

# U.S. Monetary Policy Since the 1950s and the Changing Content of FOMC Minutes

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# Introduction:

## Background & Motivation

- We are used to CB communication via several means: reports, press releases, minutes, to give just 3 examples
  - But this is fairly recent in historical terms
- What central bankers say & write potentially has financial and economic implications
  - Recent events serve to heighten interest in what CB communicate

# Introduction:

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- The US has a rich trove of documentation of the internal discussions at the FOMC level
  - The study ‘analyzes’ FOMC deliberations since the early 1950s
    - Typically much shorter samples used
  - The object is to ‘quantify’ FOMC minutes from 1952 to 2013
    - More than one technique to measure content
  - Use the estimated/calculated indicators in a small macromodel
    - 1993 is a milestone

# Introduction:

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- I assume that the minutes gives us an idea of the ‘thinking’ about the MP stance (e.g., hawkish vs dovish) that is more subtle than the actual policy decision (reflected in policy statement) which represents a consensus of sorts
- The evolution of thinking inside the FOMC over a long period of time is of separate interest
  - Preferable to have an ‘objective’ rather than a ‘subjective’ approach
  - Interaction between the content of the minutes and changes in policy as well as real and financial outcomes is also of interest since changes in policy rates may not entirely capture changes in the stance of policy

# Introduction:

## Background & Motivation

- What the paper does
  - Unlike the typical attempt to measure content the sample here is much longer
  - Unlike other attempts at ‘objective’ measurement of content 2 very different algorithms are used
- What the paper does NOT do
  - No insights about how/whether FOMC members understood/applied economic theories in their deliberations
  - No insights about the ‘readability’ (complexity?) of FOMC minutes
  - Not conclusive about whether publishing minutes ‘stifles’ debate but the impact of the minutes is different after 1993

# Why Minutes?

- Offers diversity, more details and insight than press releases (latter reflects consensus and are available only last 2 ½ decades)
- Offers the opportunity to see whether publishing them matters and how

# Why Minutes?

- Are they “boring”?

- Greenspan: “People think reading the raw transcripts is a way of learning things; I would suggest that if they spend six or eight months reading through some of this stuff, they won’t like it.” .... *“I think we've always argued that the Memorandum of Discussion--leaving aside the issues, which are not irrelevant, of its cost and the demand for such documents--is as good a record of what actually occurs in these meetings as you can get from the point of view of those who have a serious interest in monetary policy and the history of monetary policy.”*
- Bernanke: “They gets lots of attention...and most of them are deadly boring,” ...

# “Standard” Empirical Analysis of MP

- Observables and measurable economic concepts typically used to specify and macro model
  - Theory driven (e.g., New Keynesian models)
  - Needs a long enough sample to obtain useful inferences and policy implications though Lucas critique and other forms of structural change a challenge
- Verbal announcements and content important but viewed as complementary and generally used to investigate specific episodes
- Events of the past 6 years have raised the profile of ‘verbal communication’ (UMP, ZLB)
  - But the verbal side of central banking has always been important even if it has evolved over time



