Natural Experiments to Guide Macroeconomic Policy

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Key Macro Policy questions

- Monetary Policy
- Fiscal policy

Theory does not speak with a unified voice

- Keynesian vs. neoclassical views

Empirical Evidence is key!

Example: Monetary Policy

Neoclassical Model:

- Frictionless prices
- Double money supply → Prices will double (instantly)
- Nothing happens (just a change in units)
- Same argument for exchange rates!

Milton Friedman: Daylight Savings Time

- March 10 2024: Clocks rolled forward by one hour
  - Intended to optimize meeting times vs. daylight
- If meeting times were set optimally already, DST wouldn't matter
  - Apparently it does
  - More heart attacks on March 14
- "Obvious" reasons:
  - Meeting times are *not* perfectly flexible
  - Similar arguments for prices
  - Coordination, simplicity, etc.

Do Fed / BoC Actions Matter?

- Consensus in mainstream media that monetary policy effects are large
- But theory is not clear!
  - Neoclassical model with flexible prices implies monetary policy is *only* about units
  - If I measure your height in inches vs. cm, does not affect how tall you are!
- Evidence is key

Milton Friedman: Positive Macroeconomics

"Positive scientific knowledge that enables us to predict the consequences of a possible course of action is clearly a prerequisite for the normative judgment whether that course of action is desirable."

---Milton Friedman's Nobel Prize lecture in 1976

Why is Positive Macroeconomics So Hard?

Examples:

1. How does monetary policy affect the economy?
2. How does fiscal stimulus affect the economy?

Policy interventions usually happen for a reason

No randomized trials

New Ammunition

- Big data
  - Explosion of availability of micro data (underlying traditional macro statistics)
  - High frequency data from financial markets
- New empirical methods
  - Natural experiments
- New answers for old macro questions?

Five sets of graphs

1. **Understanding Inflation**
2. Monetary policy shocks
3. Fiscal stimulus
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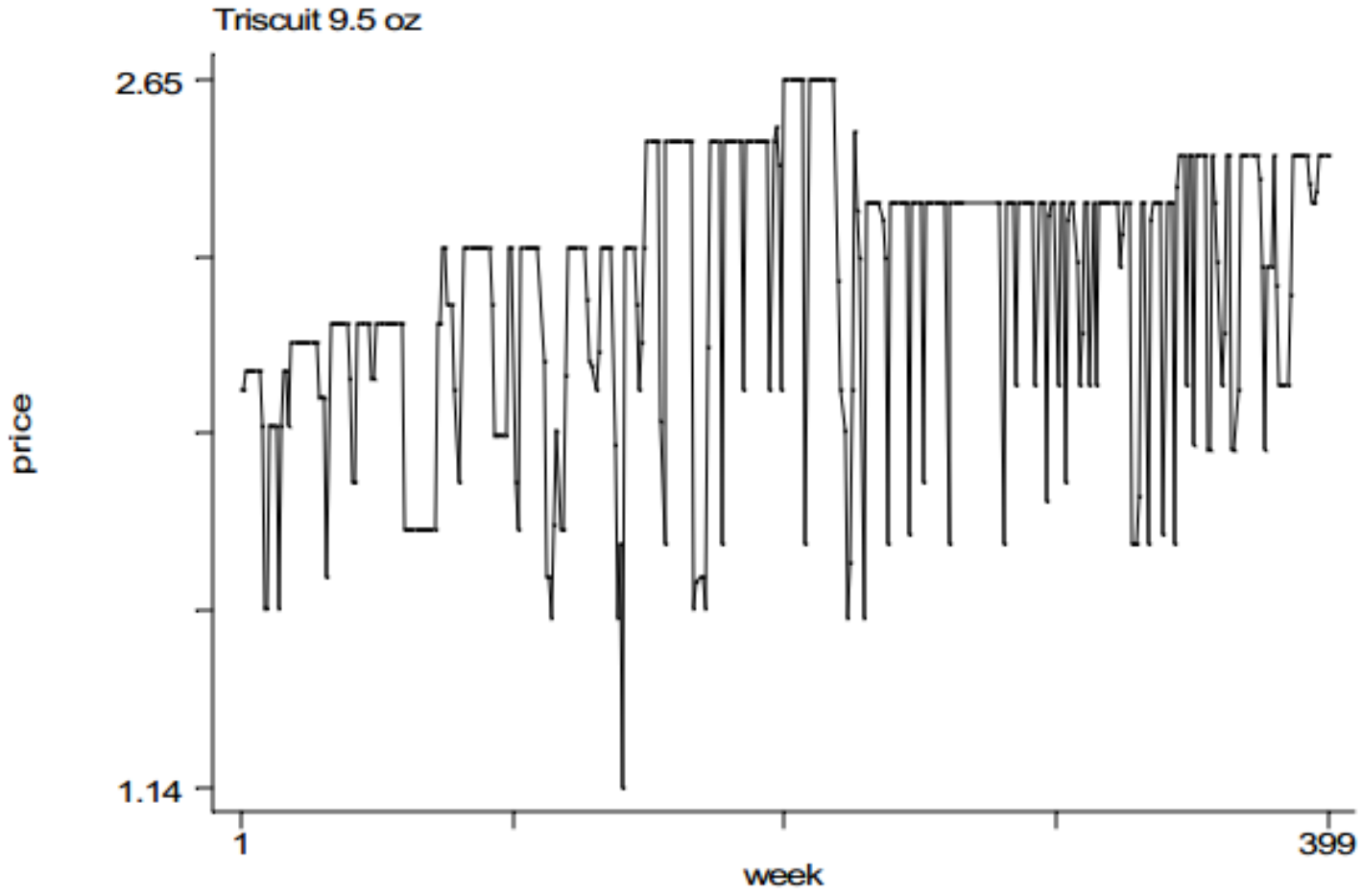
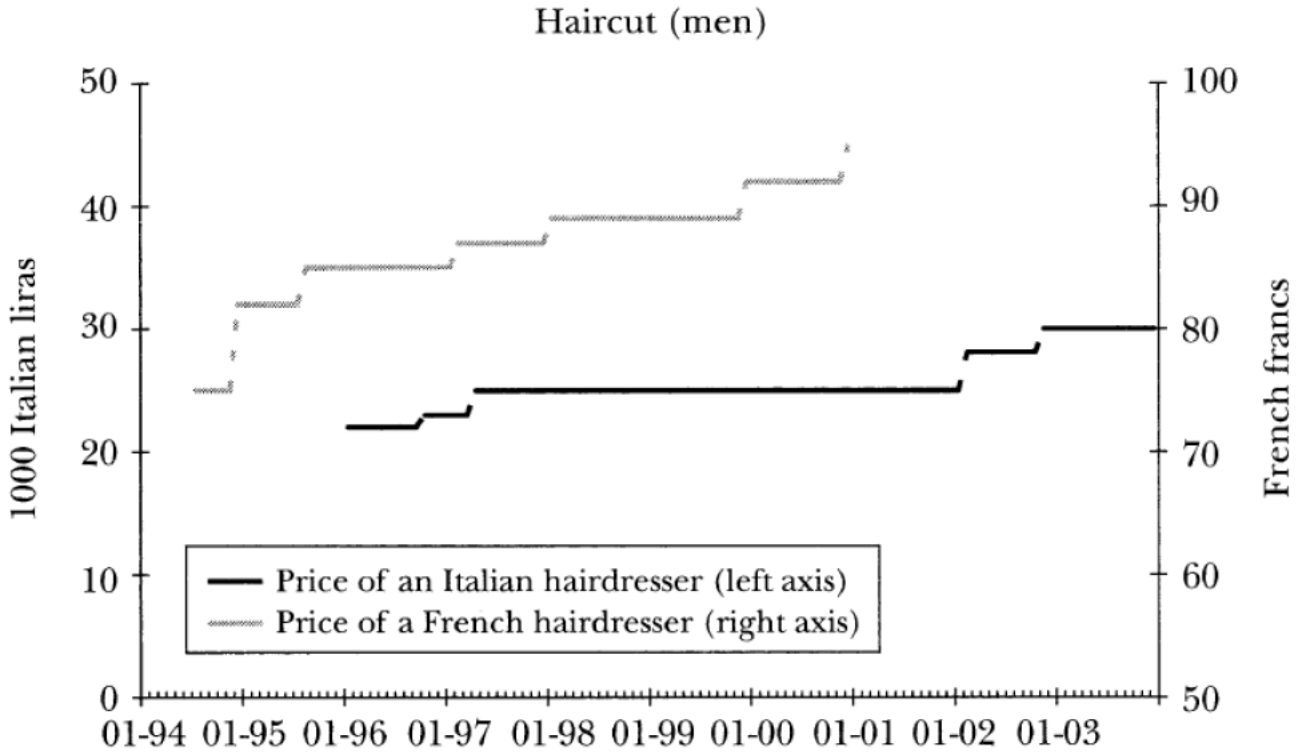
Macroeconomics of Triscuits



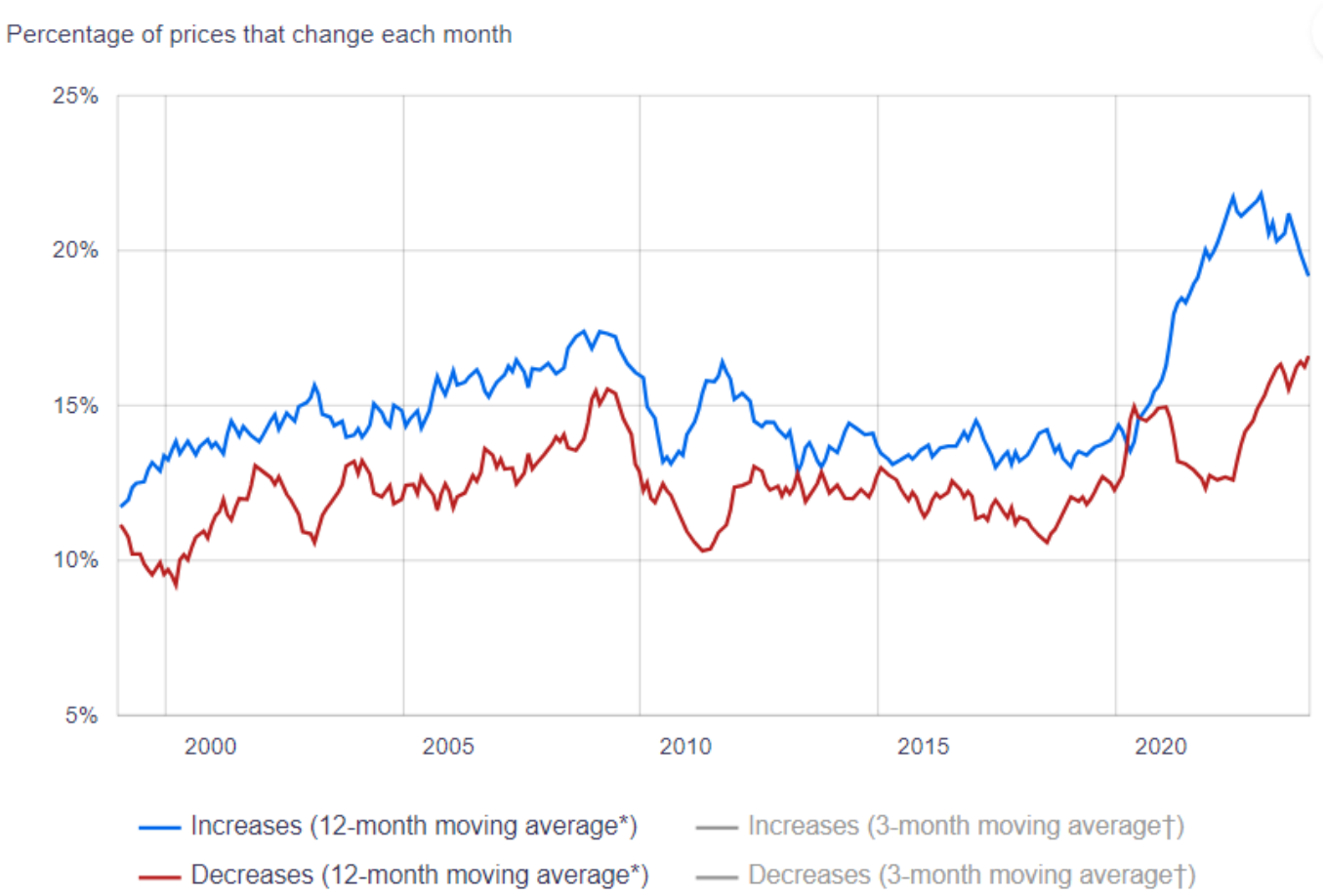
Source: Chevalier et al. (2006)

Haircuts



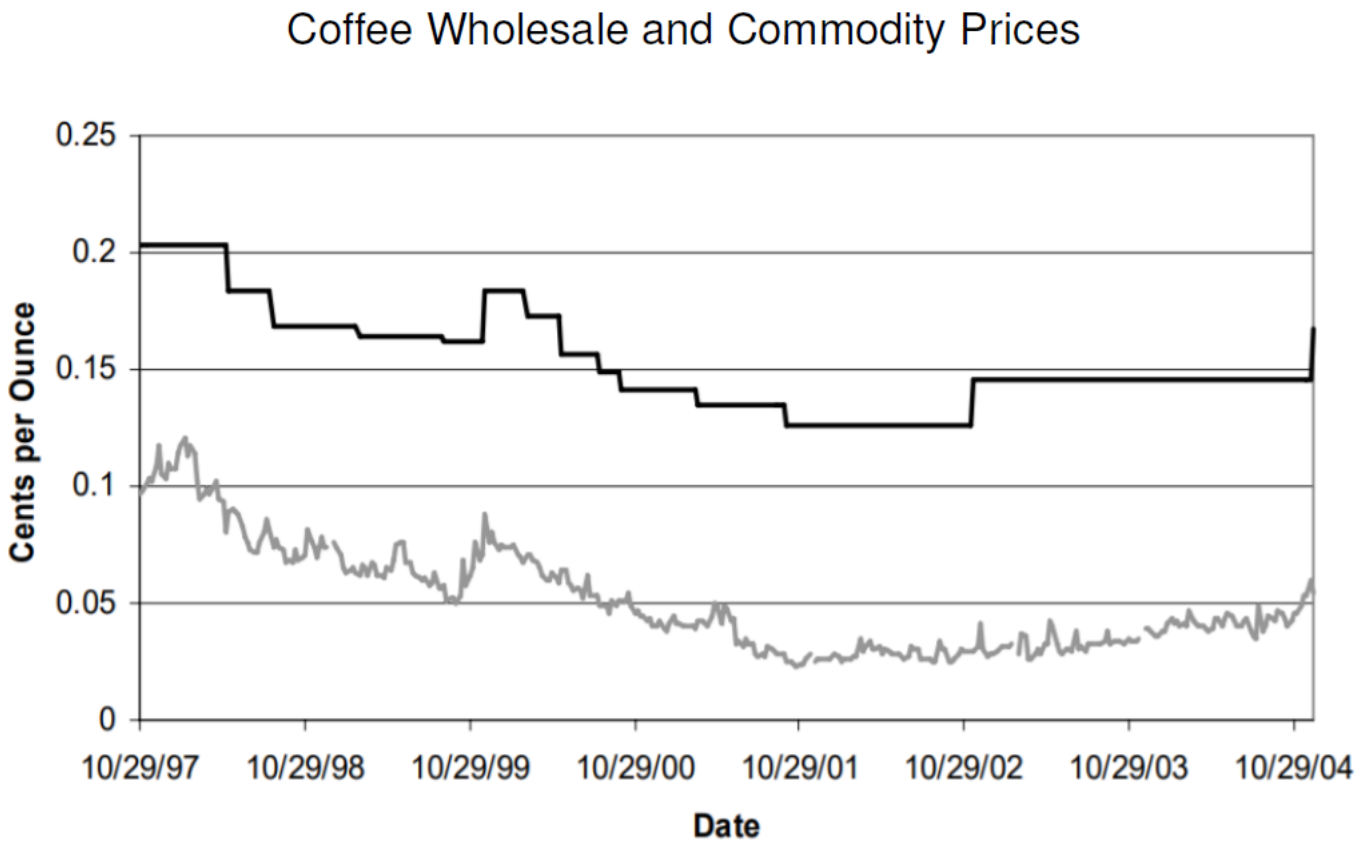
Source: Dhyne et al. (2006)

