Core Inflation

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What is Core Inflation?

- Aggregate Index:

$$\pi(t) = \pi^{*}(t) + \varepsilon(t)$$

- Can we distinguish $\pi(t)$ from $\pi^{*}(t)$?
- $\varepsilon(t)$ has long swings, but dies out [I(0)].
- Examples of Problems
  - Volatile/noisy components
  - Seasonality

Typical Methods:

Try and find some estimator $\pi^c(t)$ such that

$$E[\pi^c(t)] = \pi^*(t)$$

and

$\nu(t) = \pi^*(t) - \pi^c(t)$ has low variance

Typical Methods

Have a bunch of data:

$$\pi(it) = \pi(t) + \eta(it)$$
$$= \pi^{*}(t) + \varepsilon(t) + \eta(it)$$

Combine the data into core measures using some weighting:

$$\pi^{c}(t) = \Sigma w_i \pi(it) \text{ , with } \Sigma w_i = 1$$

Choices

- Seasonally adjustment
- Degree of aggregation
- Base index
- Frequency
- Time averaging
- Weighting pattern

How Might You Choose?

1. Unbiased
2. Smooth
3. Tracks some ex post ideal π^*
4. Forecasts future π^*
5. Allows us to spot changes in π^* quickly
6. Never Revised

Seasonal Adjustment:

	Not Seasonally Adjusted	Seasonally Adjusted	Percentage reduction in variance
Headline CPI	16.95	10.40	38.6
Traditional Core CPI	6.06	1.11	81.7
16% Trimmed Mean	1.82	0.69	62.1
Median	0.79	0.66	16.5