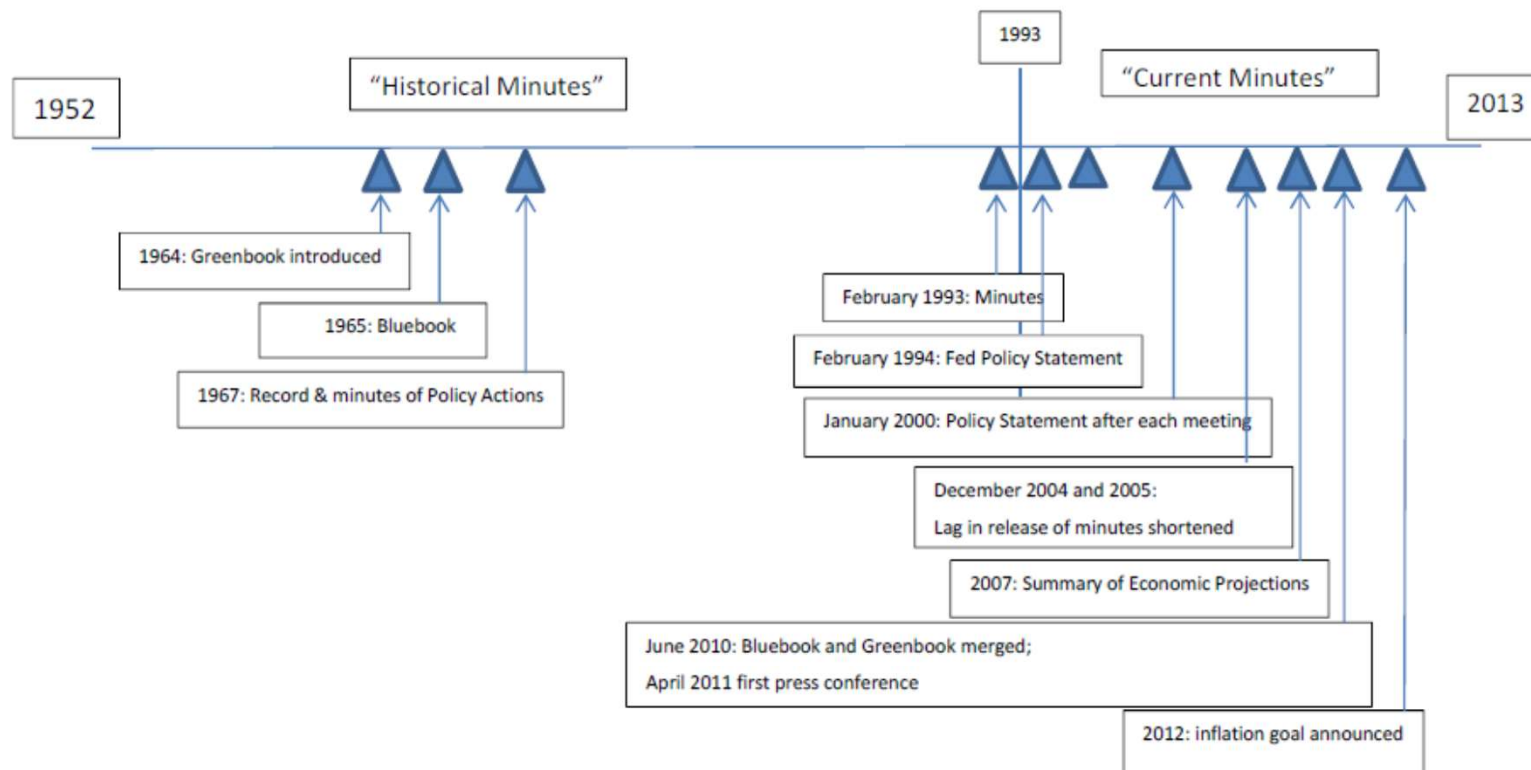
# Thinking About and Justifying MP Decisions

- The Changing Language of Central Banking
  - Changing policy strategy
  - Changing views about what the appropriate objective of MP ought to be (constrained by ‘dual mandate’)
  - Changing background and personalities inside the FOMC
- Changing View About What Monetary Policy Can and Should Do
  - A function of the instrument(s) of MP
  - A function of what constitutes ‘price stability’ and its implications
- Changing Views About Transparency & Accountability
  - A critical juncture: the 1993 decision

# Why Study Words?

- Why? For What Purpose?
  - A continuing debate over the smoothing of interest rates, or the reluctance to change interest rates even when underlying economic conditions change substantially
- Challenges
  - Minutes omit discussions outside meetings (Visser & Swank 2007)
  - Terms go in and out of fashion; new terms appear and disappear over time
  - Terms may be interpreted differently over time
  - ‘Sophistication’ of economic analysis has changed substantially as has the role of models and data (Romer and Romer (2004) versus Meltzer (2009))
  - Memory from past inflation (Malmendier & Nagel (2015), Malmendier, Nagel & Yan (2017))

Figure 1 Stylized Timeline of FOMC Releases



Note: From [https://www.federalreserve.gov/monetarypolicy/fomc\\_historical.htm](https://www.federalreserve.gov/monetarypolicy/fomc_historical.htm). Prior to 1994 the transcripts made from audio recordings were lightly edited but not reviewed by committee members. After 1993 the transcripts are lightly edited with review from committee members. Between 1993 and 2004 the minutes were released 3 days after the subsequent FOMC meeting; beginning in 2005, 3 weeks after the decision. The Bluebook was the document where monetary policy alternatives are discussed; the Greenbook provides a discussion of current economic and financial conditions (and forecasts). These were merged into the Tealbooks in 2010.

# The FOMC and the Dual Mandate

- “[T]hese objectives include economic growth in line with the economy’s potential to expand; a high level of employment; **stable prices (that is, stability in the purchasing power of the dollar)**; and moderate long-term interest rates” (2005 edition)

# What is Price Stability?

- Since 2012: 2% in PCE deflator
- Greenspan 1996: “is that state in which expected changes in the general price level do not effectively alter business or household conditions.”
- Volcker: “...a situation in which expectations of generally rising (or falling) over a considerable period are not a pervasive influence on economic and financial behavior.”
- Bernanke 2008: ““...much remains to be learned about both inflation forecasting and inflation control.”

