Comments on Olivier Coibion & Yuriy Gorodnichenko's
"What can survey forecasts tell us about informational rigidities?"

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What does this paper do?

❑ **Research question**

- ▸ "a new set of stylized facts about… expectations formation"
  - ▪ "do agents have full information"
  - ▪ "how do we model their information problem?"
- ▸ "Unlike the previous literature, we study the *conditional* responses of forecast errors and forecast dispersion to identified structural shocks."
  - ▪ Contrast with Mankiw ,Reis and Wolfers

❑ **Approach: Assess *impulse response functions***

- ▸ Average expectations <u>and</u> dispersion (disagreement)
- ▸ As measured three ways (Michigan survey; SPF; Blue Chip)
- ▸ In response to "identified" macro shocks: Monetary, technology, oil, info, confidence, fiscal

Imperfect info

1. Forecasts under-react to shocks in the short run, but not in the long run

2. Convergence rate of forecast errors *may* differ across shocks
   ▸ Depends on how you learn about diff shocks

3. Dispersion of forecasts doesn't change after a shock
   ▸ Or, indeed, ever

Sticky info

1. Forecasts under-react to shocks in the short run, but not the long run

2. Convergence rate of forecast errors is common across shocks
   ▸ Depends on state- versus time-dependent updating

3. Dispersion of forecasts rises after a shock
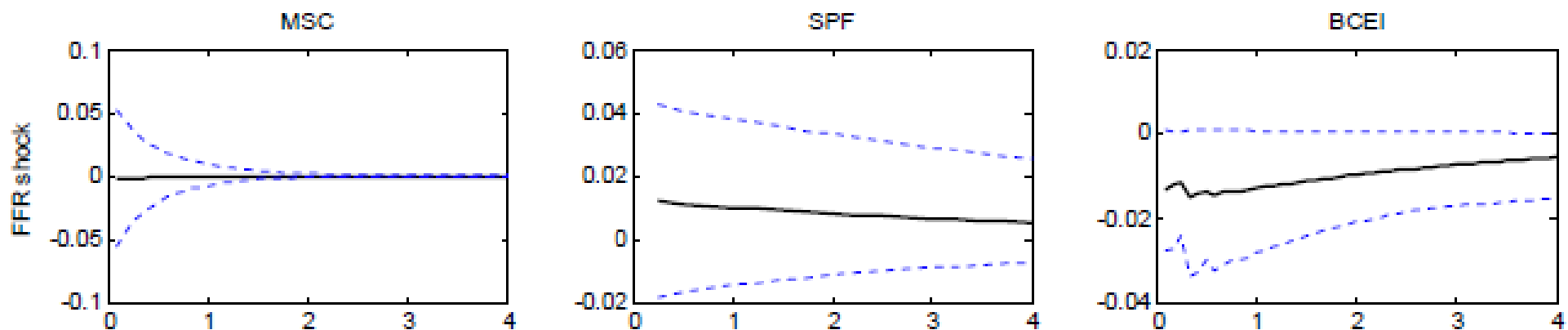   ▸ And only after shocks

Finding #1: Inflation expectations are unrelated to identified macro shocks

❑ A monetary shock affects inflation:
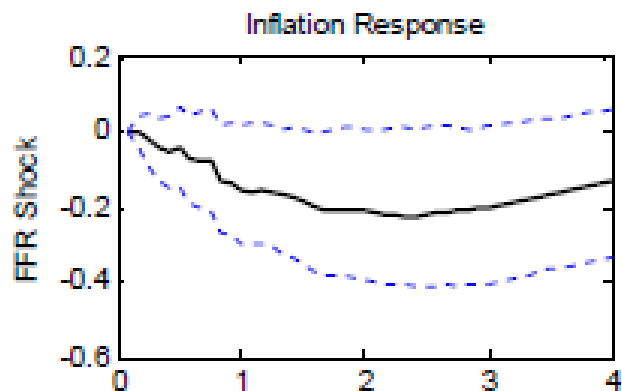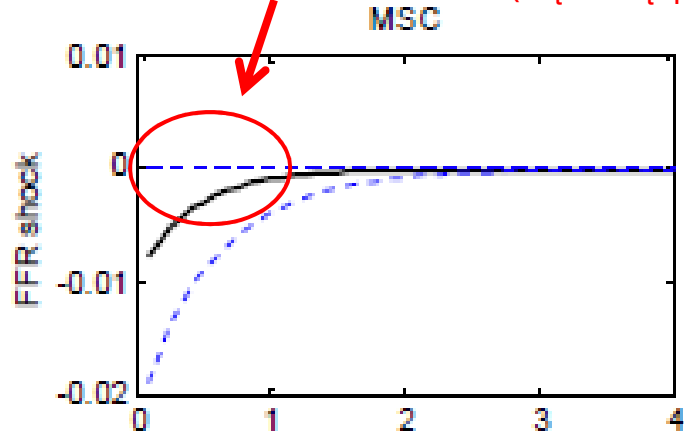

❑ But inflation expectations are unmoved:

Figure 3: Response of Mean Forecasts to Baseline Shocks

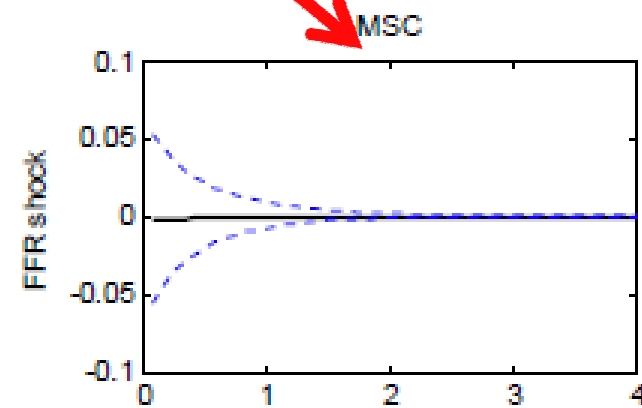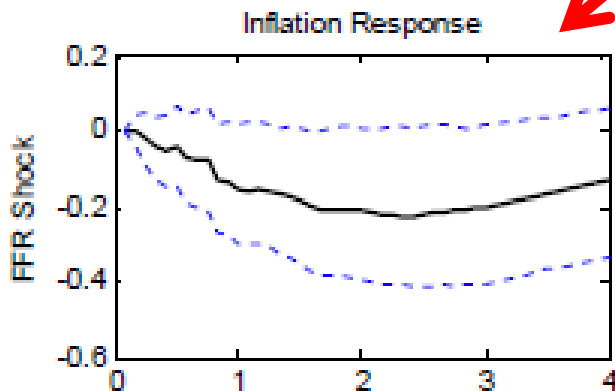# But authors emphasize: No effect on forecast error

❑ Apparently no effect of monetary shocks on forecast error

Forecast error = $(\pi_t - F_{t-4}\pi_t)$

$$\pi_t - F_{t-h}\pi_t = c + \sum_{i=1}^{I}\beta_i(\pi_{t-i} - F_{t-i-h}\pi_{t-i}) + \sum_{j=0}^{J}\gamma_j\varepsilon_{t-j}^{k} + v_t$$

❑ But shocks affect inflation, and not its forecast?

The problem with the forecast error equations

❑ "Structural" inflation and expectation equations

$$\pi_t = \overbrace{\sum_{i=1}^{I} \alpha_i \pi_{t-i}}^{\text{Past inflation}} + \overbrace{\sum_{j=0}^{J} \beta_j F_{t-j} \pi_{t-j+4}}^{\text{Past forecasts}} + \overbrace{\sum_{k=0}^{K} \gamma_k \varepsilon_{t-k}}^{\text{Structural shocks}}$$

$$F_{t-4}\pi_t = \sum_{i=4}^{I} a_i \pi_{t-i} + \sum_{j=4}^{J} b_j F_{t-j-1} \pi_{t-j} + \sum_{k=4}^{K} c_k \varepsilon_{t-k}$$