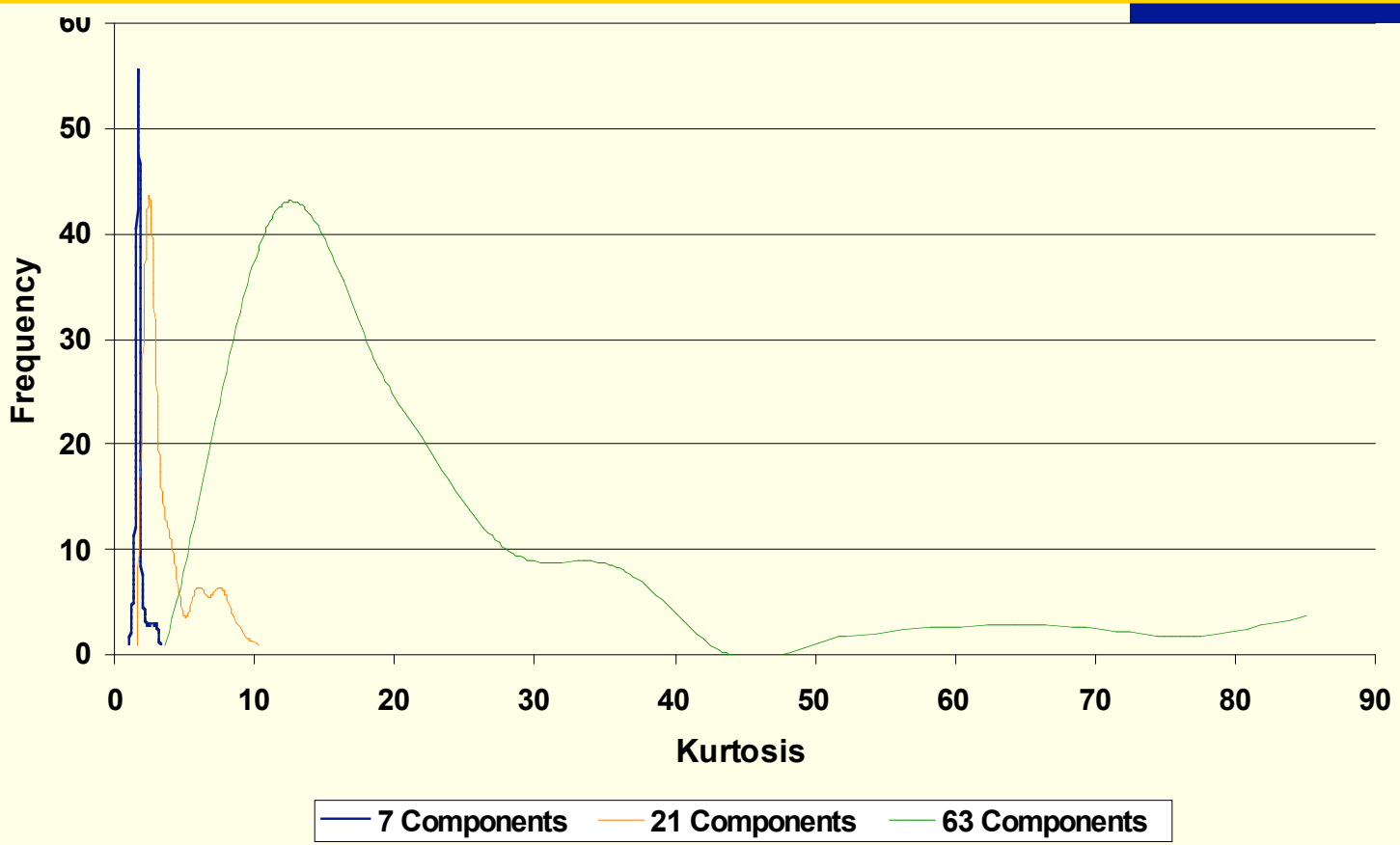
From Mike Bryan's Paper

Degree of Aggregation

- Less aggregation cuts both ways:
  It can help to get rid of the volatile stuff

  But the lumpiness of OER is a problem
  Brischetto & Richards have an ingenious solution to this problem

Aggregating COmponents



Data from Rich and Steindel

Base Index

- CPI vs. PCE?