Frequency of Price Change: Canada



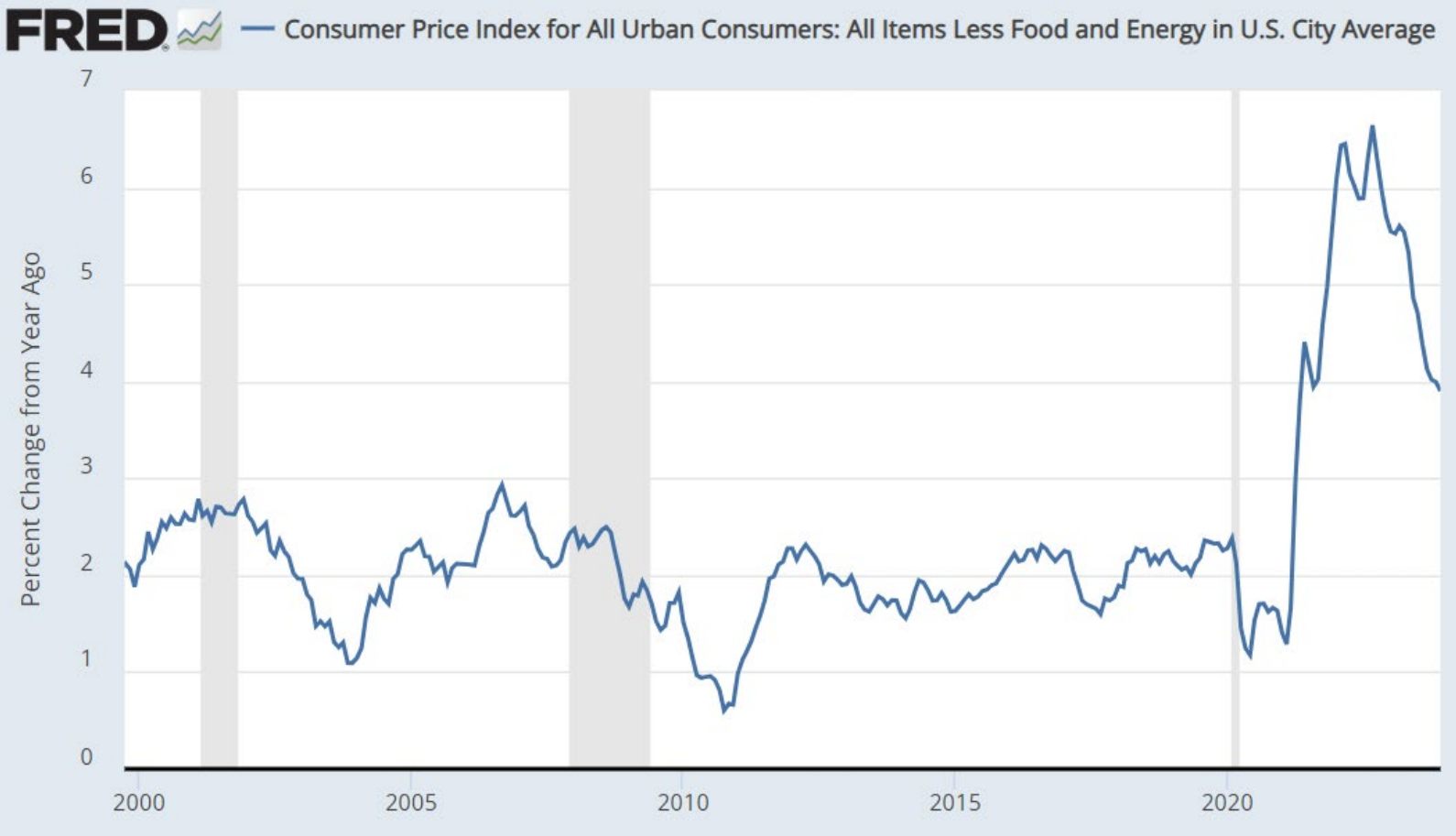
Source: Bilyk et al. (2024)

Coffee Prices: Beans vs. Wholesale

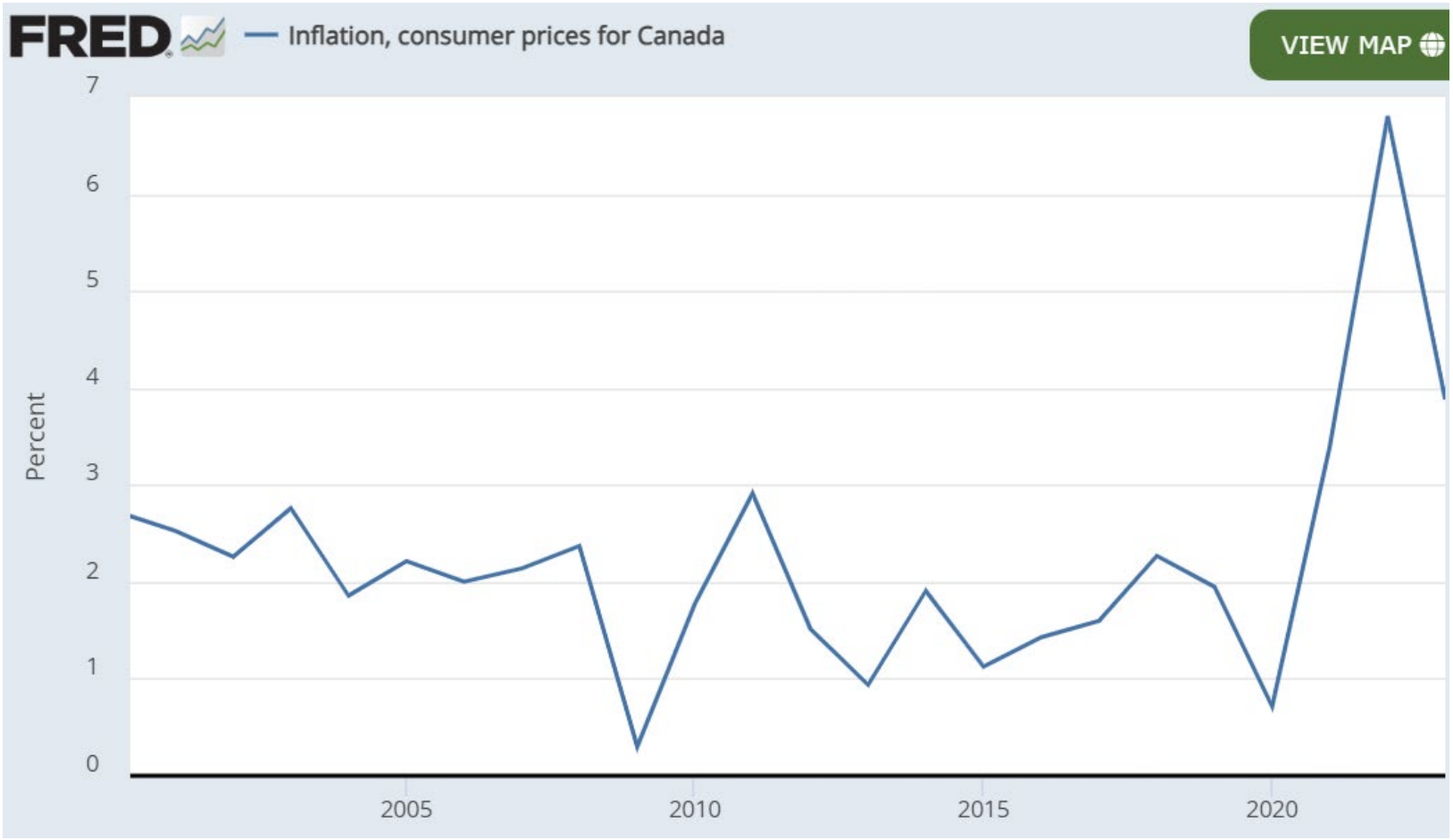


Source: Nakamura and Zerom (2010)