# Quantifying Words: Methodological Consideration

- Wide range of approaches
  - Coding based on researcher's own reading
    - Generally simple specifications (i.e., dummies)
    - Can be subjective
  - Algorithms
    - From simple 'counting' to attempts to infer 'sentiment': content analysis
    - General Inquirer, Leximancer, Atlas, ***Diction***, ***Wordscores***, and many, many, others

# Literature Review: 1 slide

- Bulíř et.al. (2014) are interested in the clarity of central bank communication
- Ehrmann and Fratzscher (2007, 2009), and Berger, Ehrmann and Fratzscher (2011) subjective assessment of CB documents
- Luca & Trebbi (2009), Hansen & McMahon (2015): automated
- Tudor and Vega (2014), Loughran and McDonald (2016): surveys
- Foregoing only scratches the surface...

# Textual Analysis Algorithms

- Wordscores
  - Assesses texts based on benchmark(s): needs a ‘reference’ and a ‘virgin’ text
    - Use changes in FFR as the ‘anchor’ but others are possible
  - Allows language used to gauge MP deliberations to evolve with changes in the chosen reference texts
  - Statistics are testable
  - All words are typically included
- DICTION
  - Collection of ‘indicators’ that define the “tone” of a document
    - Certainty
    - Optimism
    - Commonality
    - OTHERS CAN ALSO BE DEFINED
  - Can be a word count (in frequency terms) or vis-à-vis benchmark (e.g., mean)
  - Other indicators also exist (e.g., variety)



# Wordscores vs. Diction

- Wordscores is akin to a Bayesian reading of texts
  - given word frequencies in a **reference** (or *anchor*) text what is the likelihood that a **virgin** text expresses the same position (i.e., produces the same distribution of word frequencies)?
- Diction seeks to capture the tone of a document
  - Tone is “..., a tool people use (sometimes unwittingly) to create distinct special impressions via word choice.”
  - Based on categories of words: e.g., certainty, activity, optimism, commonality

# Wordscore

Probabilistic interpretation

$$p_{rt}^w = \frac{f_{rt}^w}{\sum_r f_{rt}^w}$$

Relative frequency of some Word W

$$WS_{rt} = \sum_w p_{rt}^w \cdot a_{rt}$$

Position taken

r=reference text

$$WS_{vt}^* = (WS_{vt} - WS_{\bar{vt}}) \frac{\sigma_{rt}}{\sigma_{vt}} + WS_{\bar{vt}}$$