❑ Yielding forecast errors

$$\pi_t - F_{t-4}\pi_t = \sum_{i=1}^{3} \alpha_i \pi_{t-i} + \sum_{j=0}^{3} \beta_j F_{t-j} \pi_{t-j+4} + \sum_{k=1}^{3} \gamma_k \varepsilon_{t-k}$$

$$+ \sum_{i=4}^{I} (\alpha_i - a_i)\pi_{t-i} + \sum_{j=4}^{J} (\beta_j - b_j)F_{t-j}\pi_{t-j+4} + \sum_{k=4}^{K} (\gamma_k - c_k)\varepsilon_{t-k}$$
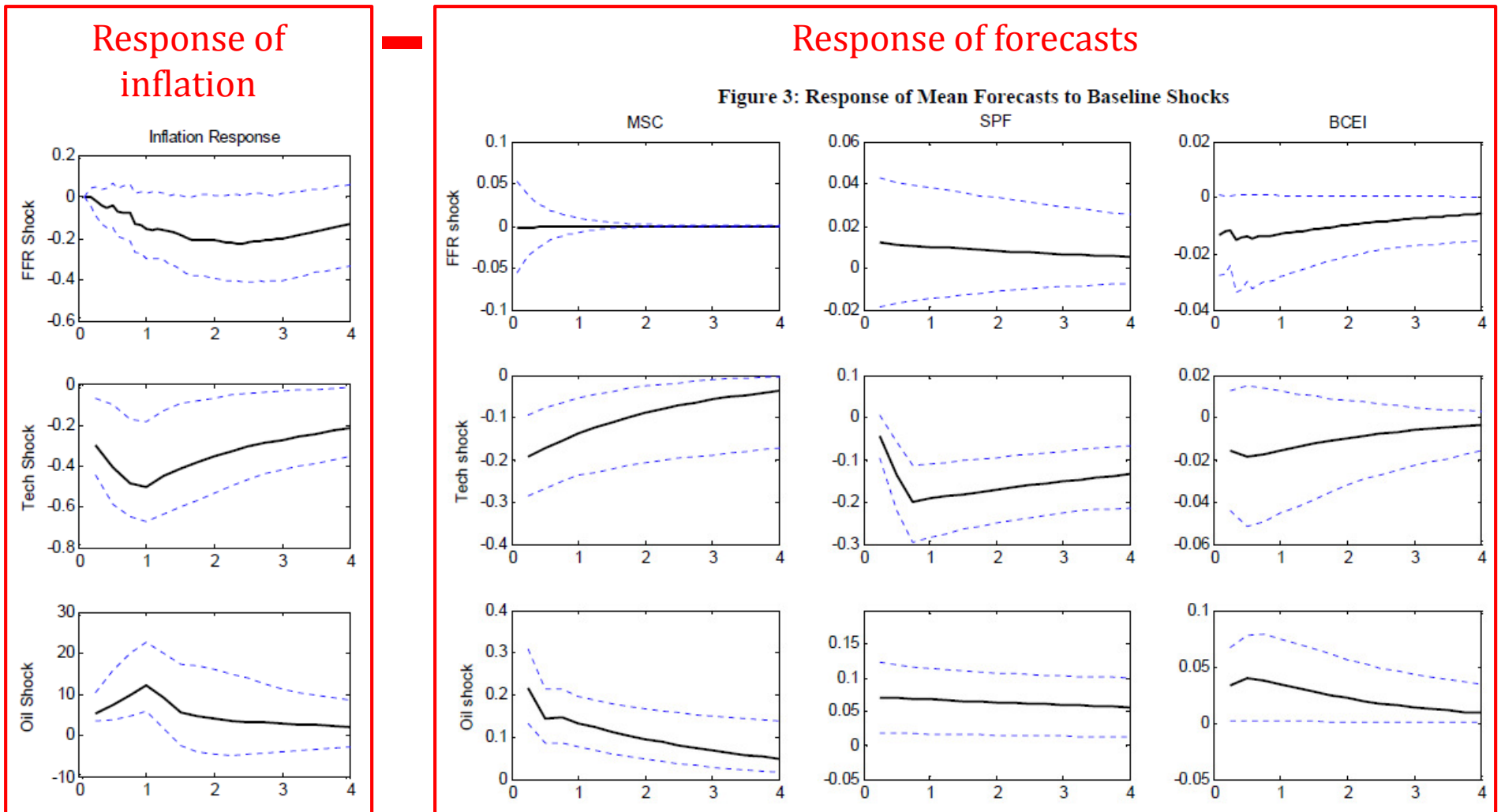
❑ But they estimate:

$$\pi_t - F_{t-h}\pi_t = c + \sum_{i=1}^{I} \beta_i (\pi_{t-i} - F_{t-i-h}\pi_{t-i}) + \sum_{j=0}^{J} \gamma_j \varepsilon_{t-j}^k + v_t$$

❑ Imposing:

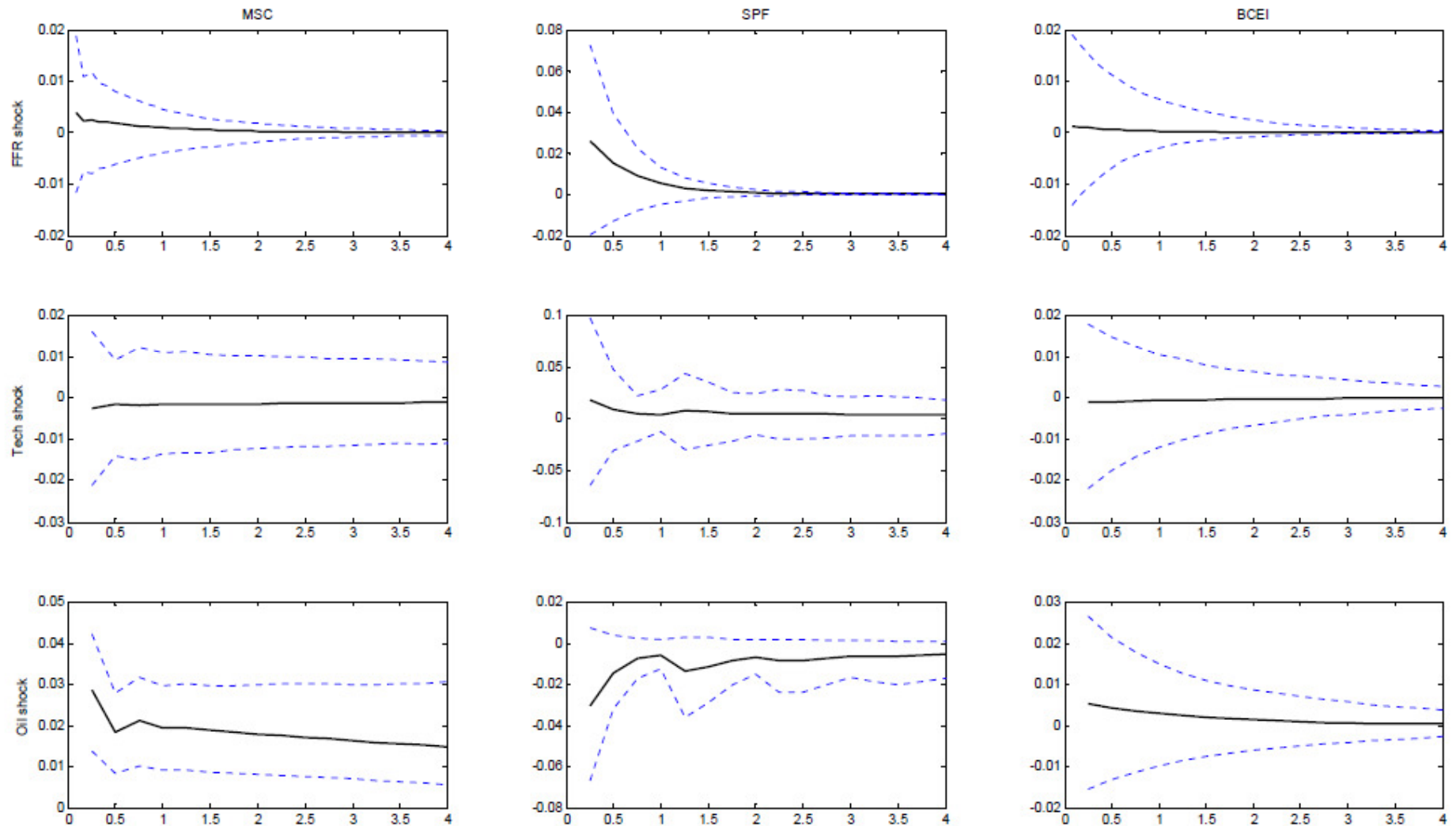$$\boxed{\alpha_i = -\beta_i \text{ for i} = 1,2,3 \text{ and } \alpha_i - \alpha_i = -(\beta_i - b_i) \text{ for i} \geq 4}$$

What if we drop this constraint?