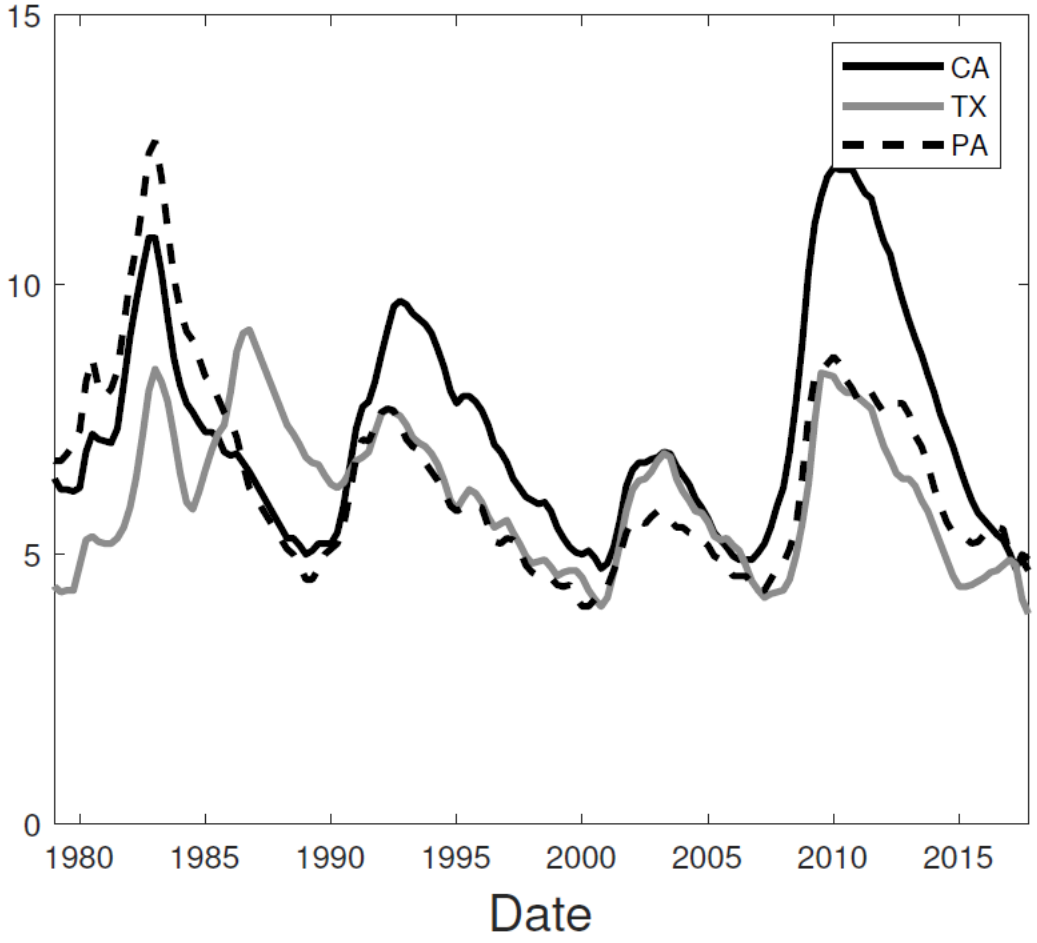
Recent Inflation in the US



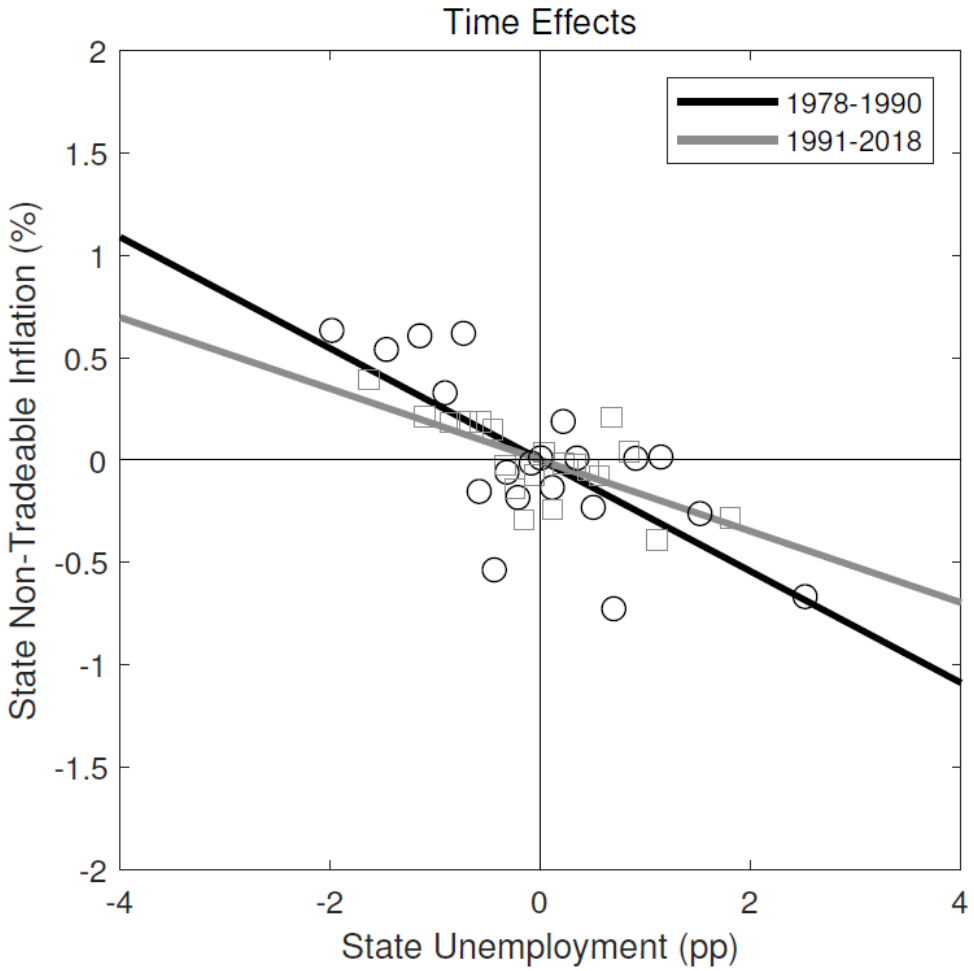
Recent Inflation in Canada



Unemployment by State

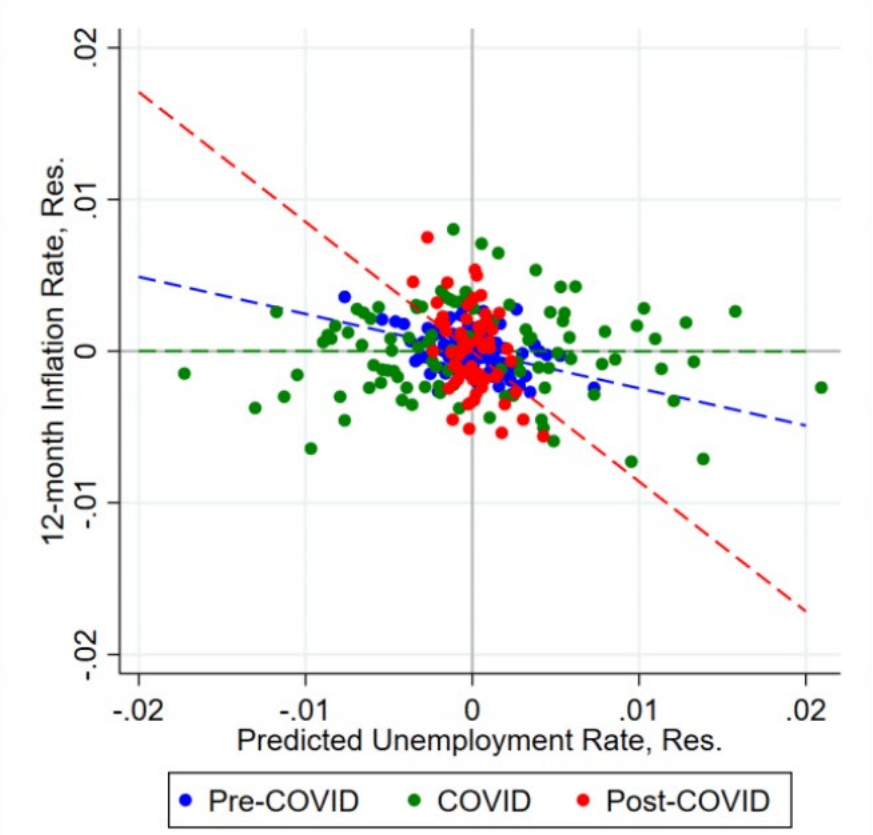


State Level Phillips Curves



State Level Phillips Curves: Pre vs. Post Covid

Cerrato and Gitti (2023)



Phillips Curve for Canadian Provinces

Table 3: Phillips curves for Canadian provinces

Variables	OLS on aggregate (Canada)	Pooled	Regional
Inflation(-1)	0.48***	0.38***	0.17***
	(0.00)	(0.00)	(0.00)
Unemployment rate	0.021	-0.00032	-0.069**
	(0.78)	(0.98)	(0.04)
Constant	0.76	1.1***	2.1***
	(0.20)	(0.00)	(0.00)
Observations	120	1,200	1,200
Adjusted R-squared	0.23	0.15	0.62
Time-fixed effects	No	No	Yes

te: The sample is 1990 to 2019 and includes data for the 10 provinces. *, ** and *** indica

Source: Gnocchi et al., 2024

Five sets of graphs

1. Understanding Inflation
2. **Monetary policy shocks**
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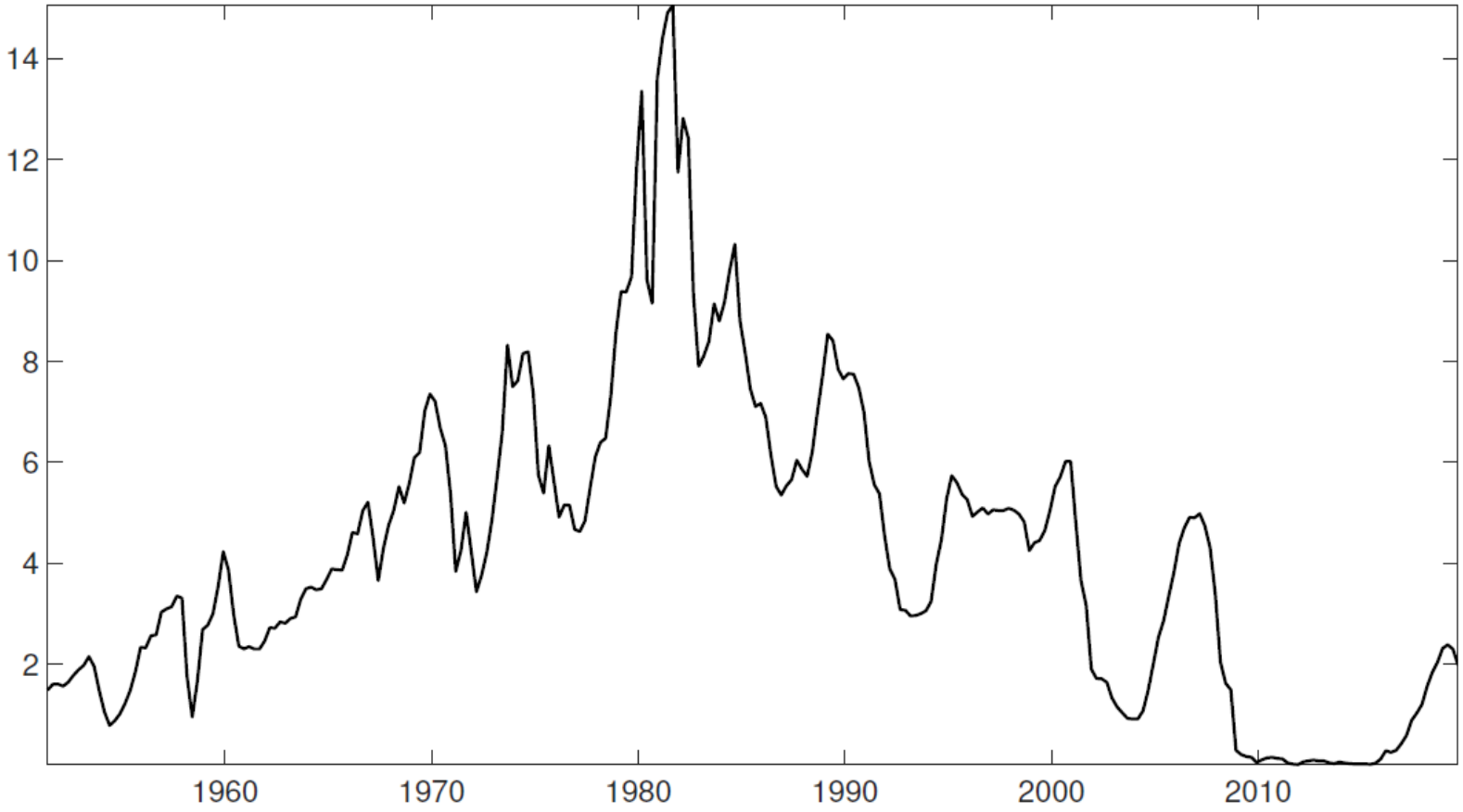
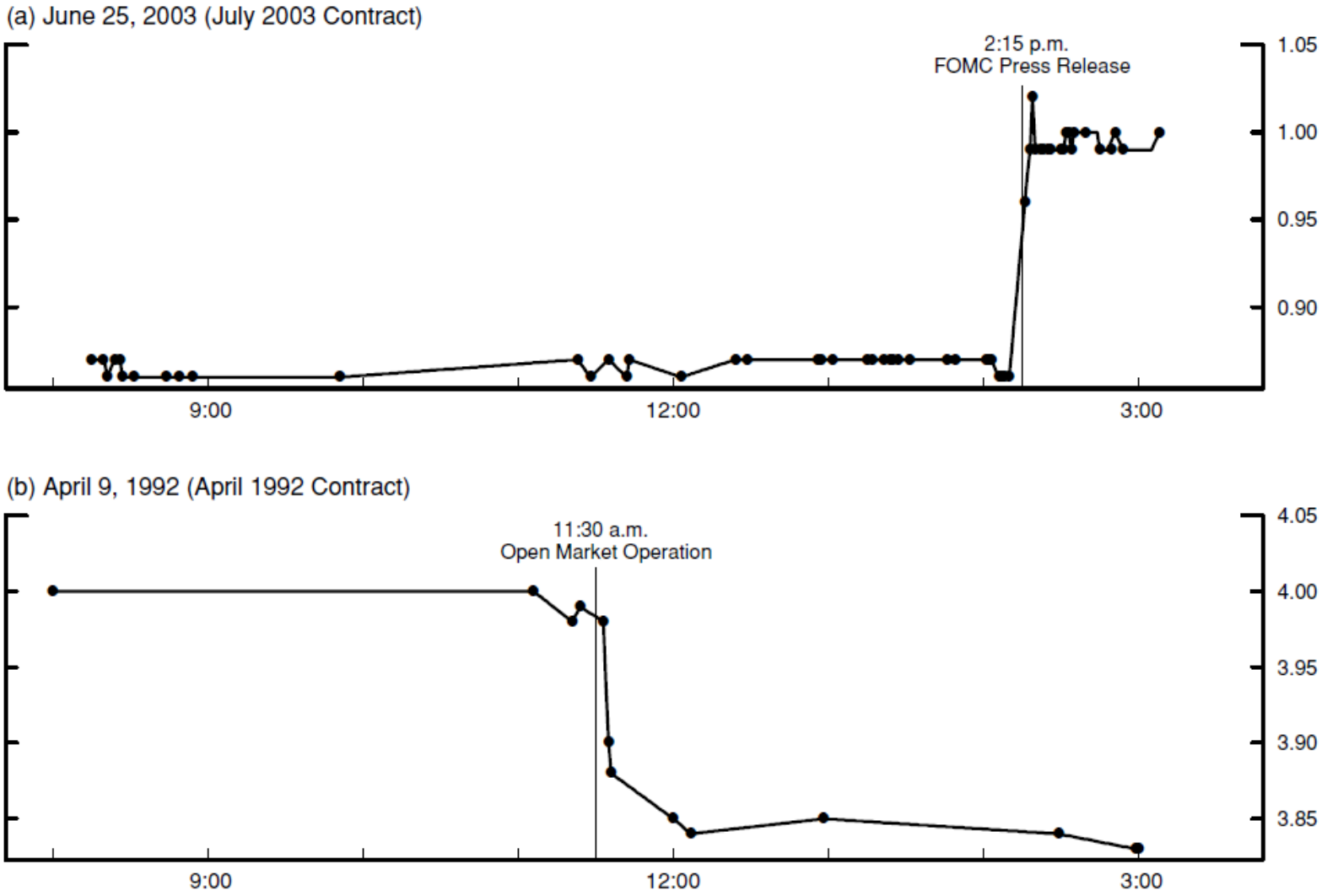
5. Exchange Rate Depreciations

Interest Rates: 3 Month T-Bill Yield (Pre-Covid)

