

- **Empirical Finance** (Decomposition of Returns)
  Campbell and Shiller (1988), Cochrane (1992), Campbell and Ammer (1993), Chen and Zhao (2009).

## Introduction: A Map of the Road

1. **Concepts.** Derive a linearized decomposition from the valuation equation
   ◦ In a simplified environment
   ◦ In a general environment (bonds with multiple maturities and currency denominations)

2. **Bayesian-VAR.** Methodolgy and Results
   ◦ Dealing with poor data + ensuring decomposition
   ◦ Bayesian estimation + Prior distribution
   ◦ Variance + Recession decompositions

3. **Theory.** Two-country NK model: an open and a "closed" economy
   ◦ Linearized equations
   ◦ Estimation *via* method of moments

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