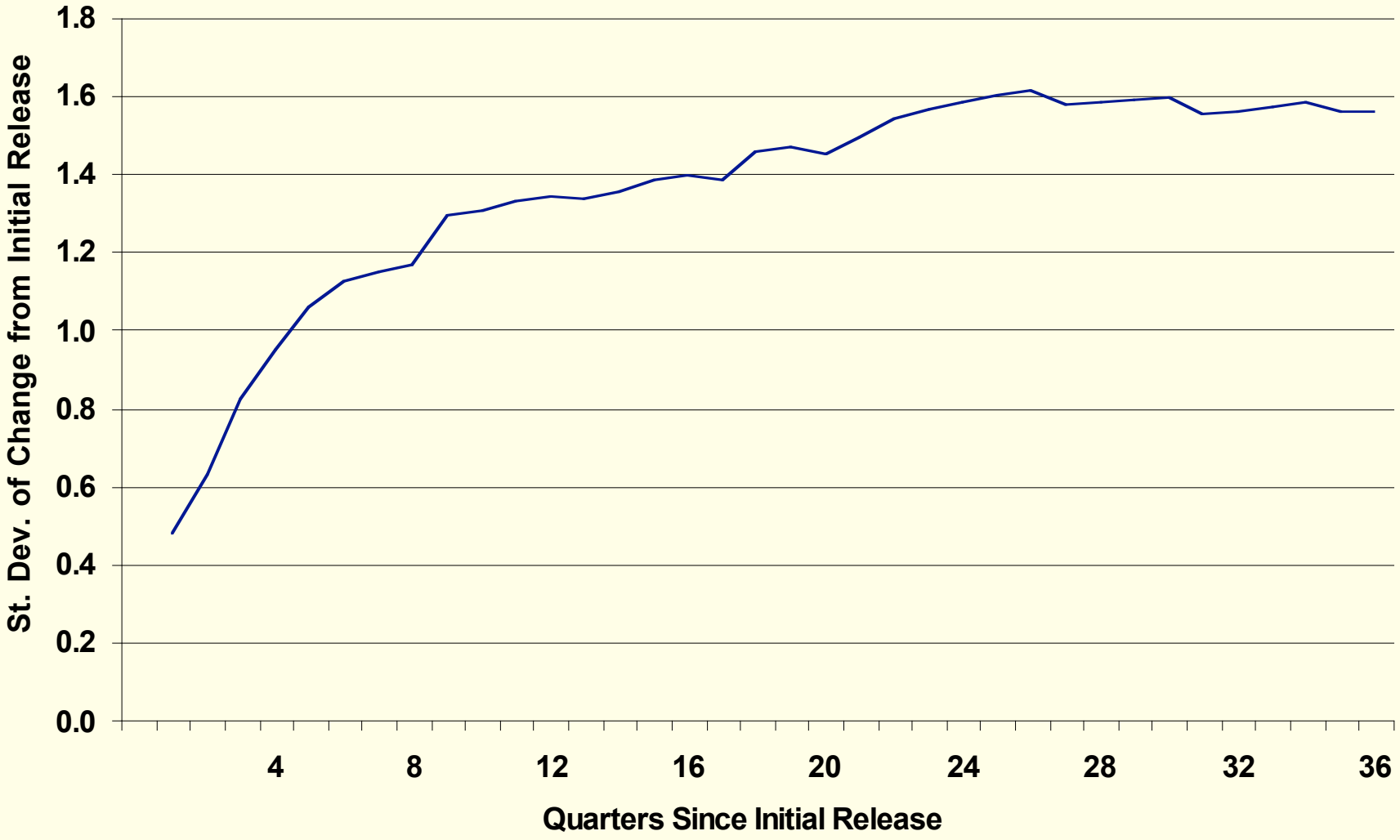
CPI is

1. Not Revised
2. Well Known

PCE has

1. More accurate coverage
2. Less Bias

Revisions in Implicit PCE Deflator