Virgin (v) text  
TS or transformed score  
r and v have same SD

$$\sigma_{vt}^2 = \sum_w f_{vt}^w (WS_{wt} - WS_{vt})^2$$

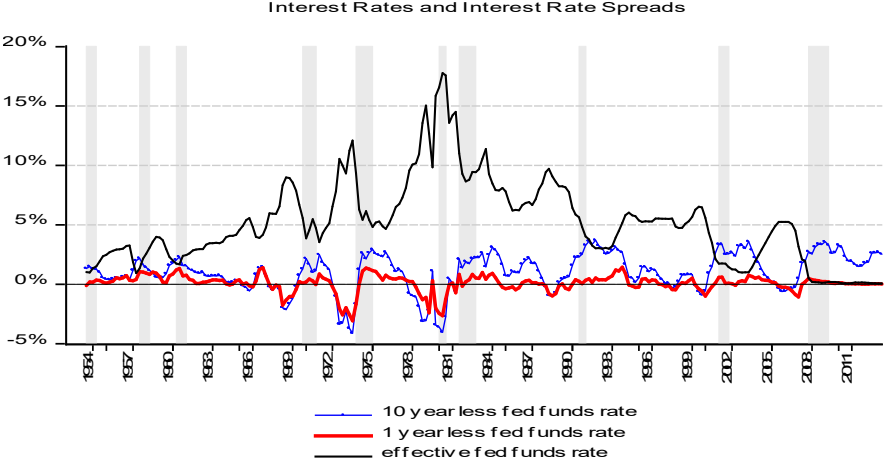
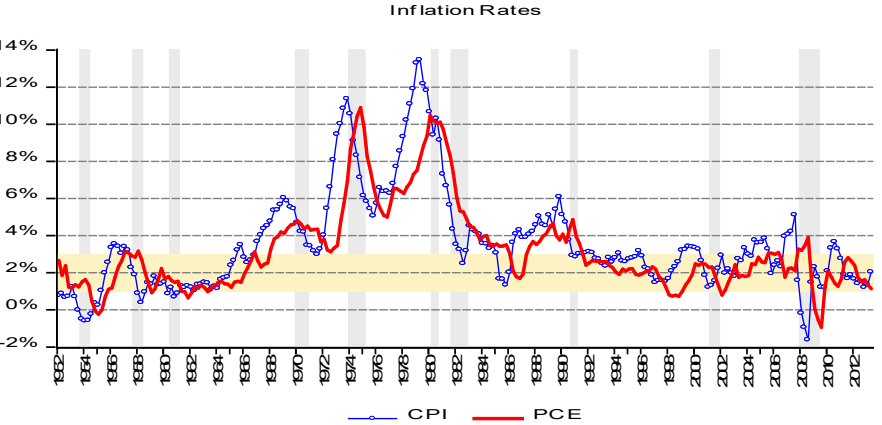
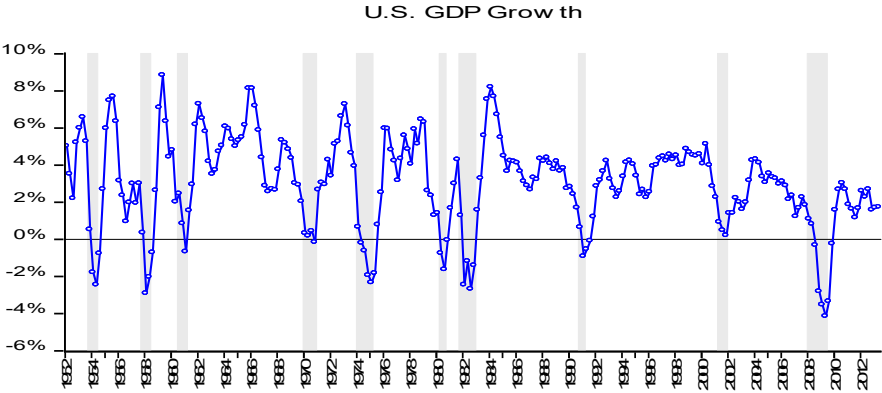
# Diction

Certainty	Language indicating resoluteness, inflexibility, and completeness and a tendency to speak <u>ex cathedra</u>	[Tenacity + Leveling + Collectives + Insistence] – [Numerical Terms + Ambivalence + Self Reference + Variety]
Optimism	Language endorsing some person, group, concept or event or highlighting their positive entailments.	[Praise + Satisfaction + Inspiration] – [Blame + Hardship + Denial]
Activity	Language featuring movement, change, the implementation of ideas and the avoidance of inertia.	[Aggression + Accomplishment + Communication + Motion] – [Cognition + Passivity + Embellishment]
Commonality	Language highlighting the agreed -upon values of a group and rejecting idiosyncratic modes of engagement.	[Centrality + Cooperation + Rapport] – [Diversity + Exclusion + Liberation]

Stylized Facts

# **EMPIRICAL EVIDENCE**

# Some Key Time Series



# Taylor Rules I

	53Q1-13Q4	54Q4-13Q4	54Q1-13Q4	54Q1-93Q4
Infl(t+2)	1.00(.42)*	.97(.41)*	.80(.45)+	.94(.39)*
Change <i>ygap</i>	4.01(1.84)*	4.04(.41)*	3.57(1.58)*	2.90(1.52)+
<i>ygap</i> (-1)	.58(.45)	.44(.43)	.57(.39)	.41(.45)
FFR(-1)	.94(.00)*	.94(.00)*	.93(.00)*	.91(.00)*
WS		.05(.02)+		
Diction			.06(.08)	
Constant	.14(11)	.15(.11)	.20(.14)	.27(.17)