❑ Impulse response function of forecast errors=

Response of inflation ▬ Response of forecasts

Figure 3: Response of Mean Forecasts to Baseline Shocks

Finding #2: Disagreement is unrelated to "structural" shocks

Figure 5: Response of Forecast Dispersion to Baseline Shocks

Reconciling two papers

Mankiw, Reis and Wolfers

❑ Average inflation expectations

▸ Inflation expectations reflect partial, but incomplete adjustment to news

❑ Dispersion in inflation expectations

▸ There exists substantial disagreement about future inflation

▸ Disagreement varies through time

▸ Disagreement covaries with macroeconomic conditions

Coibion and Gorodnichenko

❑ Average inflation expectations

▸ Do not respond to "structural shocks"

❑ Dispersion in inflation expectations

▸ Does not vary with "structural shocks"

Differences

❑ Sample periods

❑ Analyzing impulse response functions v. all the variation
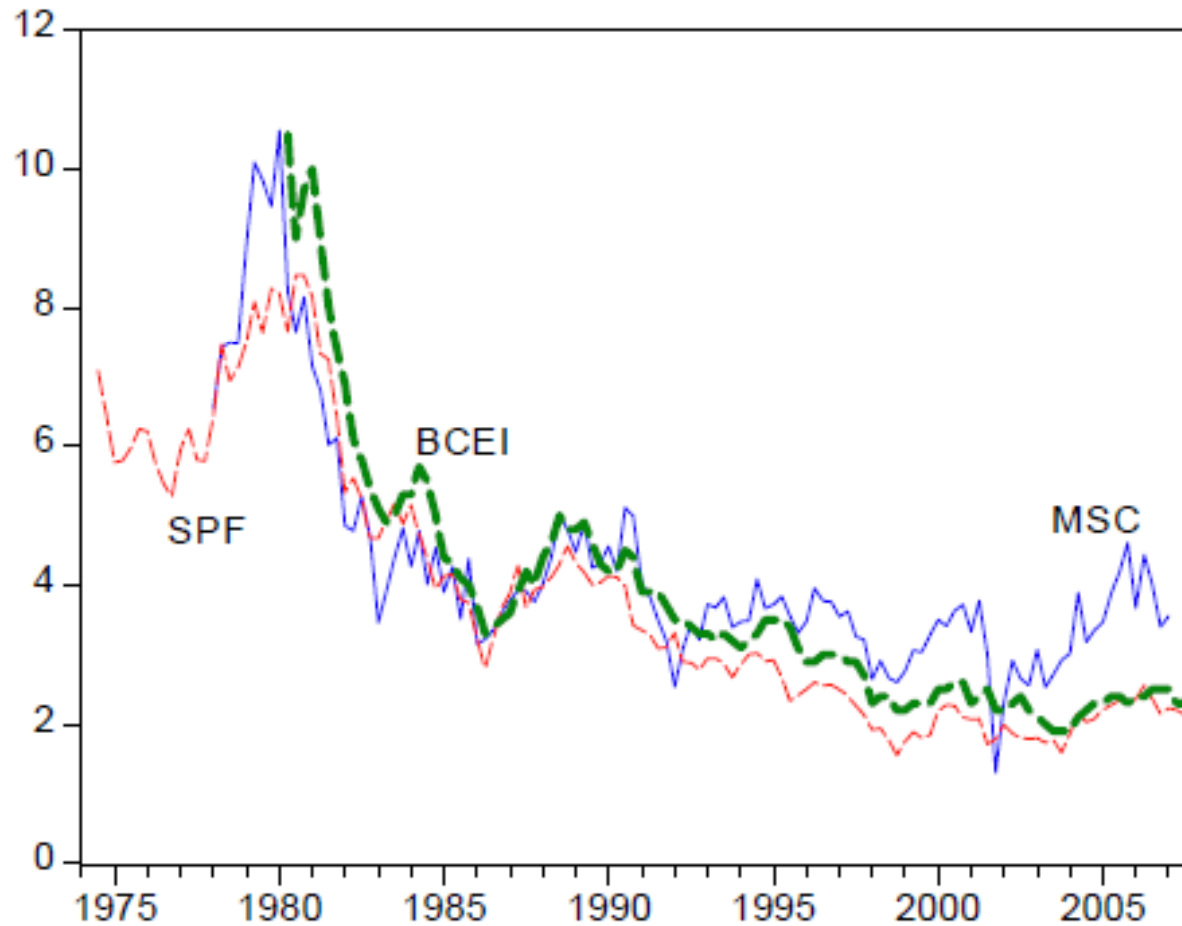
❑ Minor technical stuff (mean v. median; IQR v. SD)

Median Inflation Expectations and Actual Inflation

Source: Mankiw, Reis and Wolfers (2004)
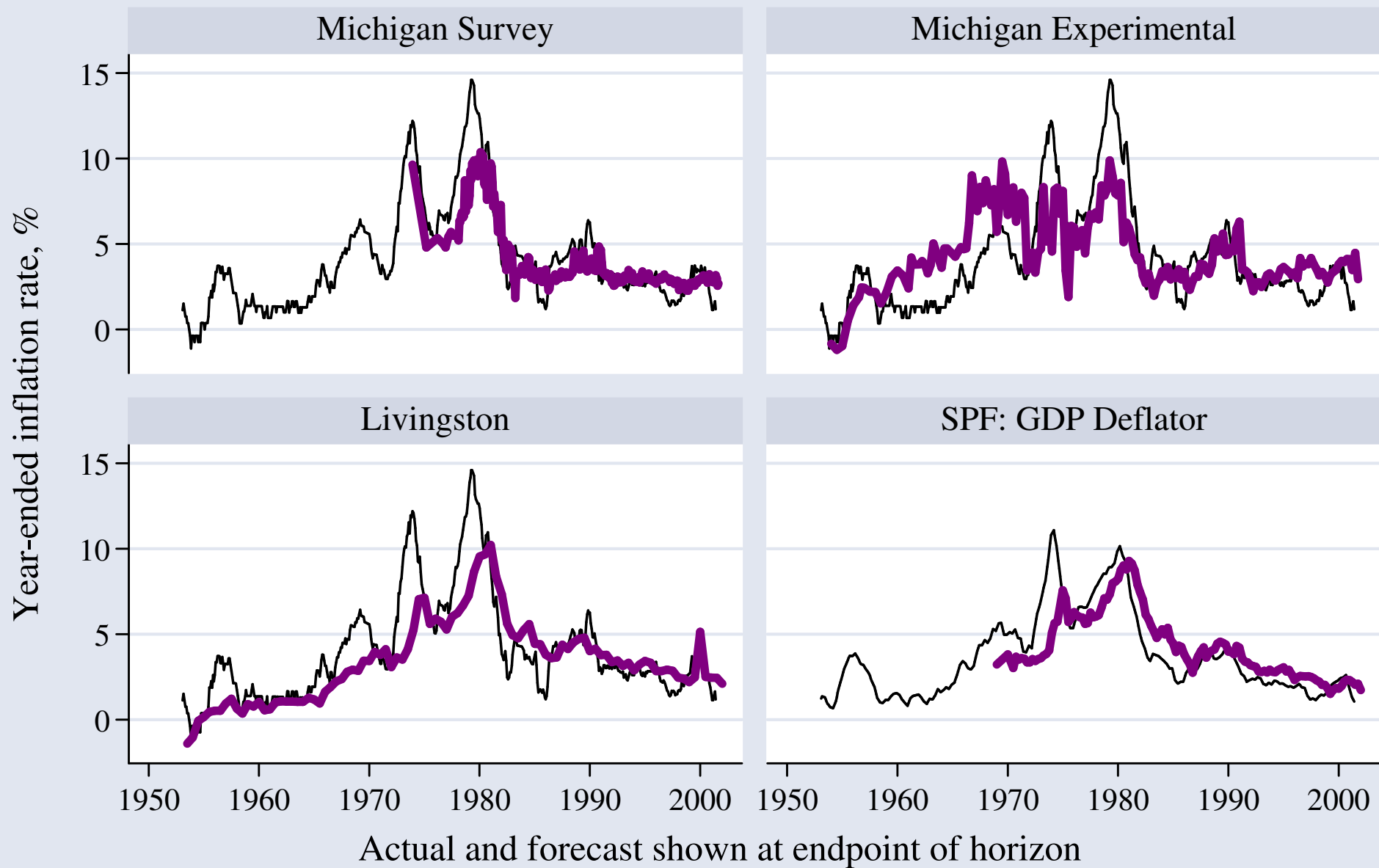
Average inflation expectations