Source: FRB Philadelphia, Quarterly 1965 to 2006.

Other Considerations

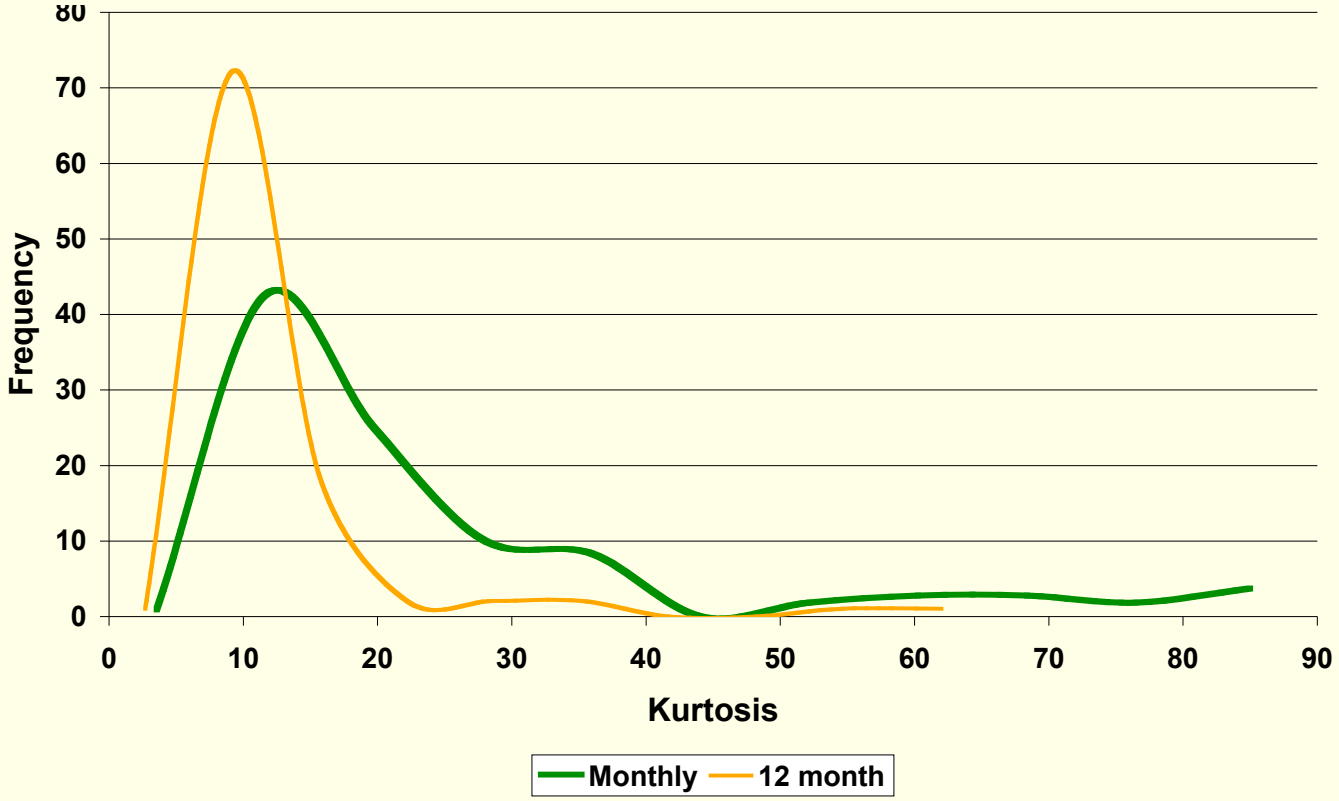
- Frequency:
  When is higher worse?