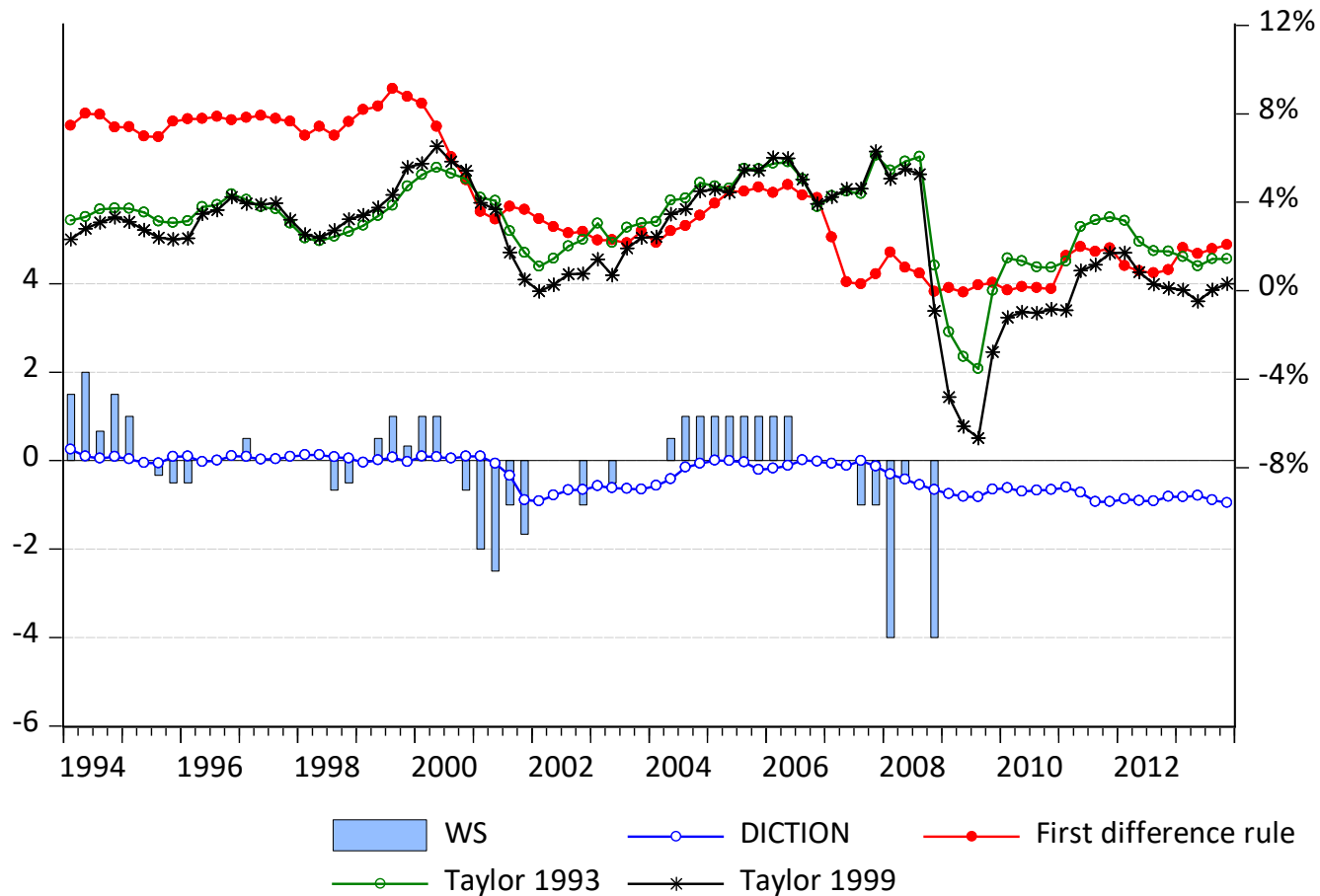
\* 5%; +10%

# Taylor Rules II

	94Q1-13q4	94Q4-13Q4
Infl(t+4)	.62(.22)*	1.15(.24)*
Change <i>ygap</i>	-.48(.21)*	-.25(.25)
<i>ygap</i> (-1)	.09(.13)	.67(.10)*
FFR(-1)		
WS		.89(.19)*
Diction	4.96(.67)*	
Constant	1.86(.89)*	-.70(.99)*