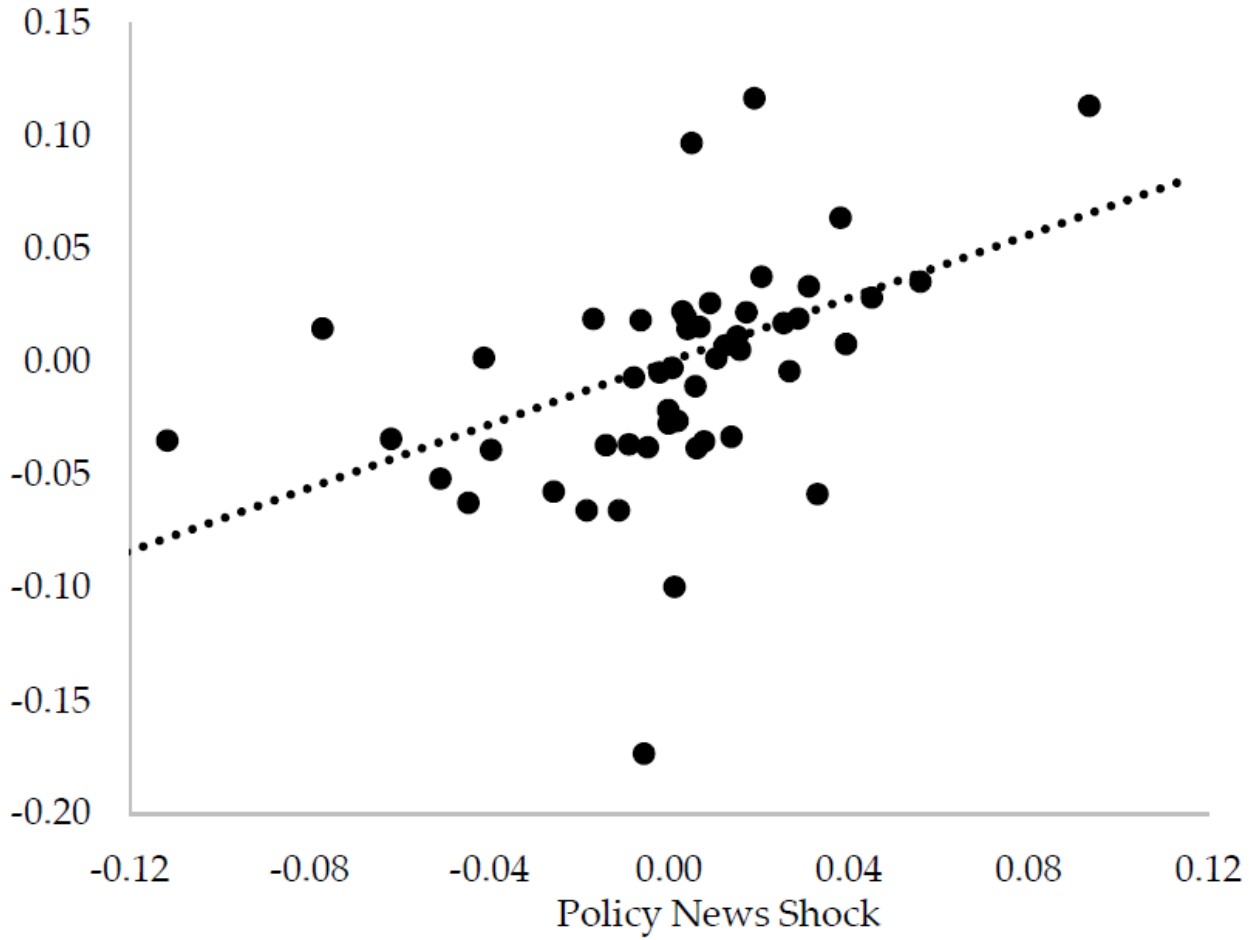


FOMC Announcements Are Mini-Experiments



Effect on real rates

Figure 1: Binned Scatter Plot for 5-Year Real-Yield Regression



Monetary shocks in canada

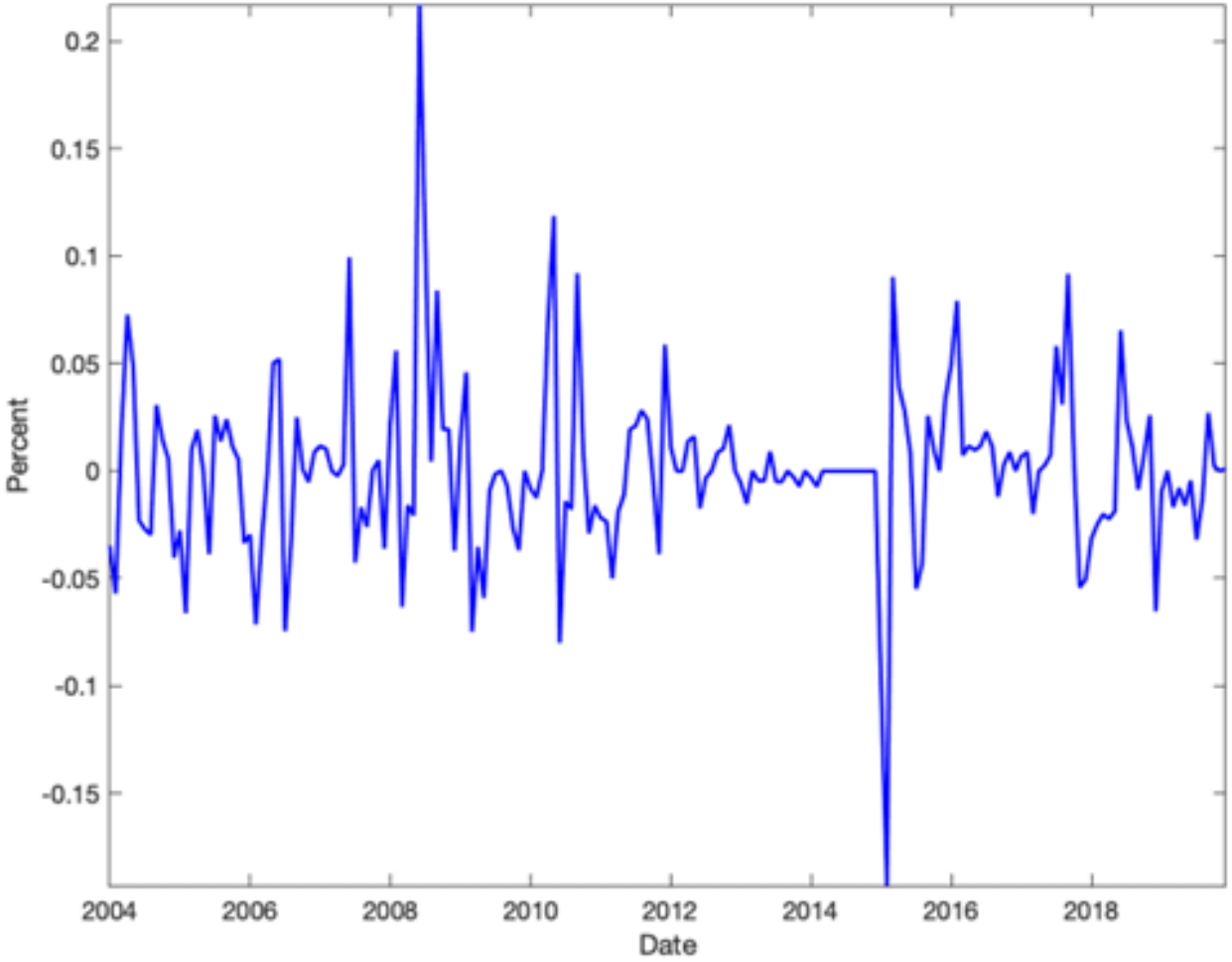
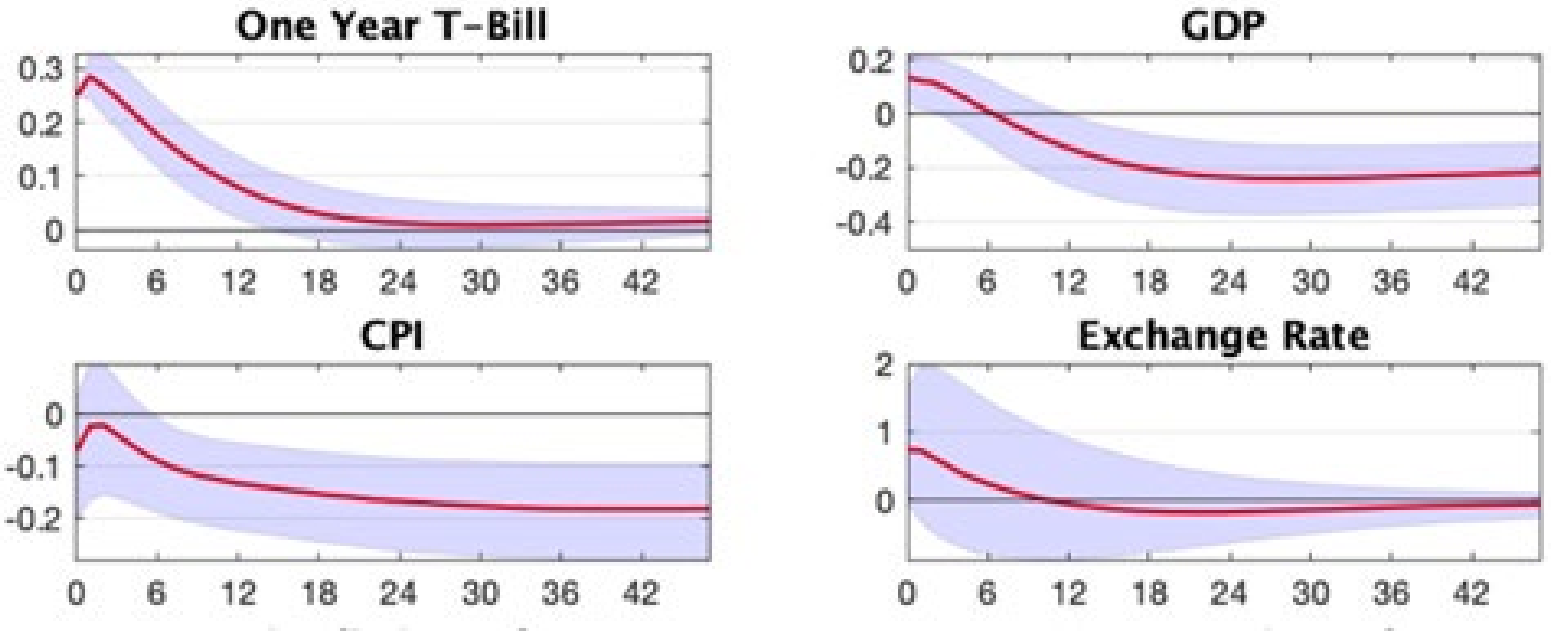


Figure 2: Second front contract of the monetary surprise measure (BAX2).

Source: Soosalu, 2024

Effects of Monetary Tightening in Canada



Six sets of graphs

1. Understanding Inflation
2. Monetary policy shocks
3. **Fiscal stimulus**
4. Declining employment rates
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Fiscal Stimulus: The Empirical Challenge

- Government spending happens for a reason
  - E.g., Government employs fiscal stimulus to offset a recessionary shock (e.g. negative housing wealth shock)
- Simple correlations yield wrong answers
- Unfortunately (for science) no randomized trials

Regional Variation in Military Spending

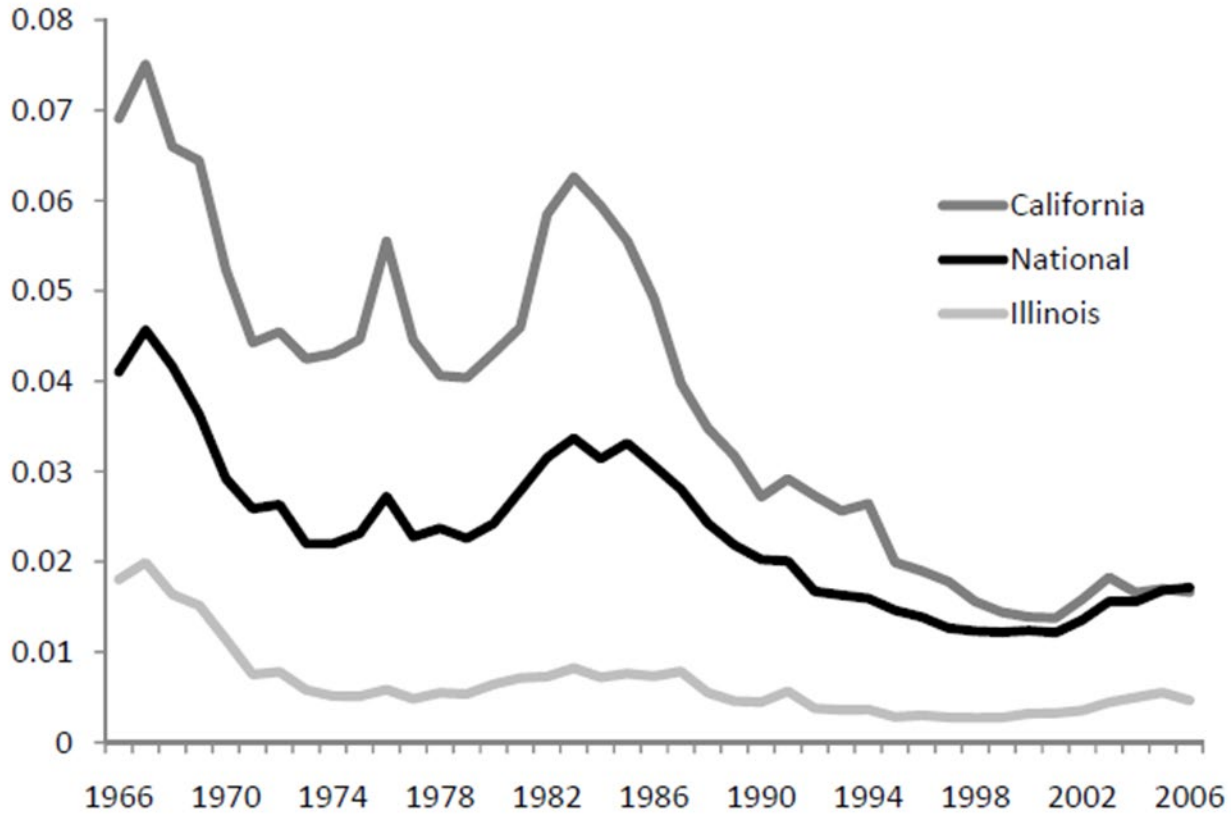

Figure I
Prime Military Contract Spending as a Fraction of State GDP

Scatter plot

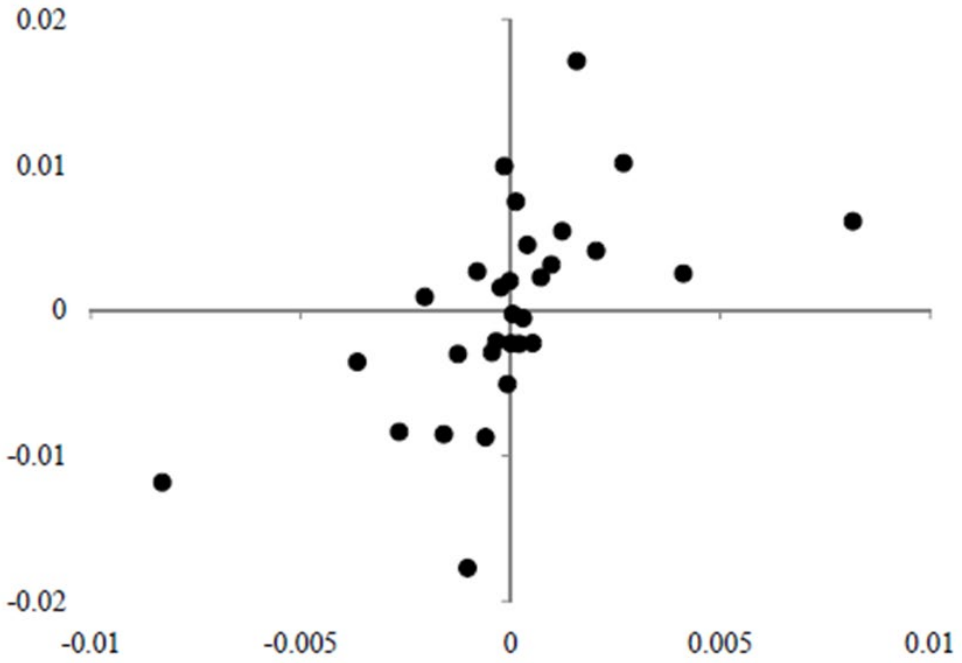

FIGURE III
Quantiles of Change in Output Versus Predicted Change in Military Spending

The figure shows averages of changes in output and predicted military spending (based on our first-stage regression), grouped by 30 quantiles of the predicted military spending variable. Both variables are demeaned by year and state fixed effects.