- Time averaging
  Related to frequency: Why would you?

Note on averaging

- Averaging across both time and components:
  Distributions become normal
  Less justification for trimming

Time Aggregation



Criteria

- Core **should** be
  - Smooth
  - Track the trend
  - Quickly identify shifts in the trend
- Core **should** not
  - Be the inflation target
  - Be the best possible forecast of inflation

A Candidate for π*

Inflation (π) =

Persistent trend + Temporary component

π^* + η

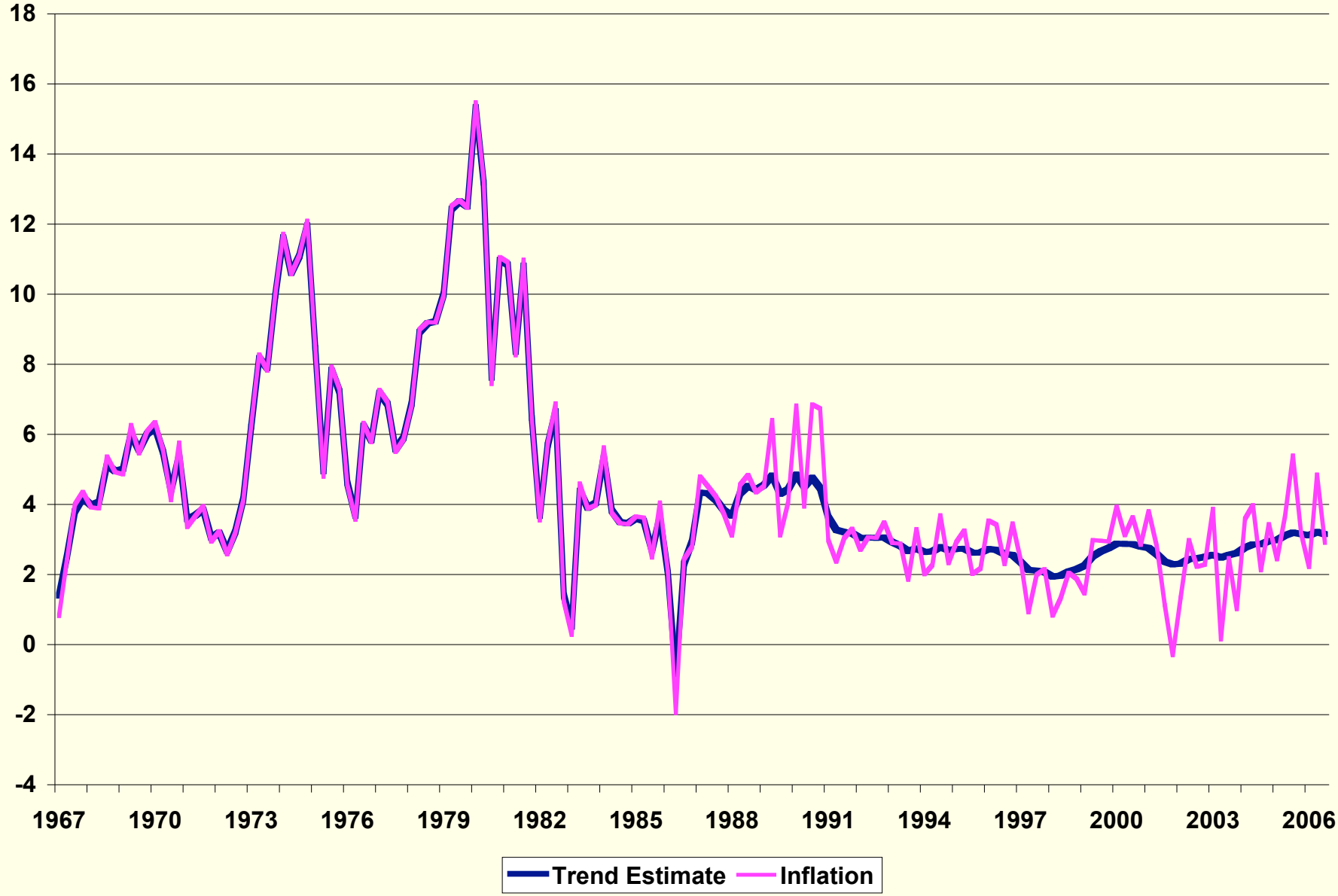
Stochastic Volatility Model

$$\pi(t) = \pi^*(t) + \eta(t),$$
$$\pi^*(t) = \pi^*(t\text{-}1) + \varepsilon(t),$$

where $\sigma_\varepsilon(t)$ and $\sigma_\eta(t)$ vary over time

Estimates are headline CPI quarterly at a.r.