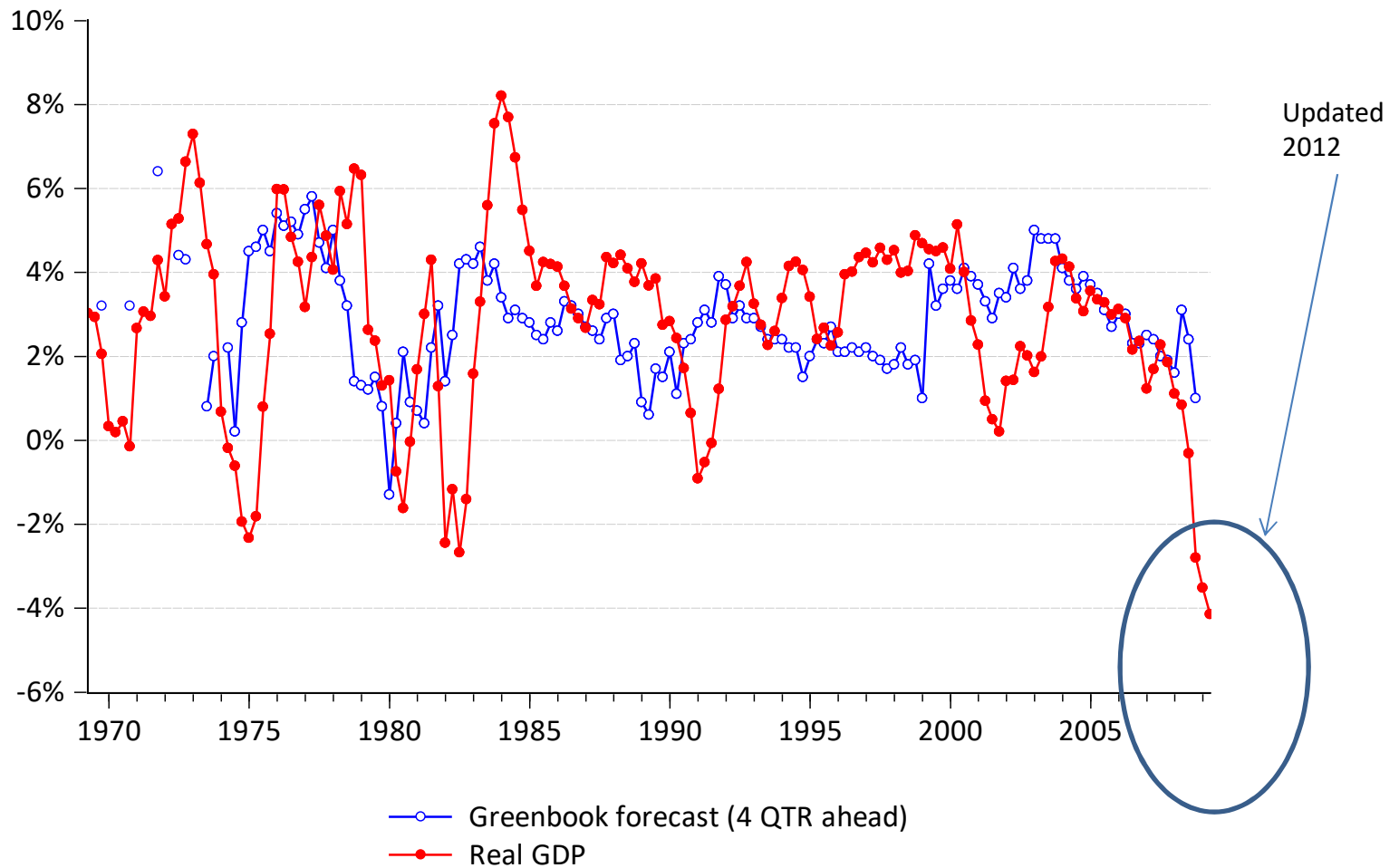
\* 5%; +10%

# Post 1994 Taylor Rules & Content