Fiscal Multipliers from Japan

Fiscal Multipliers in Japan

	(B) 2SLS	
	(1)	(2)
Regional fiscal multiplier (β_R)	1.741***	1.604***
	(0.274)	(0.363)
Prefectural fiscal multiplier (γ_P)	1.441**	1.604***
	(0.570)	(0.363)

Source: Kameda et al., 2021

Five sets of graphs

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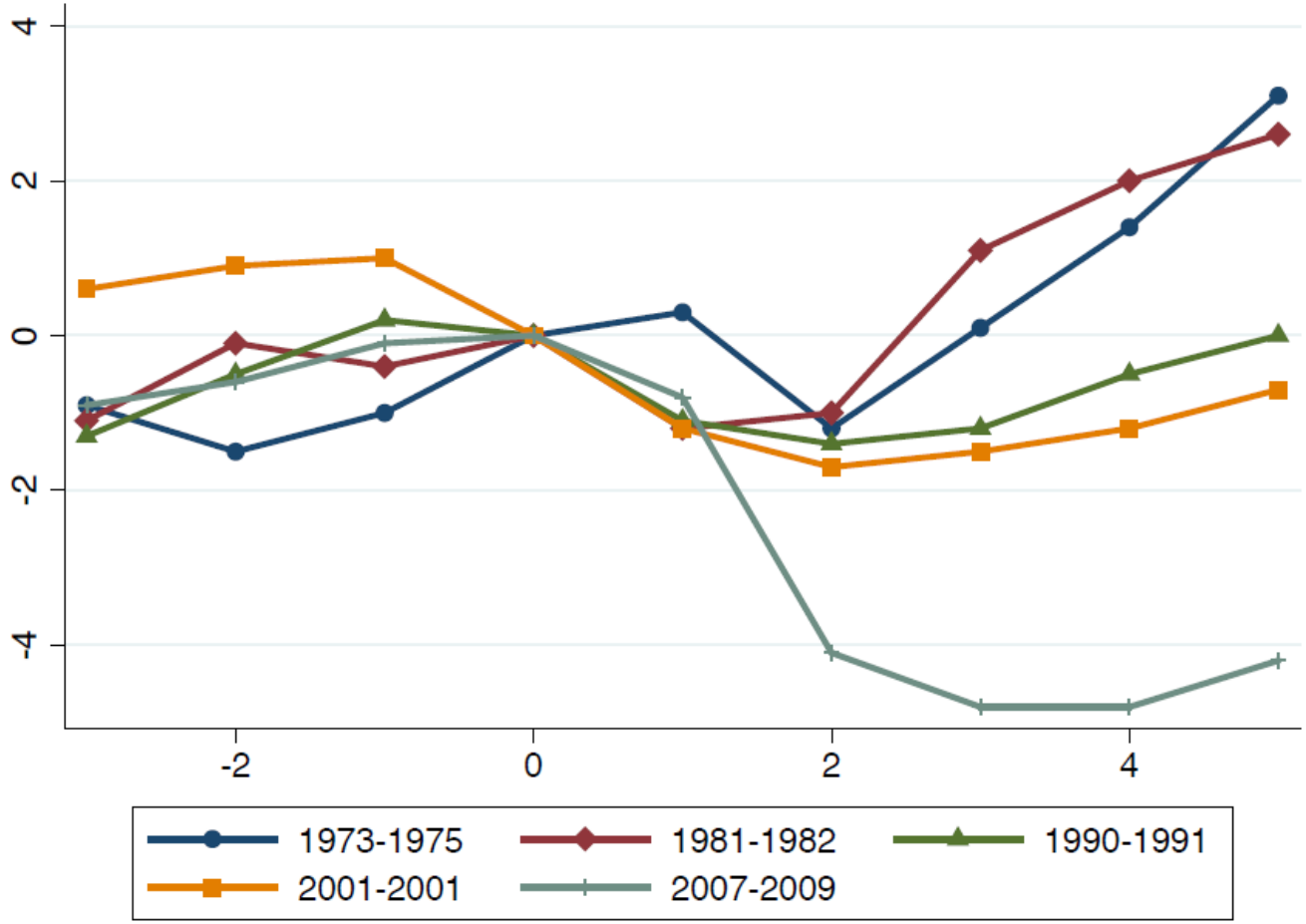
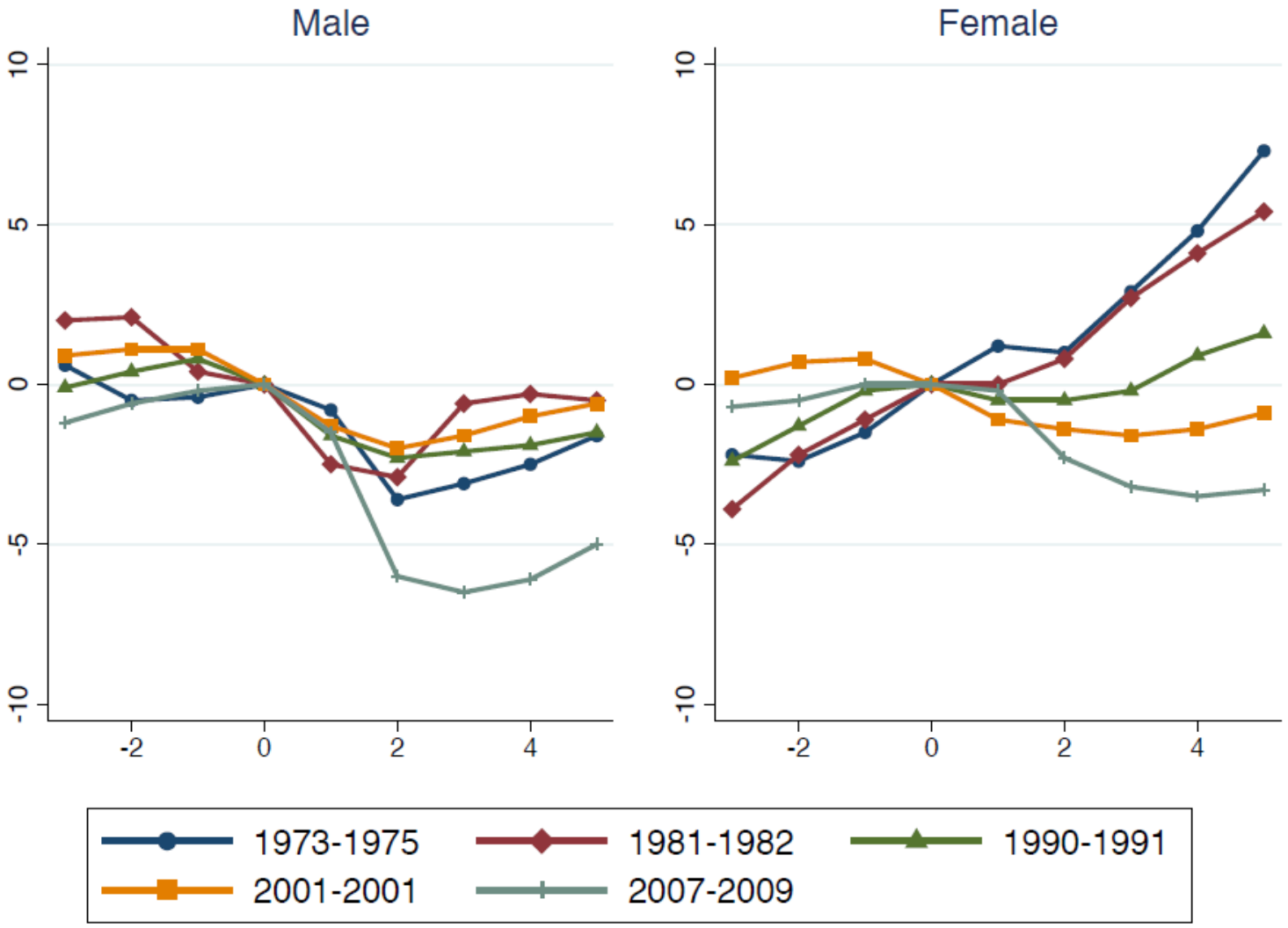
Slowing Recoveries (Pre Covid)



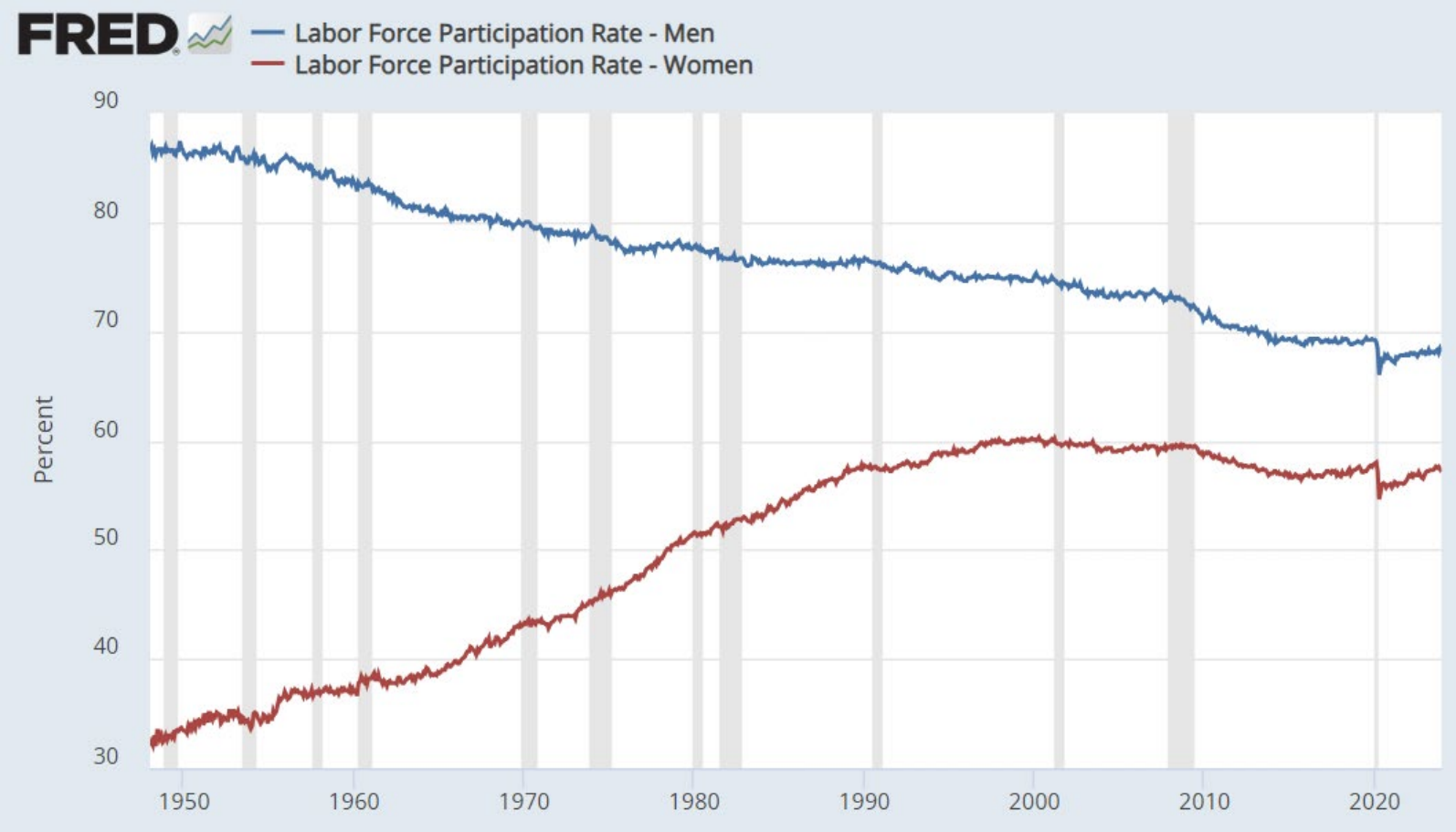
Source: Fukui, Nakamura, Steinsson (2023)

And It's All about Women

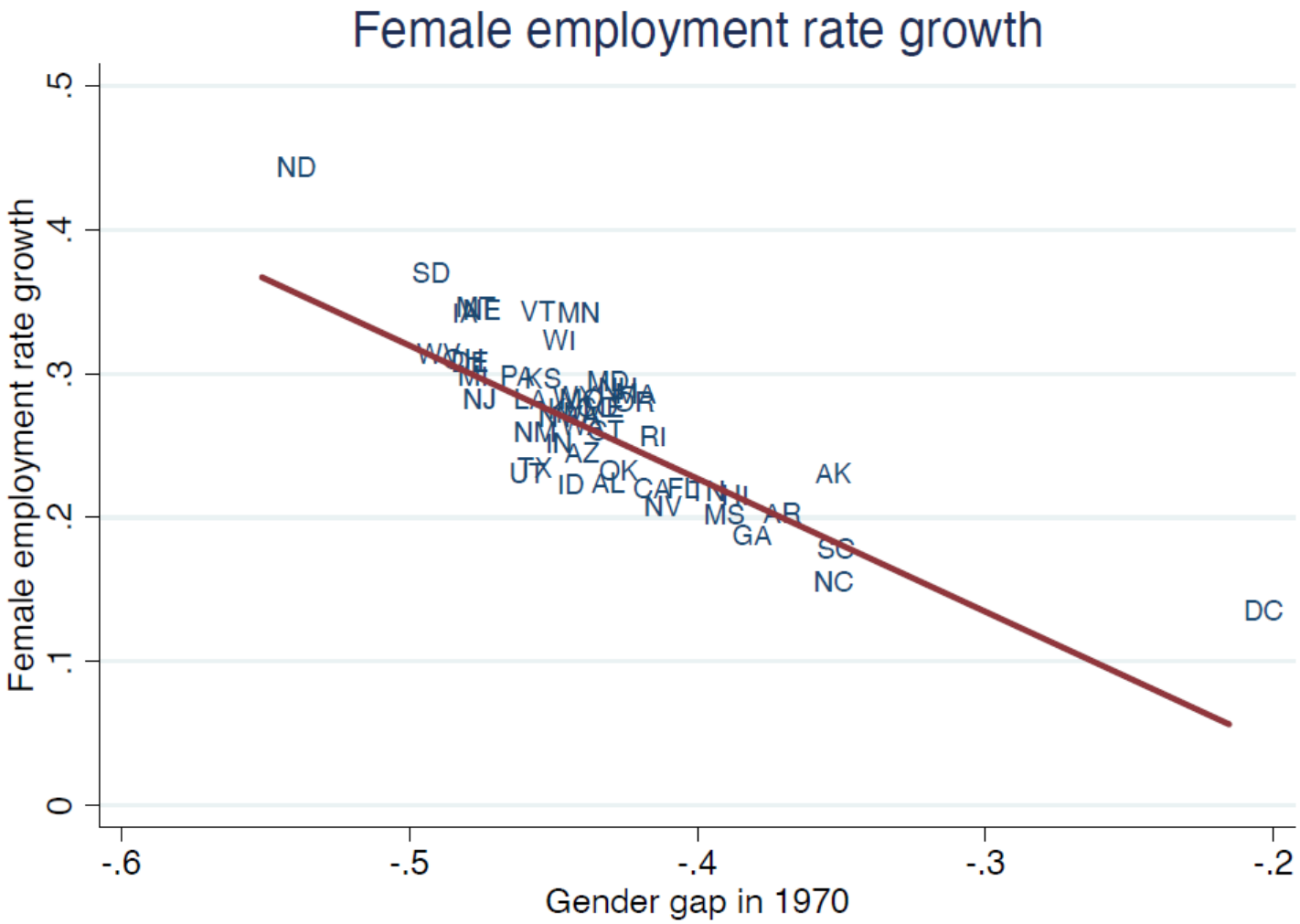


Source: Fukui, Nakamura, Steinsson (2023)

Labor force participation: Men vs. Women



Do Women Crowd Out Men?