Panel A: Mean Forecasts of Inflation over Next Year

Weak & Semi-Strong Tests of Rationality

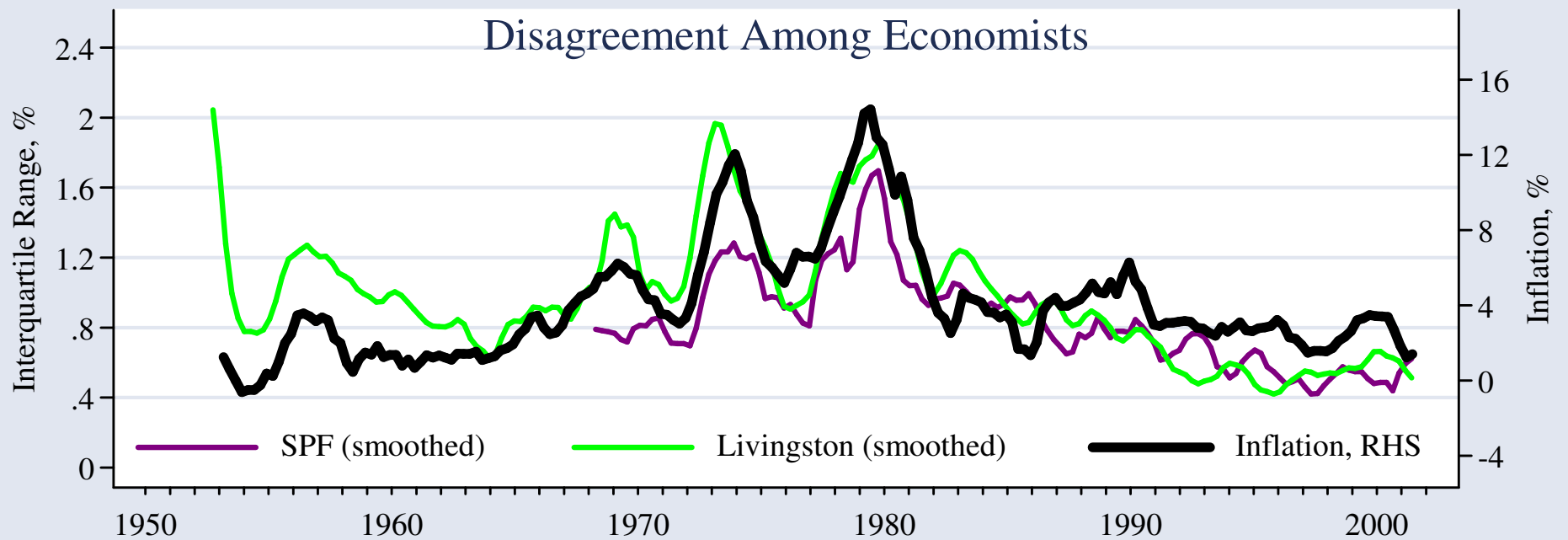|	Michigan	Michigan-Experimental	Livingston	SPF (GDP Deflator)
Panel C: Are Forecasting Errors Persistent?				
$\pi_t - E_{t-12}\pi_t = \alpha + \beta (\pi_{t-12} - E_{t-24}\pi_{t-12})$				
β: $\pi_{t-12} - E_{t-24}[\pi_{t-12}]$	0.371[**]	.580[***]	0.490[***]	0.640[***]
	(.158)	(.115)	(.132)	(.224)
α: Constant	0.096%	0.005%	0.302%	-.032%
	(.183)	(.239)	(.210)	(.223)
Adj. R^2	.164	.334	.231	.375
Panel D: Are Macroeconomic data fully exploited?				
$\pi_t - E_{t-12}\pi_t = \alpha + \beta E_{t-12}[\pi_t] + \gamma \pi_{t-13} + \kappa i_{t-13} + \delta U_{t-13}$				
α: Constant	-0.816%	0.242%	4.424%[***]	3.566%[***]
	(.975)	(1.143)	(.985)	(.970)
β: $E_{t-12}[\pi_t]$	0.801[***]	-0.554[***]	0.295	0.287
	(.257)	(.165)	(.283)	(.308)
γ: Inflation$_{t-13}$	-0.218[*]	0.610[***]	0.205	0.200
	(.121)	(.106)	(.145)	(.190)
κ: Treasury Bill$_{t-13}$	-0.165[**]	-0.024	-0.319[***]	-0.321[***]
	(.085)	(.102)	(.106)	(.079)
δ: Unemployment$_{t-13}$	0.017	-0.063	-0.675[***]	-0.593[***]
	(.126)	(.156)	(.175)	(.150)
Joint Test on Macro Data ($\gamma=\kappa=\delta=0$)	$F_{3,285}=2.65$[**]	$F_{3,164}=15.84$[***]	$F_{3,91}=8.29$[***]	$F_{3,120}=11.65$[***]
Adj. R^2	.293	.382	.306	.407

Disagreement and Inflation

Disagreement Among Consumers

Michigan (smoothed) — Michigan-Experimental (smoothed) — Inflation, RHS
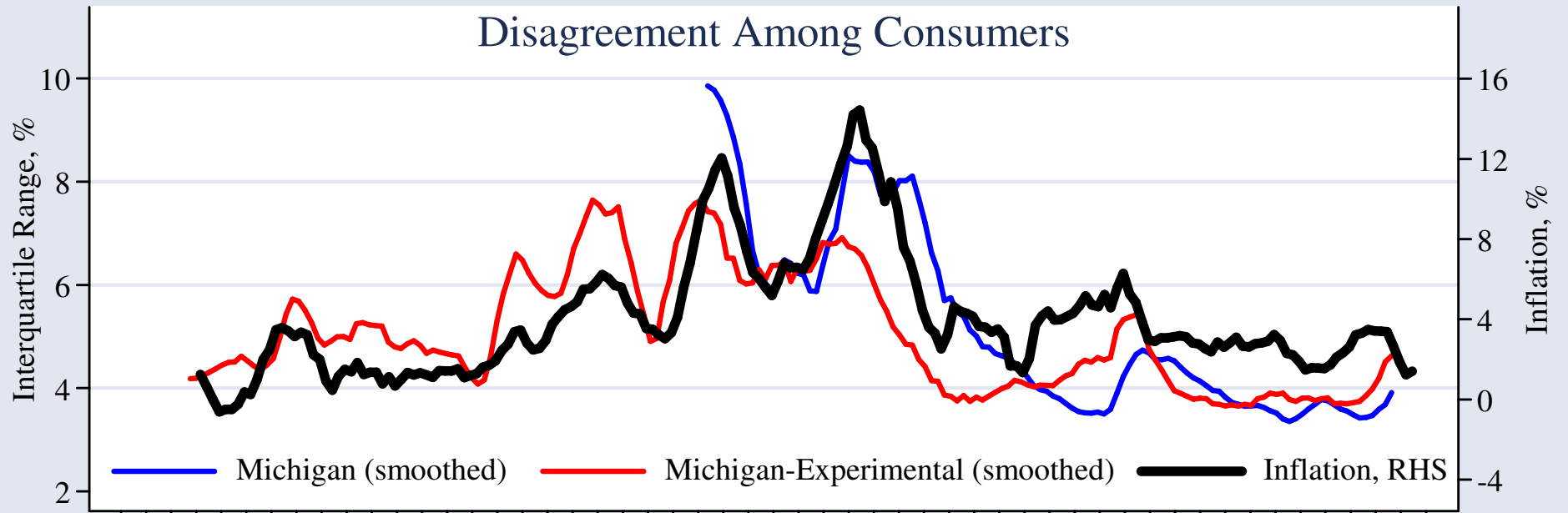
Disagreement Among Economists

SPF (smoothed) — Livingston (smoothed) — Inflation, RHS

Source: Mankiw, Reis and Wolfers (2004)