Comparing Quarterly Actual Inflation with Smoothed Trend Estimate



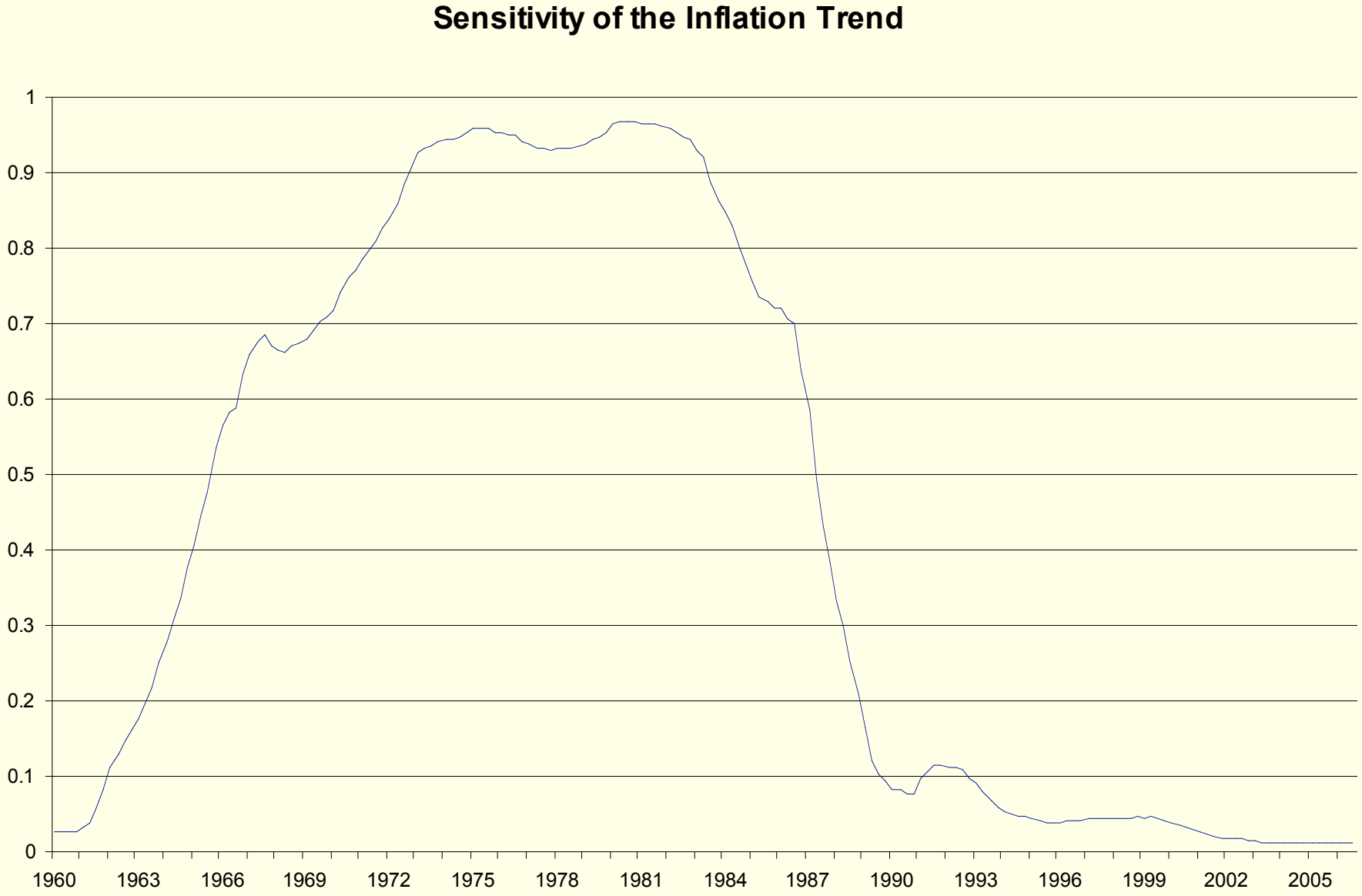
The Question

For $\Delta\pi(t)$=1, what is $\Delta\pi^*(t)$?

[Mike Bryan examines this question in detail]

Answer depends on ratio $\sigma_\eta(t)/\sigma_\varepsilon(t)$

Not constant over time!


Sensitivity of the Inflation Trend
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1960
1963
1966
1969
1972
1975
1978
1981
1984
1987
1990
1993
1996
1999
2002
2005

Simple Regressions

- Estimate:
  $\Delta\pi^*(t) = a + b\Delta\pi^c(t)$
- What is the estimate of *b*?
- Expect *b* to vary over time.
- Different indicators, different sample periods.

Sensitivity of $\Delta\pi^*$					
Candidate Indicator		**1967-76**	**1977-86**	**1987-96**	**1997-06**
Ex. Food & Energy	Coeff	1.56	2.95	0.35	0.12
	t-ratio	2.12	10.97	1.15	1.04
	R^2	0.18	0.66	0.10	0.09
16% Trimmed Mean	Coeff	3.47	3.68	0.98	0.40
	t-ratio	13.30	18.59	4.28	3.39
	R^2	0.79	0.79	0.35	0.26
Weighted Median	Coeff	2.62	2.93	-0.03	0.00
	t-ratio	4.70	9.24	-0.11	0.03
	R^2	0.46	0.63	0.05	0.07

1. Coefficients change as sample period changes.
2. 16% Trimmed does relatively well.
3. Surely we can do better!

Why Core Inflation?

- Not the policy objective.
- Not the best forecast of future inflation.
- What is it for?