Source: Fukui, Nakamura, Steinsson (2023)

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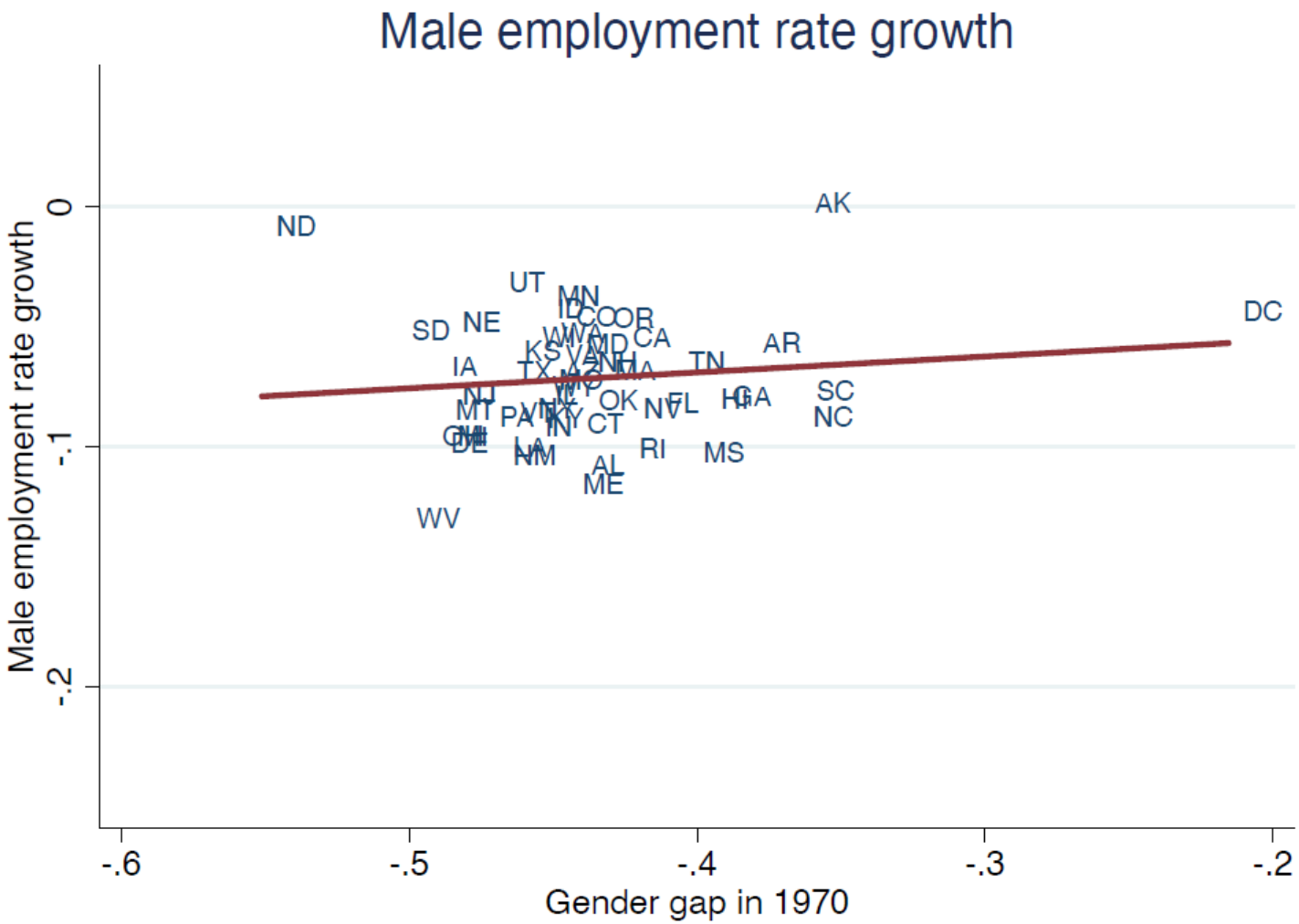
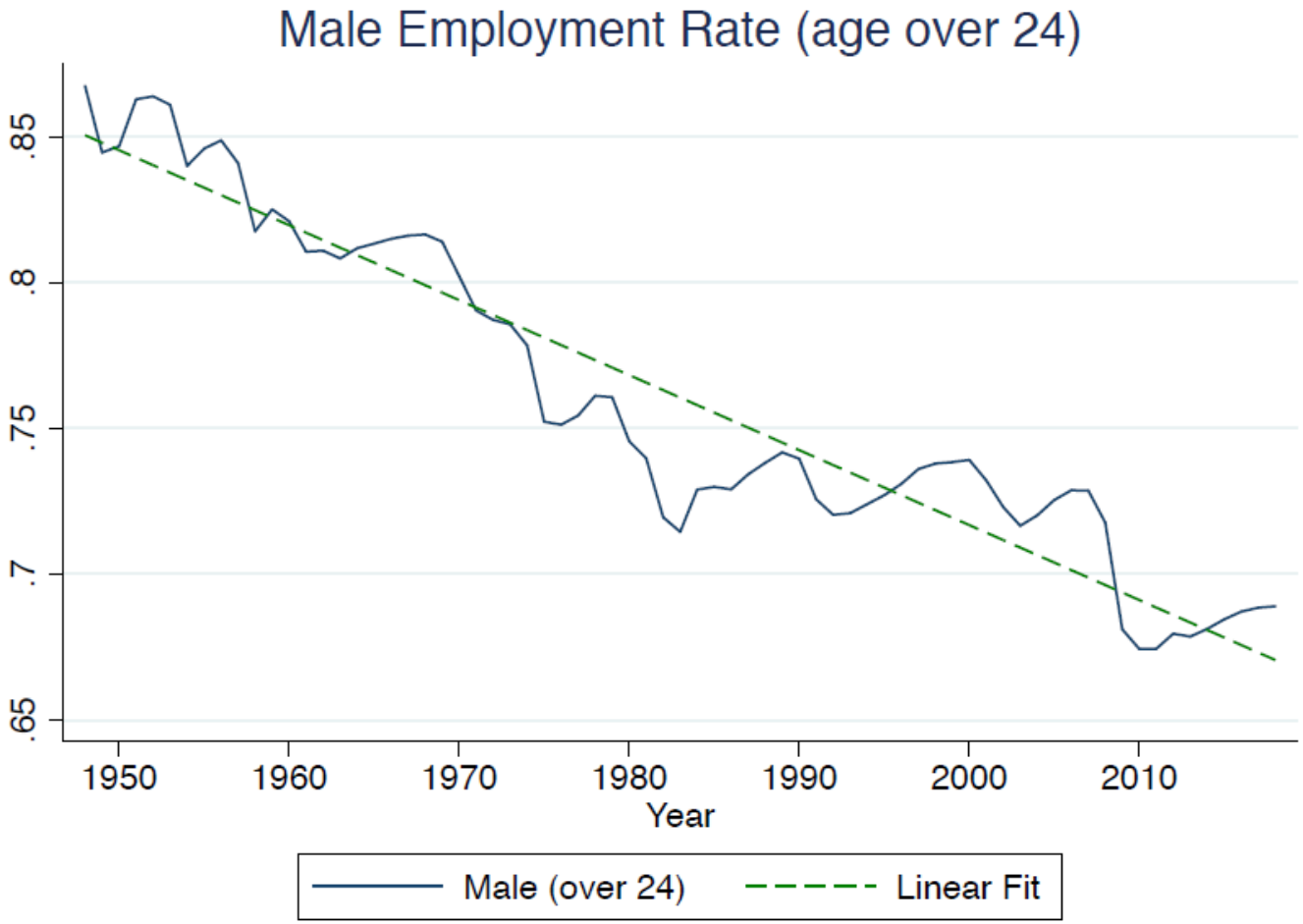


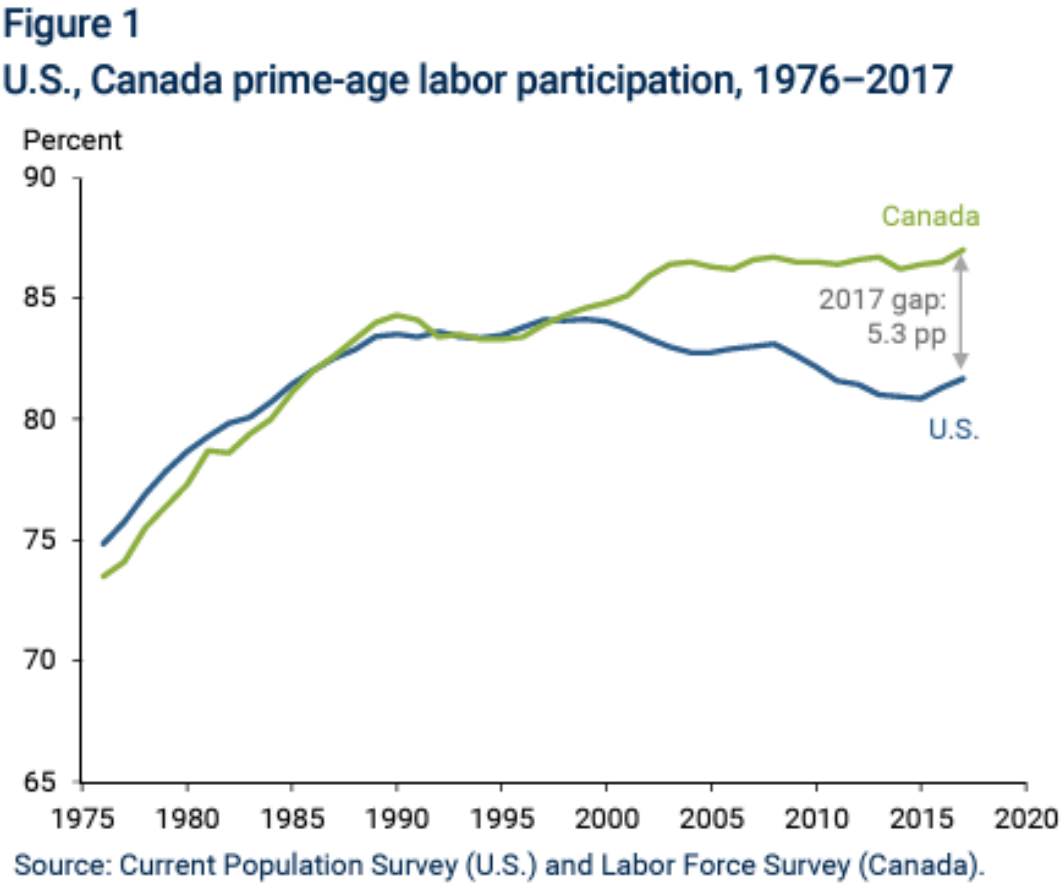
Source: Fukui, Nakamura, Steinsson (2023)

Men> 24: Trend Since 1950



Source: Fukui, Nakamura, Steinsson (2023)

Canada vs US: Prime Age Labor Force Participation

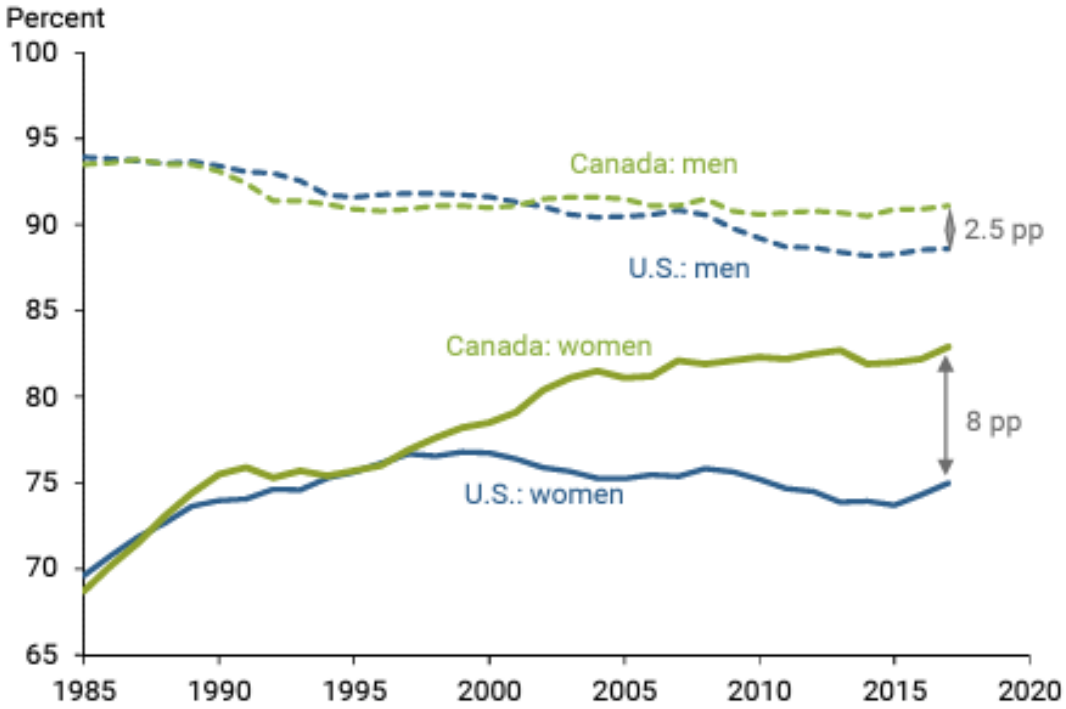


Source: Daly et al. (2018)

Canada vs US: Prime Age LFP By Gender

Figure 2

Canada and U.S. prime-age labor participation by gender



Source: Current Population Survey (U.S.) and Labor Force Survey (Canada).

Source: Daly et al. (2018)

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5. **Exchange Rate Depreciations**

How does an exchange rate depreciation affect the economy?

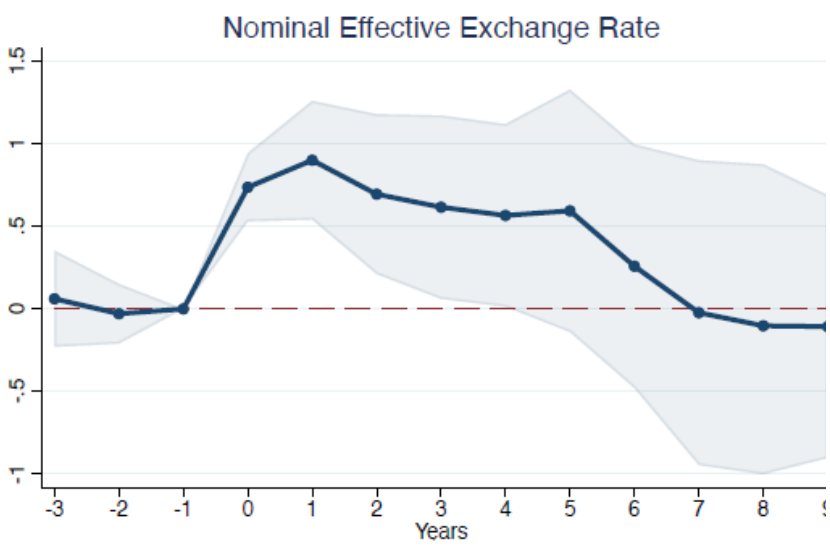
- Alternative theories yield conflicting results
  - Simple textbook logic suggests expansionary effect
  - But: Long literature on contractionary depreciations, exchange rate disconnect
- What is the empirical evidence?
  - Challenge (again): Reverse causality!
  - A negative economic shock (e.g., banking crisis) may *cause* an exchange rate depreciation
  - Hard to think of "effect" of exchange rate depreciation in isolation

A Natural Experiment?