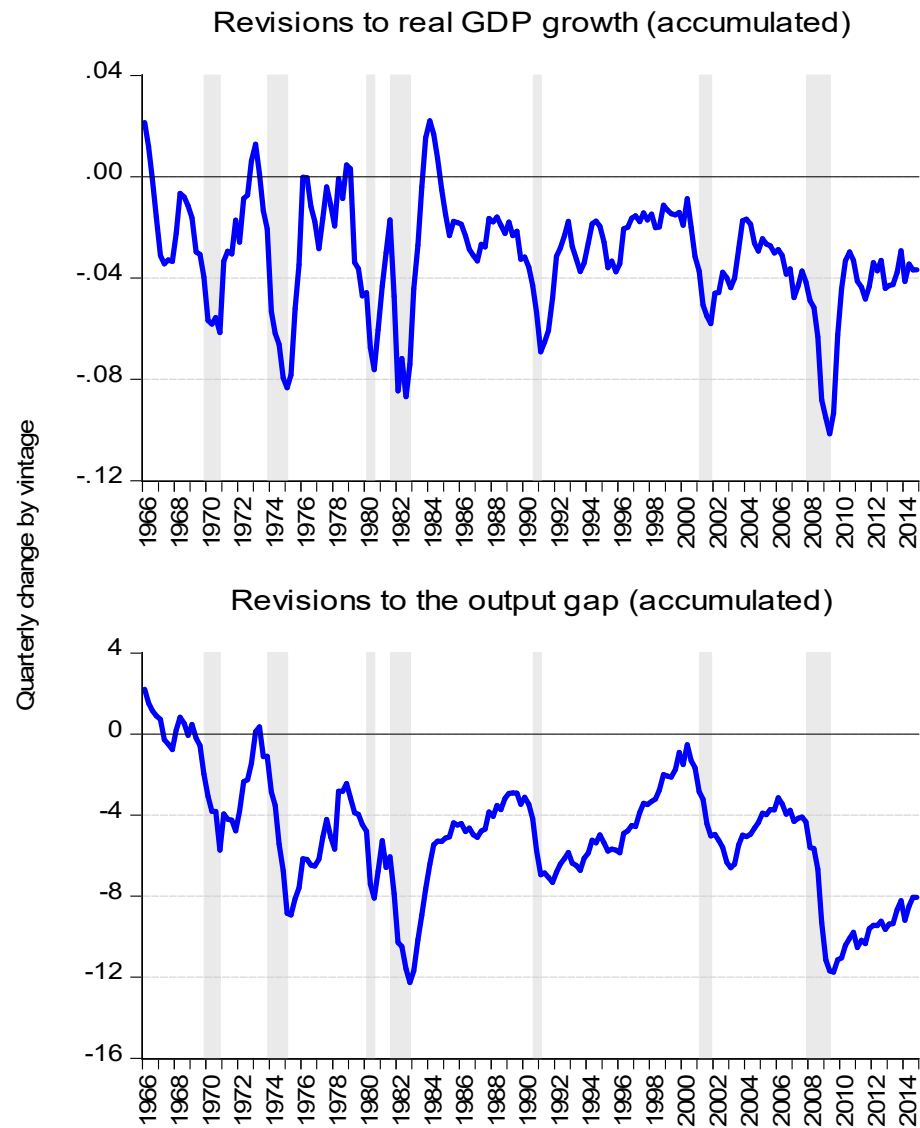




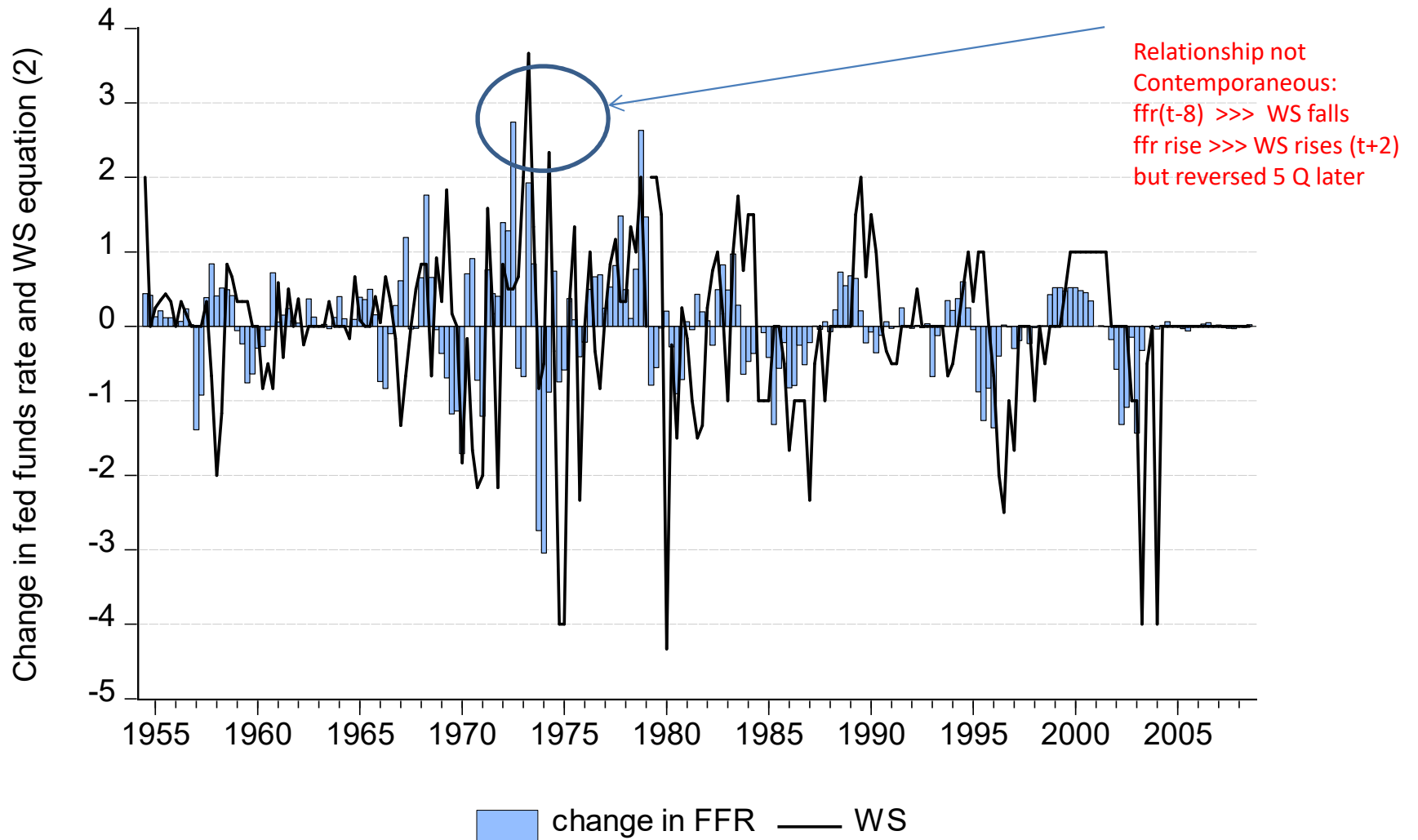
# Greenbook