Disagreement and Inflation
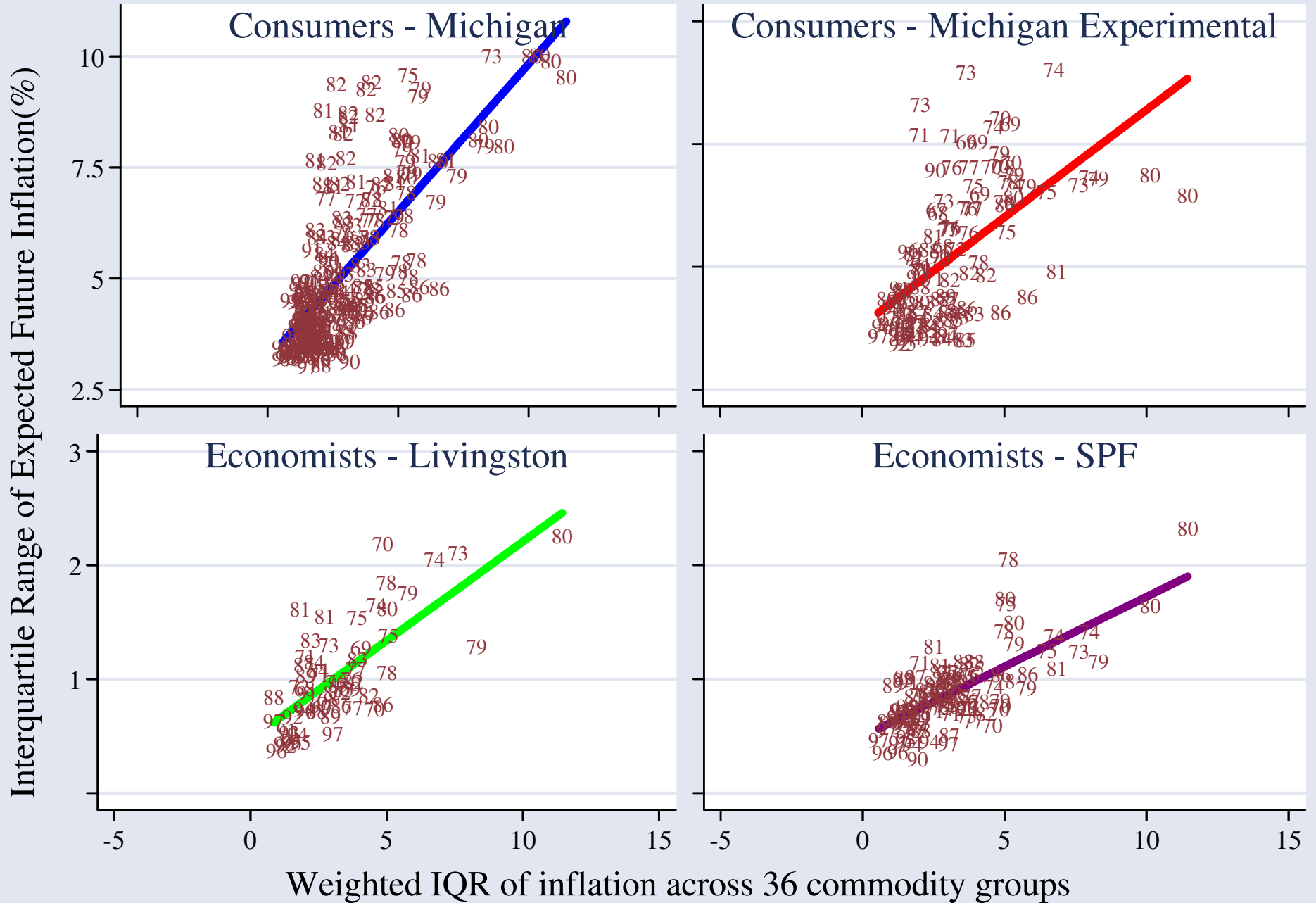
Disagreement and the Change in Inflation
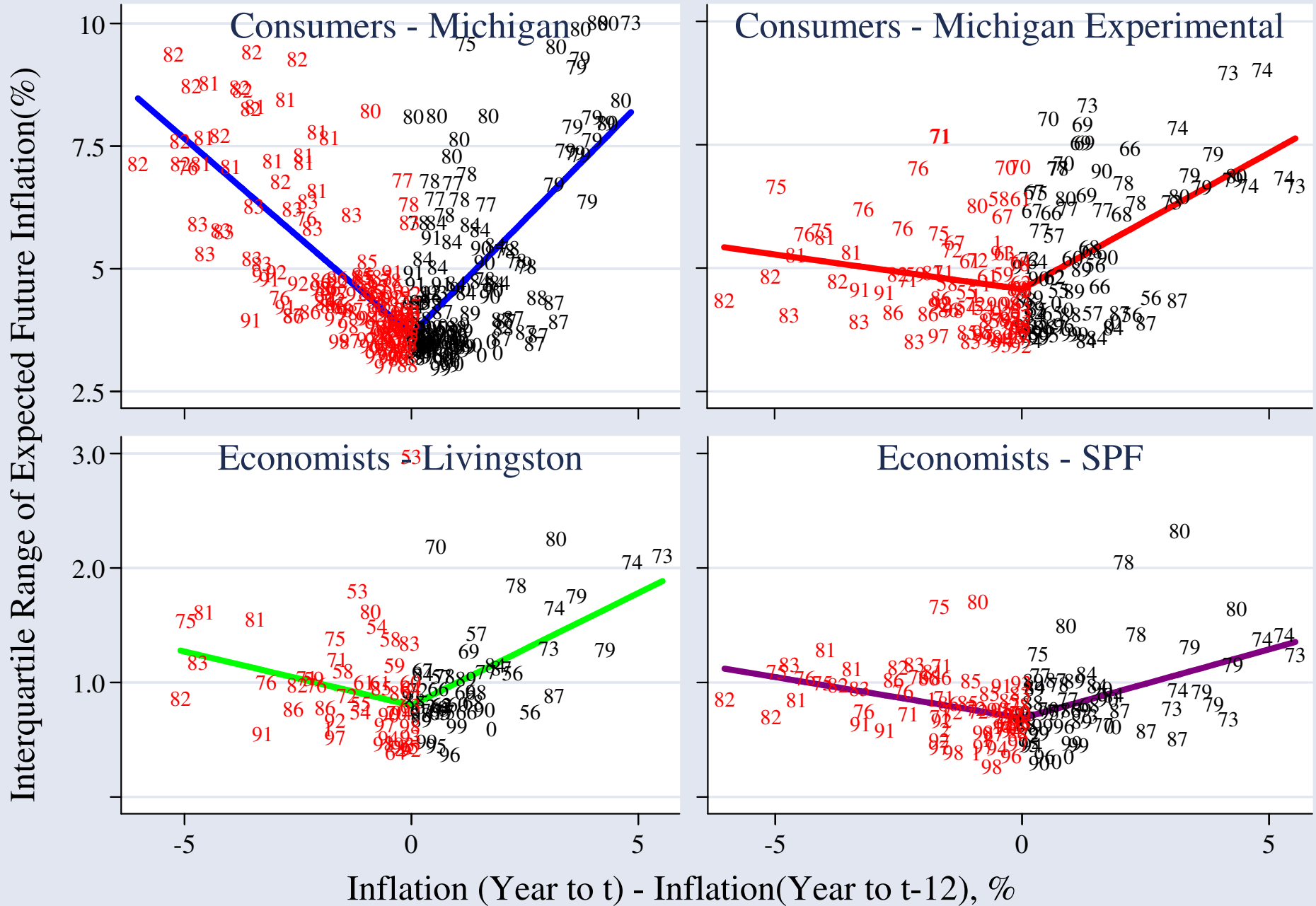
Distribution of Inflation Rates Across CPI Components
Weighted percentiles, based on 36 CPI component indices