- Historical determination of peg vs. floater status creates potential for natural experiment

- Example:
  - Egypt pegs to USD, South Africa floats versus USD
  - When USD depreciates, EGP depreciates versus ZAR
  - How does this event affect other macro outcomes in Egypt versus South Africa?

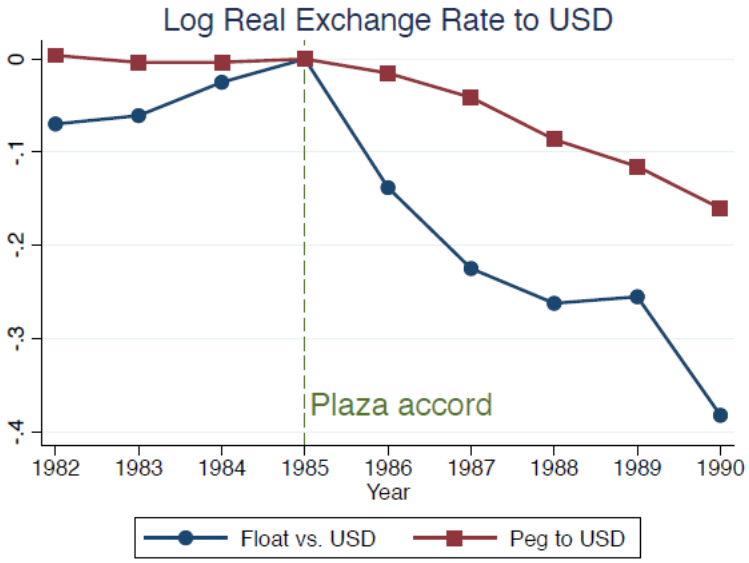
Turns out that Peggers Boom when USD causes Currency to Depreciate

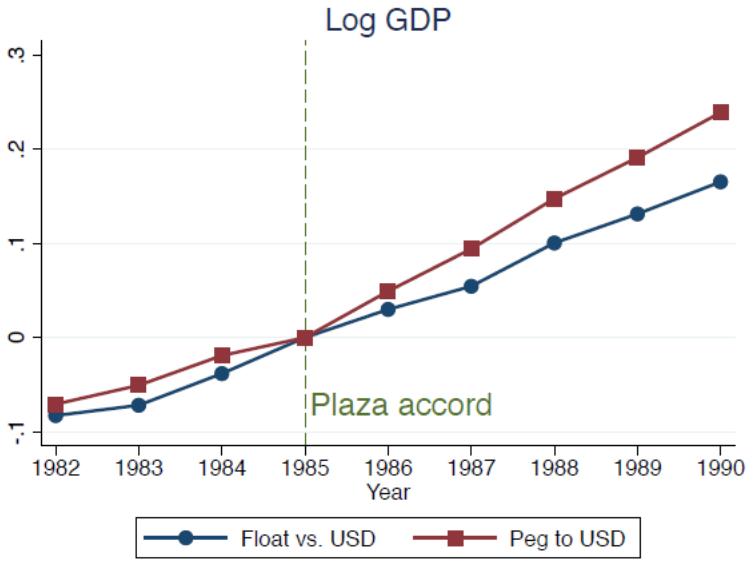


- But not because of export boom or monetary easing

Example: Plaza Accord

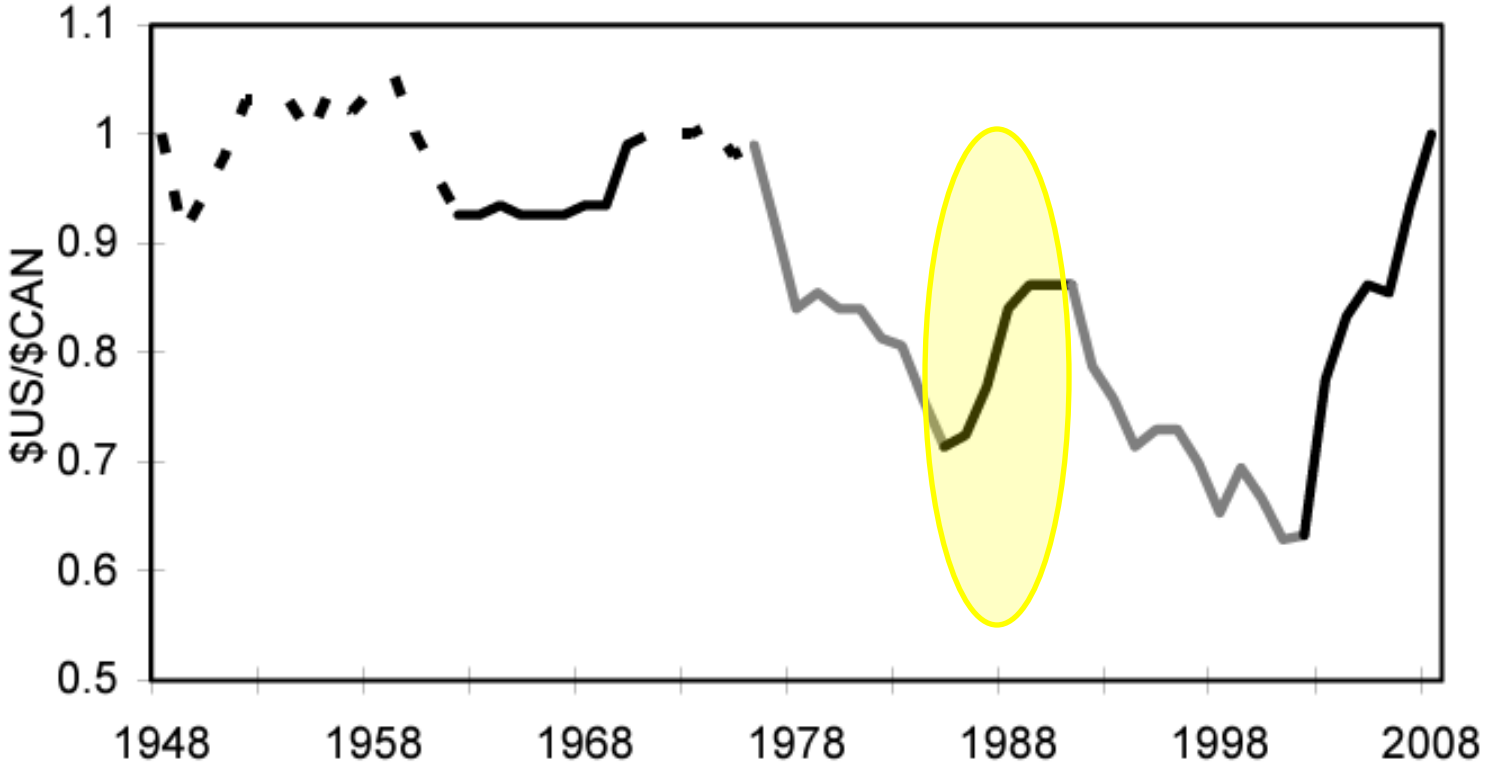
- January 1985: James Baker becomes Treasury Secretary
- September 22, 1985: G5 jointly agreement to depreciate USD





Canadian Dollar in terms of US Dollar

Figure 1: Historical Trajectory of Canadian Dollar Exchange Rate



Source: Devereux (2009)

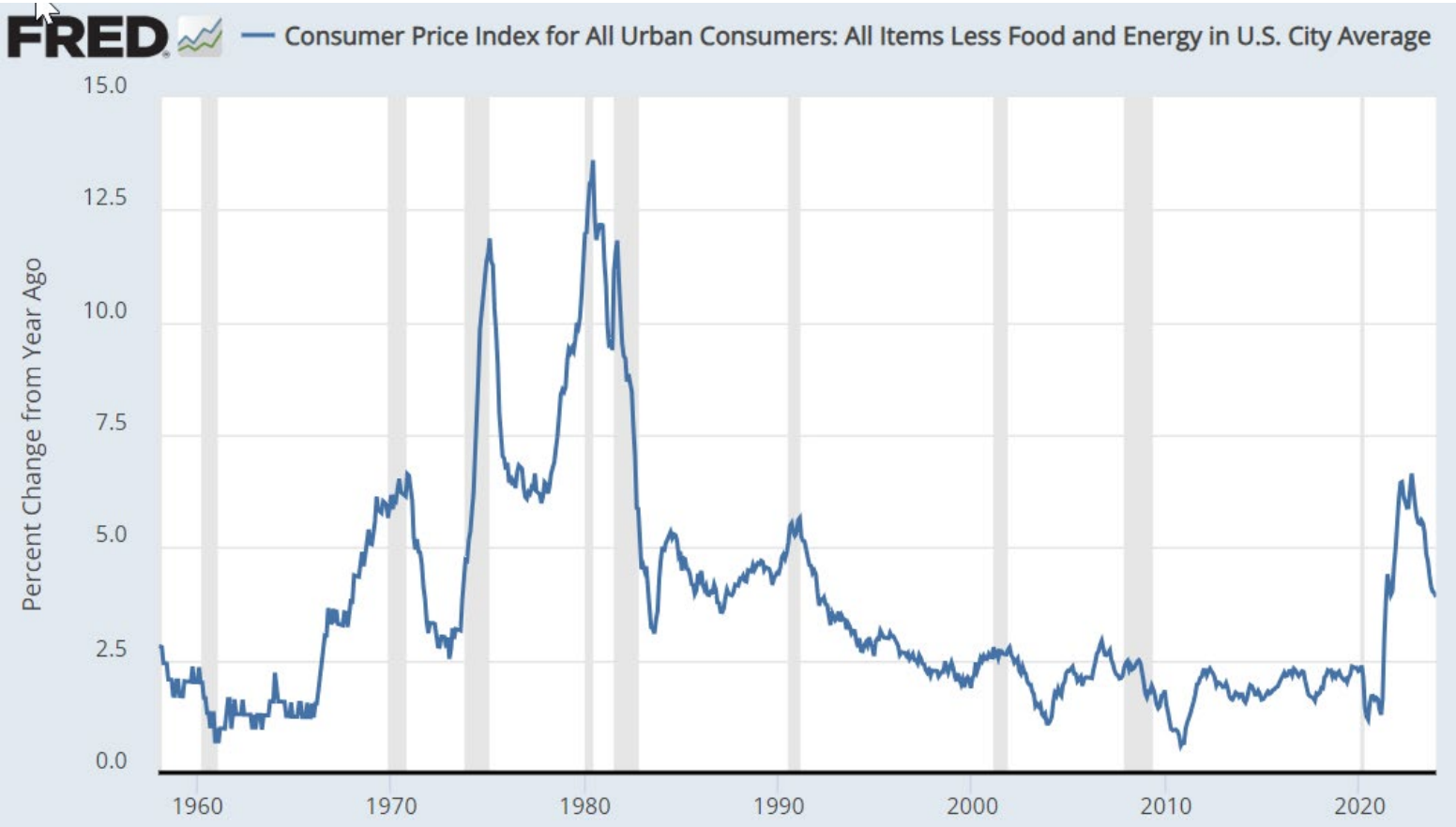
Bridge from Natural Experiments to Theory

- I have glossed over the details of the connection between the natural experiments and macro theories
- Often the natural experiment isn't *exactly* the experiment we want for policy questions
  - E.g., We want to know what happens when government spending increases overall, not in one state *relative* to another
- Hard to answer without combination of theory and data