Legend:
- 25th percentile inflation rate
- 75th percentile inflation rate
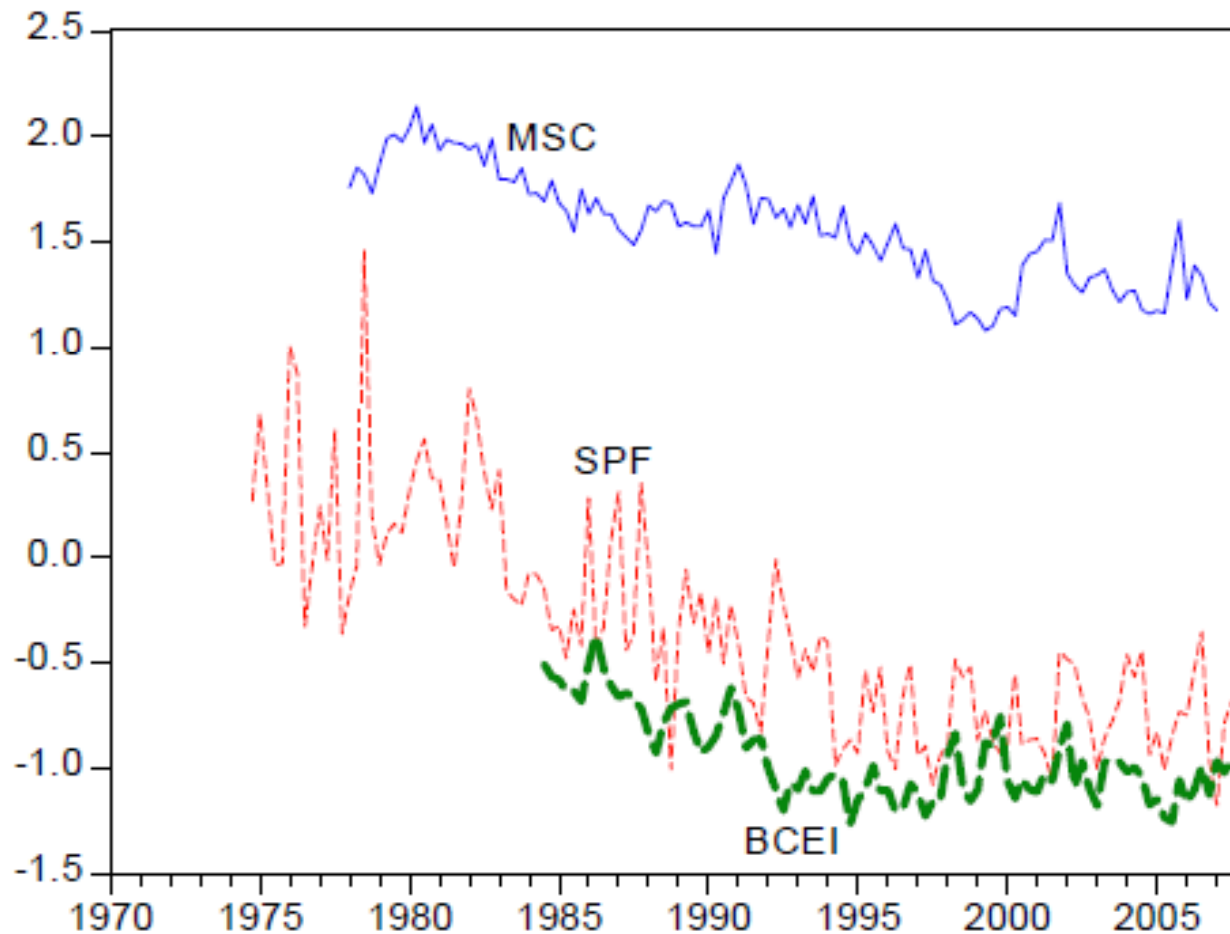- IQR of weighted component-level inflation rates over past year
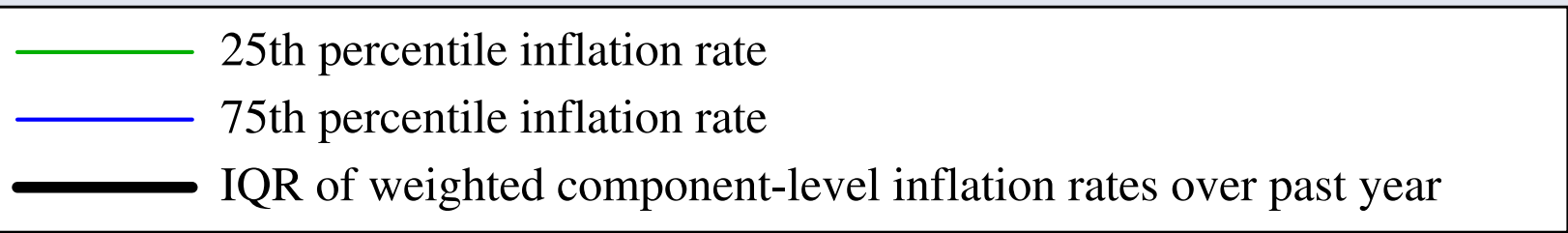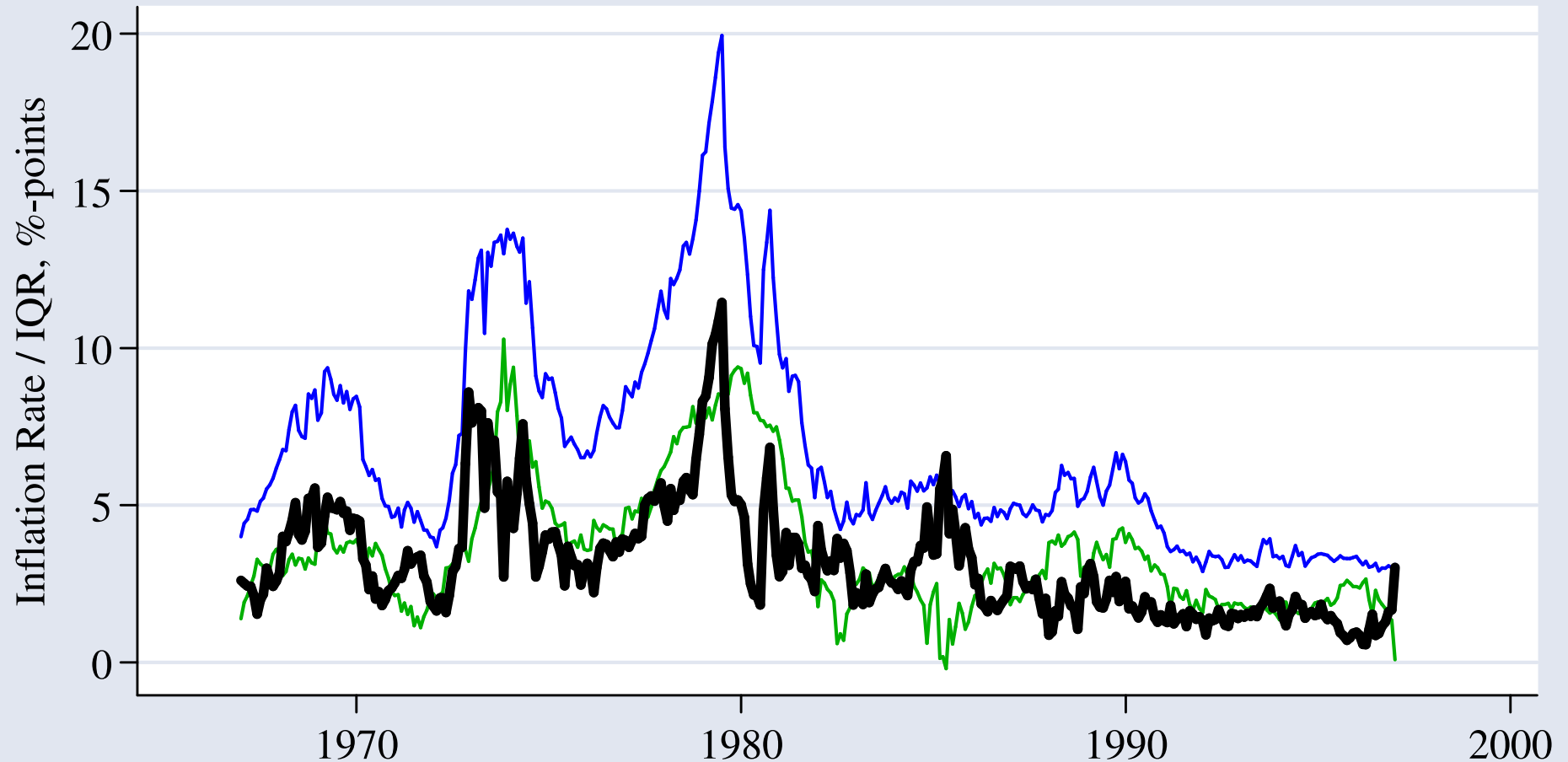
Disagreement and Relative Price Dispersion

Coibion and Gorodnichenko sample

Panel B: (Log) Cross-sectional Standard Deviation of Inflation Forecasts over Next Year

Disagreement Over the Business Cycle-Consumers

**Dependent Variable: Dispersion in Inflation Expectations (Interquartile Range)**

	Bivariate Regressions	Controlling for inflation	Multivariate Regression
Panel A: Michigan Data			
Inflation Rate	0.441***		0.408***
	(.028)		(.028)
ΔInflation-squared	18.227***	10.401***	7.062***
	(2.920)	(1.622)	(1.364)
Output Gap	0.176	0.415***	0.293***
	(.237)	(.088)	(.066)
Panel B: Michigan - Experimental			
Inflation Rate	0.228***		0.217***
	(.036)		(.034)
ΔInflation-squared	1.259**	0.814	0.789
	(.616)	(.607)	(.598)
Output Gap	-0.047	0.026	0.017
	(.092)	(.086)	(.079)

Disagreement Over the Business Cycle-Economists

Dependent Variable: Dispersion in Inflation Expectations (Interquartile Range)

	Bivariate Regressions	Controlling for inflation	Multivariate Regression
Panel C: Livingston Survey			
Inflation Rate	0.083***		0.066***
	(.016)		(.013)
ΔInflation-squared	2.682***	2.051***	1.663**
	(.429)	(.483)	(.737)
Output Gap	0.070**	-0.062**	0.020
	(.035)	(.027)	(.032)
Panel D: Survey of Professional Forecasters (GDP deflator)			
Inflation Rate	0.092***		0.095***
	(.013)		(.015)
ΔInflation-squared	2.292**	-0.406	-0.305
	(.840)	(.641)	(.676)
Output Gap	-0.001	-0.009	-0.007
	(.029)	(.013)	(.014)

Disagreement: Professional Forecasters and the FOMC
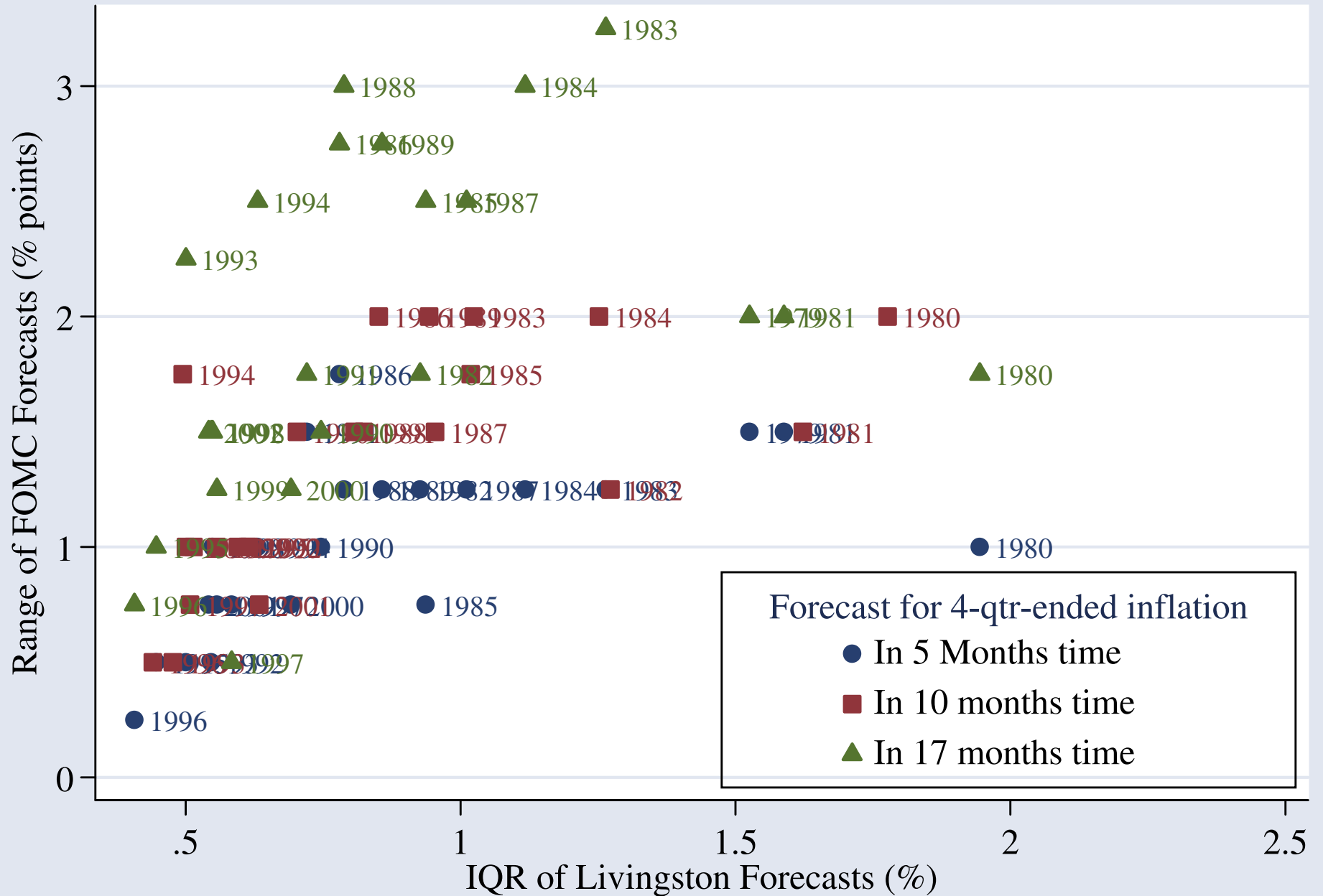
Using all the variation

❏ Why focus on only the "identified" shocks?

❏ <u>All</u> variation in expectations must be driven by

▸ Identified shocks

▸ Unidentified shocks

▸ And their dynamic consequences

Mankiw, Reis and Wolfers approach

❏ Set λ=0.1

▸ Update expectations, on average, about every 10 months

❏ When updating:

▸ Analyze time series of inflation, output gap and short-term interest rates

▸ Apply coefficients from a simple monthly VAR $\{\pi, Y^{gap}, i\}$

▸ Yields a predicted series for the evolution of the full distribution of inflation expectations
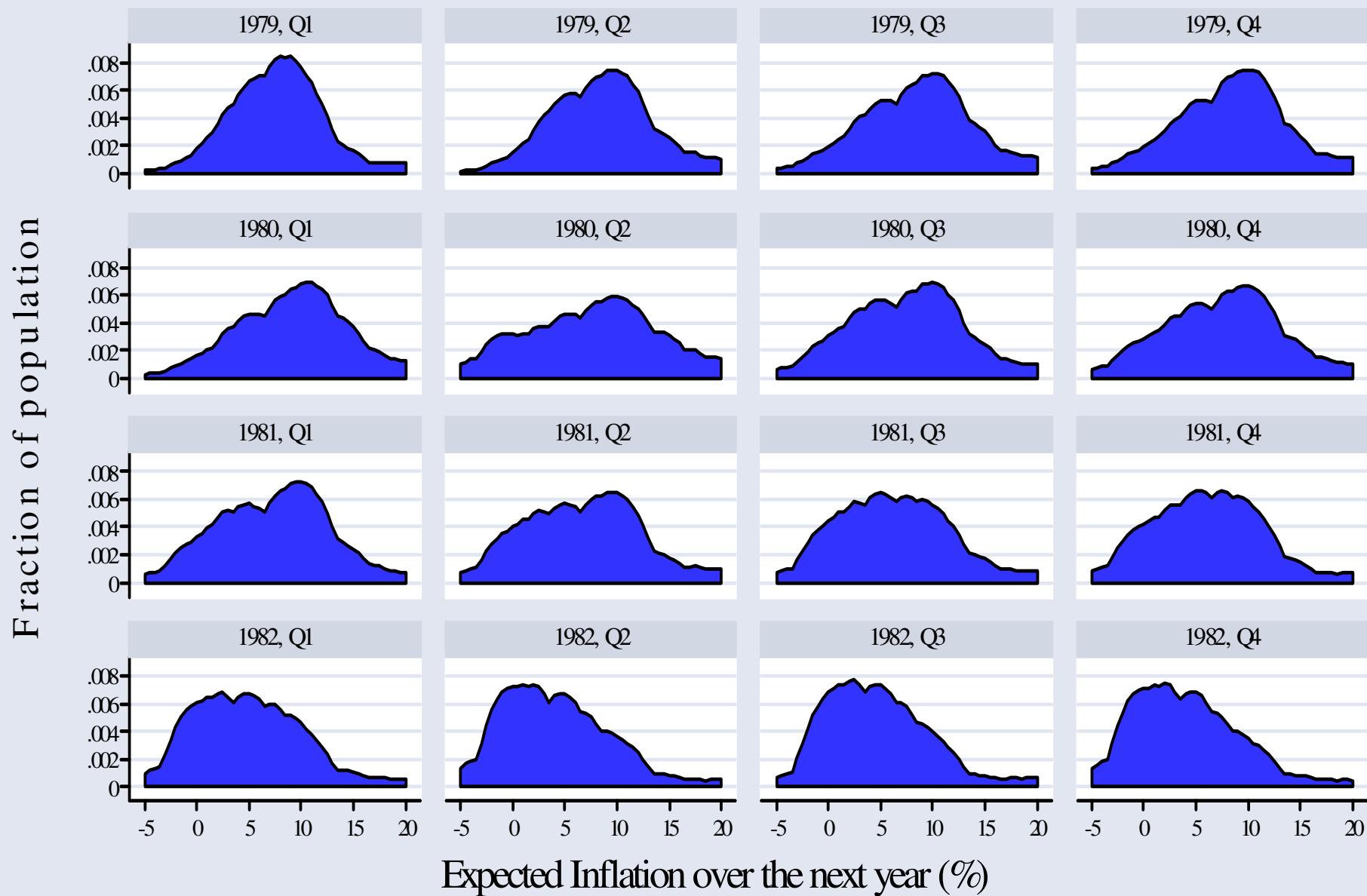
▸