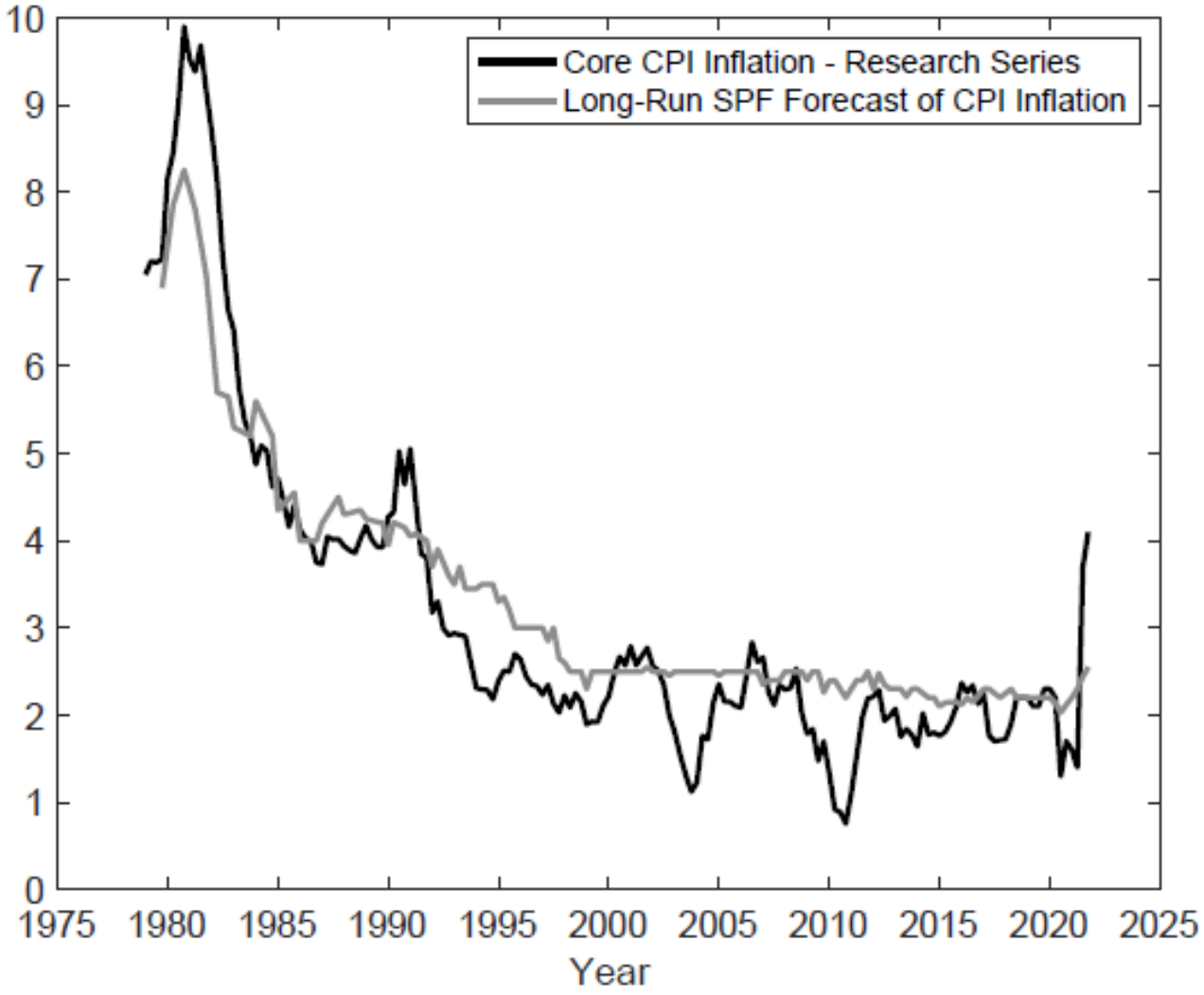
Macroeconomics and Meteorology

Appendix

A Longer Perspective…



Volcker Disinflation: Long-Run Inflation Expectations



Regional Philips Curves

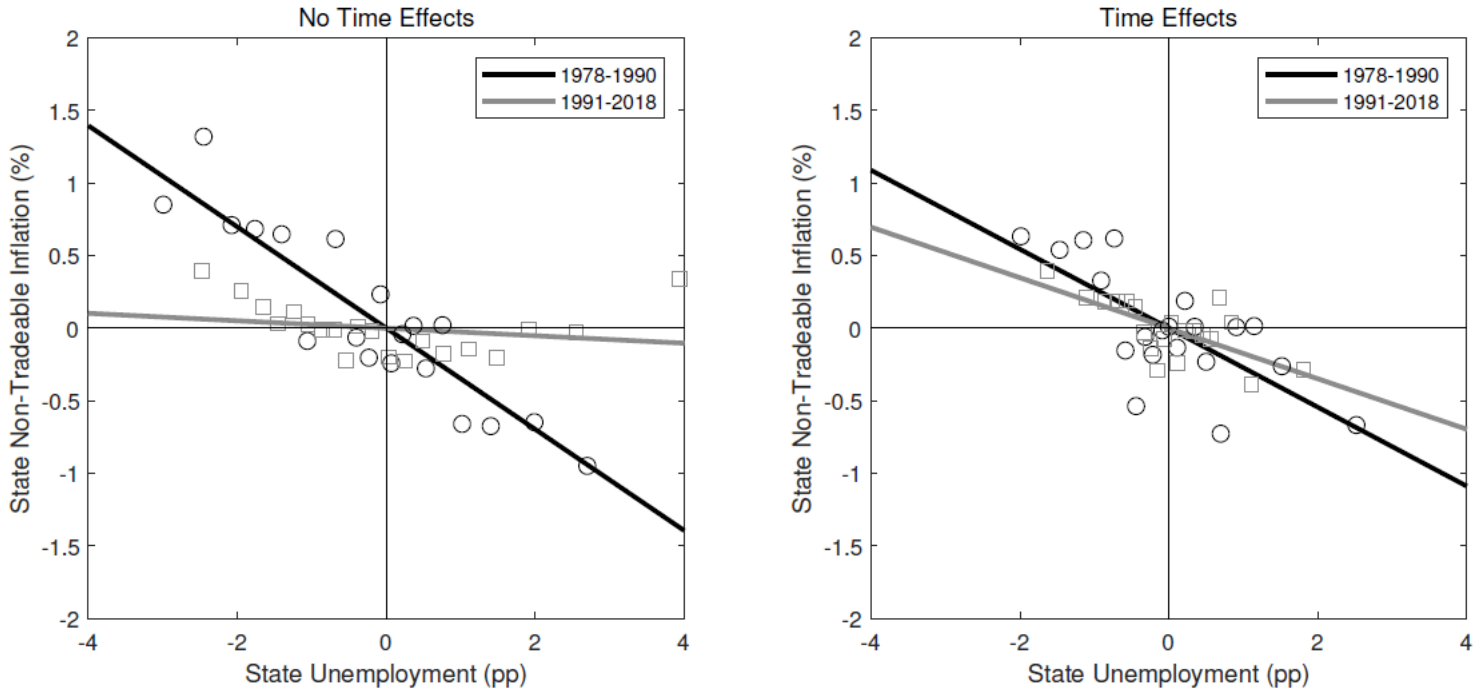
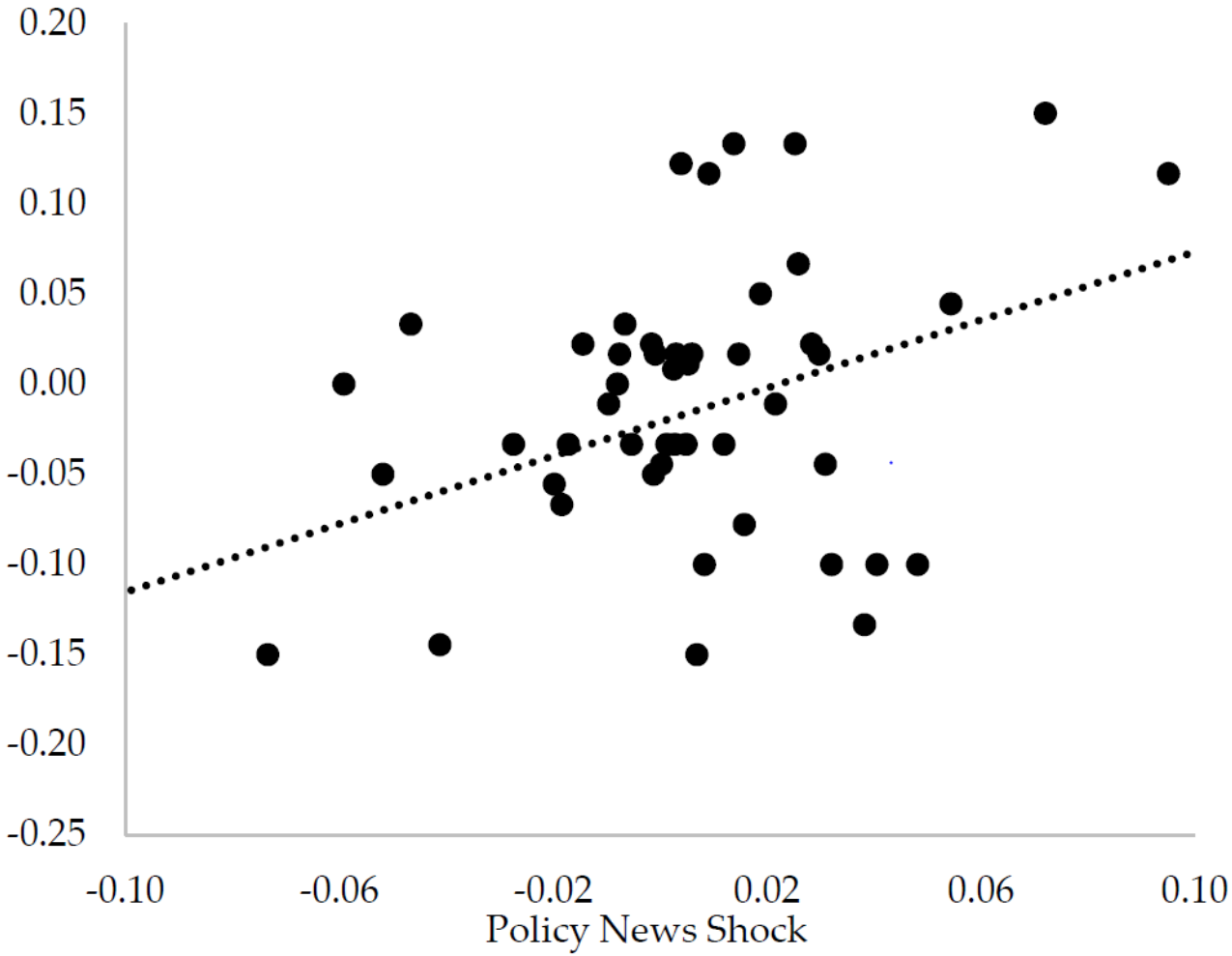
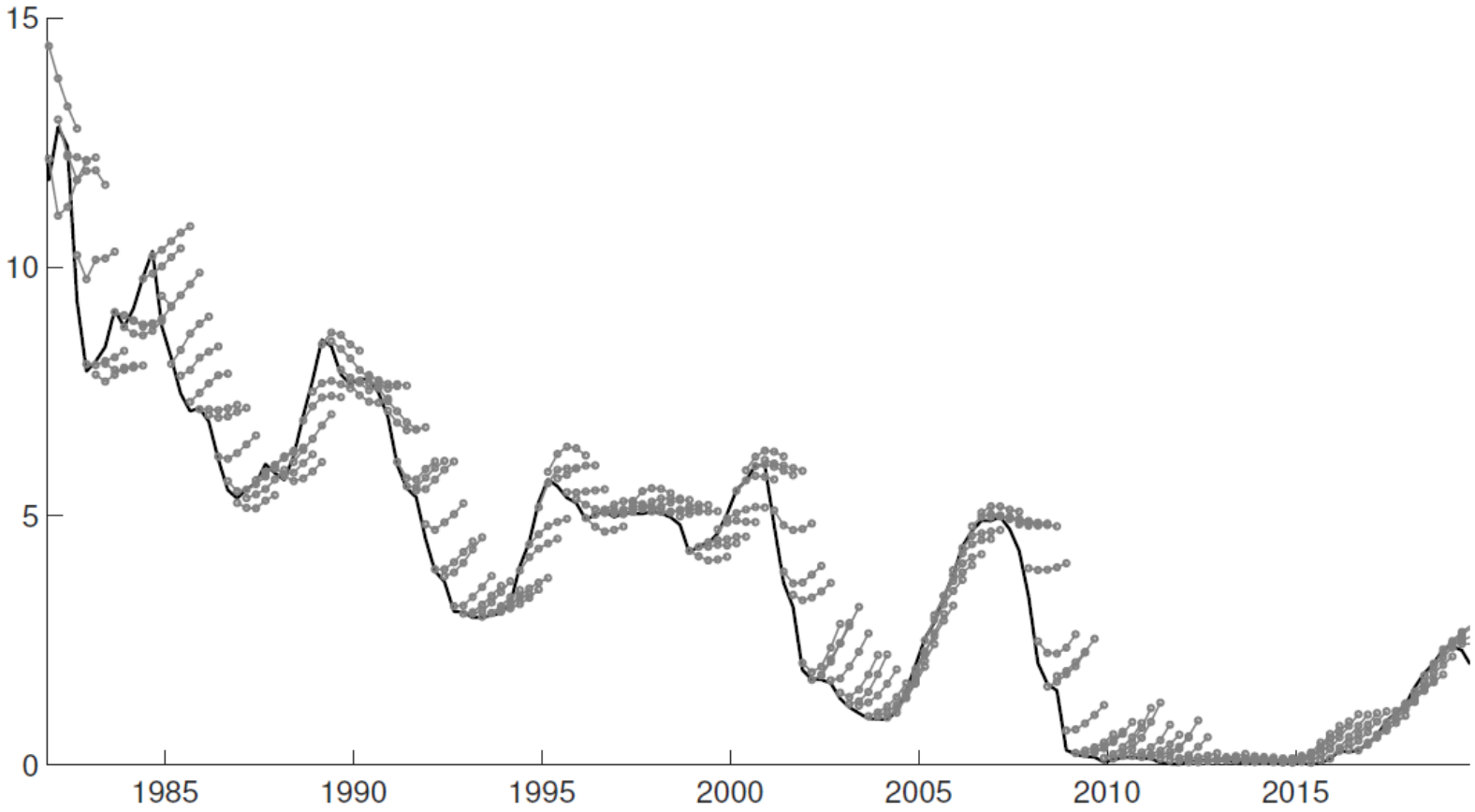


FIGURE: Scatterplots—Non-Tradeable Inflation and Unemployment

Contractionary monetary policy shocks Associated with positive growth updates

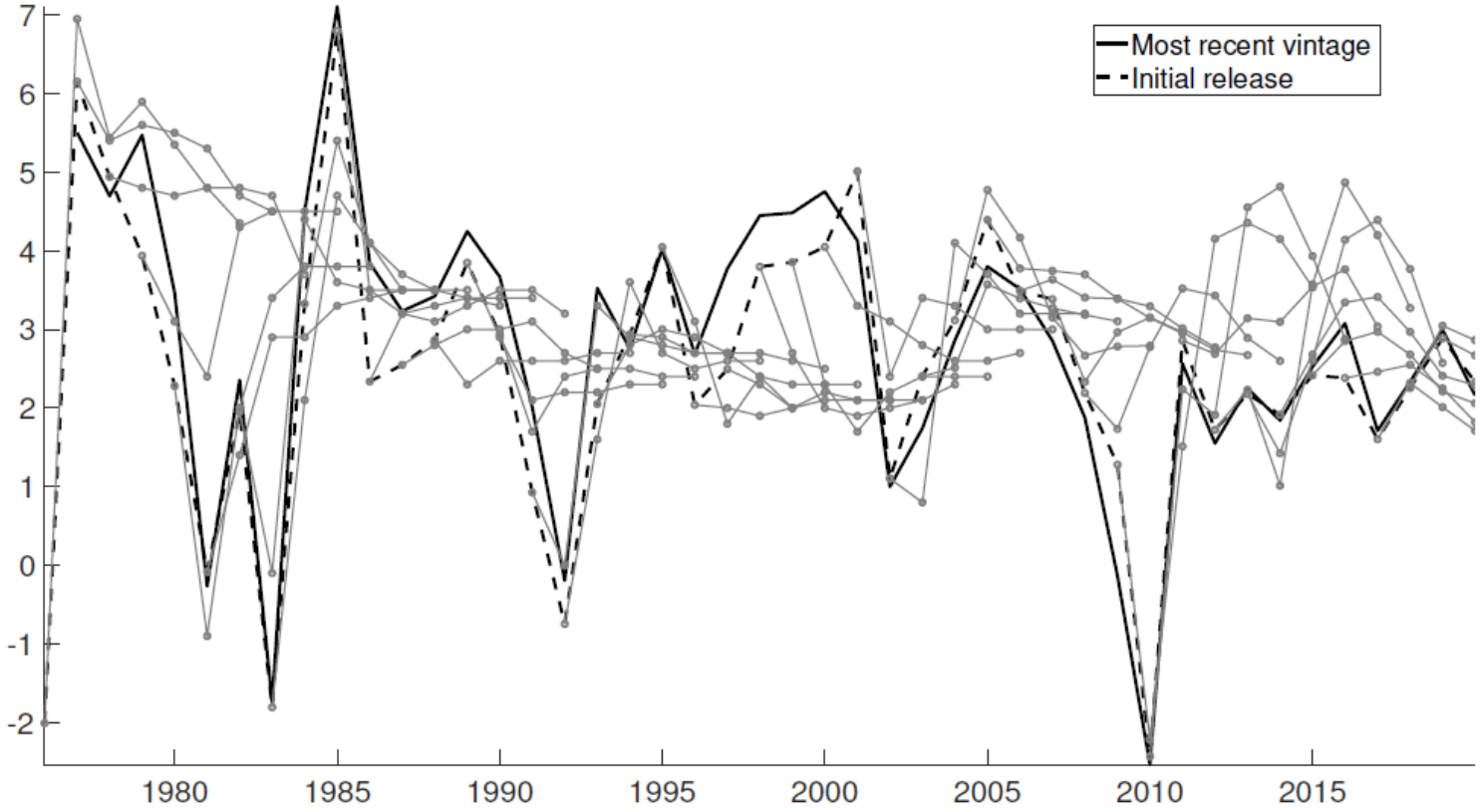


T-Bill Rates: Professional Forecasts



Source: Farmer, Nakamura, Steinsson (2023)

Real GDP Growth: Professional Forecasts



Source: Farmer, Nakamura, Steinsson (2023)