Actual and Predicted Median Inflation Expectations
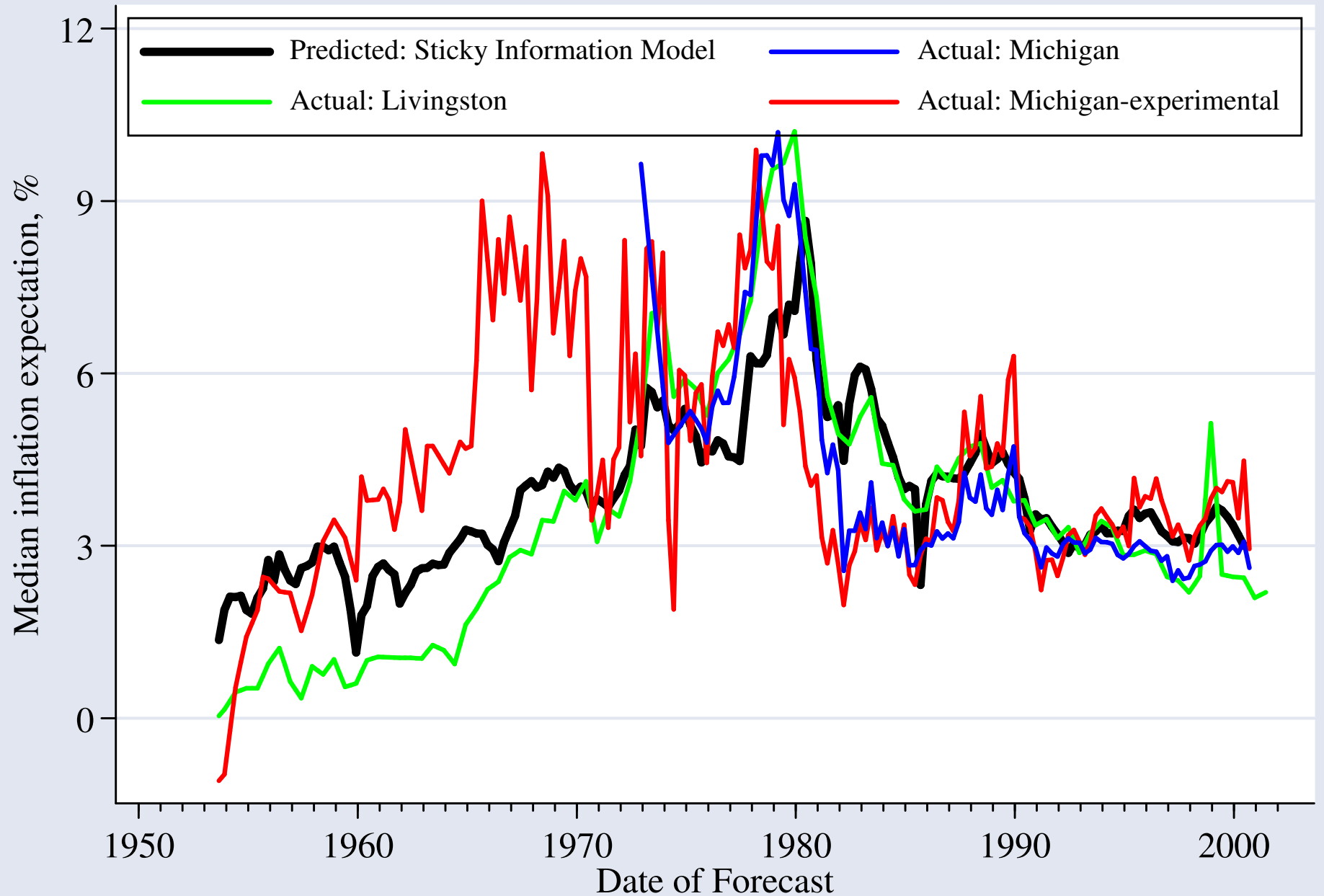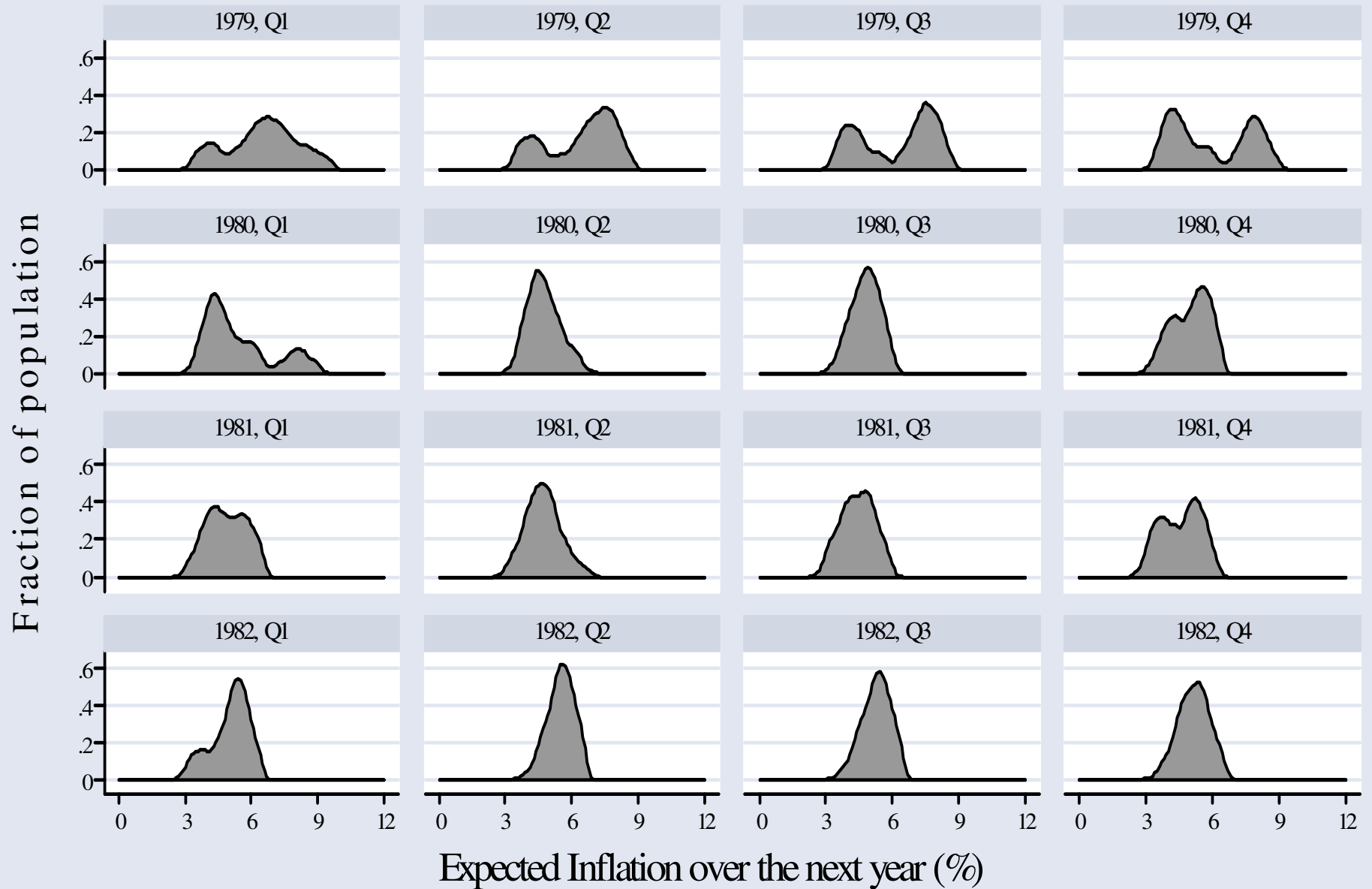
Actual and Predicted Dispersion
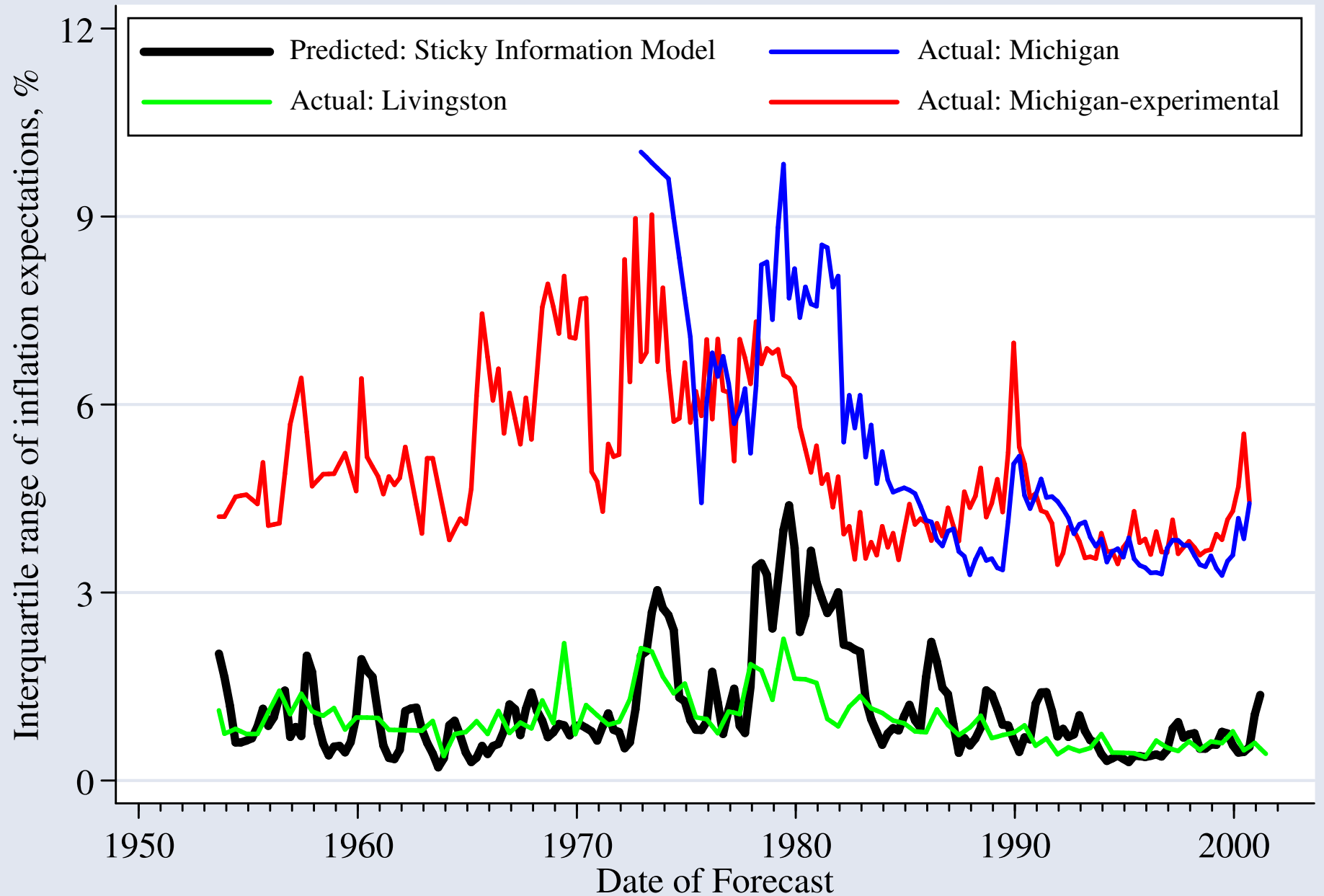
Inflation Expectations Through the Volcker Disinflation

Probability Distribution Function: Consumers' Expectations

Inflation Expectations Through the Volcker Disinflation

Probability Distribution Function Predicted by Sticky Information Model

Coibion & Gorodnichenko's Conclusions

☑ Forecasts fail to adjust one-for-one with the variable being forecasted after structural shocks.

▸ Yielding serially correlated conditional forecast errors

▸ But they actually find forecasts barely adjust at all

☒ Forecast errors converge to zero in the long-run

▸ Probably true

▸ But convergence is surely slower than suggested by these estimates

❑ Conditional forecast errors converge at similar rates across agents

▸ Is this a precise estimate?

☒ Structural shocks do not appear to lead to any discernible increase in disagreement

▸ Difficult to reconcile with clear business-cycle variation in disagreement.