Forecasts



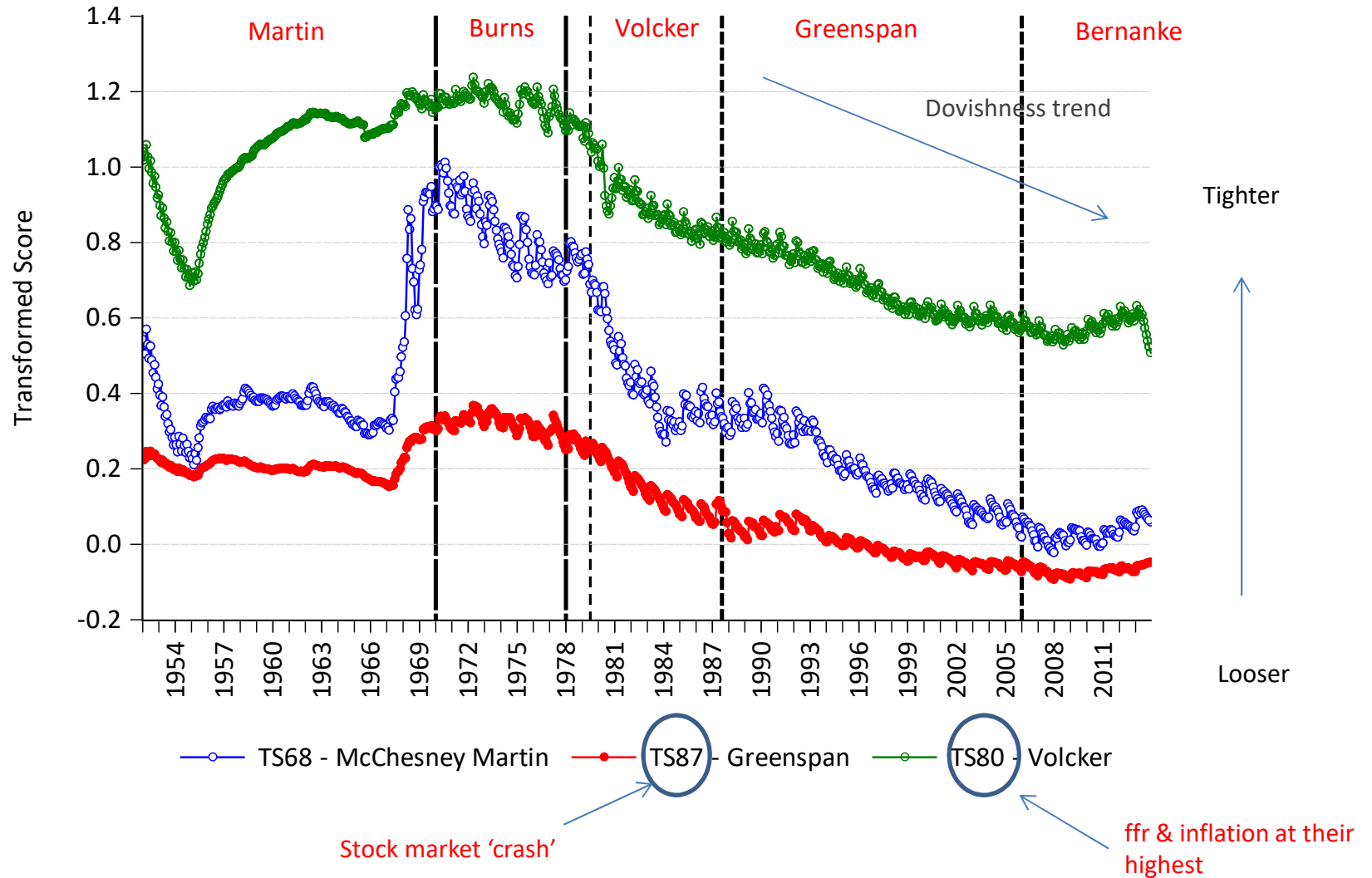
# Real Time Data



# Figure 2: WS & the FFR



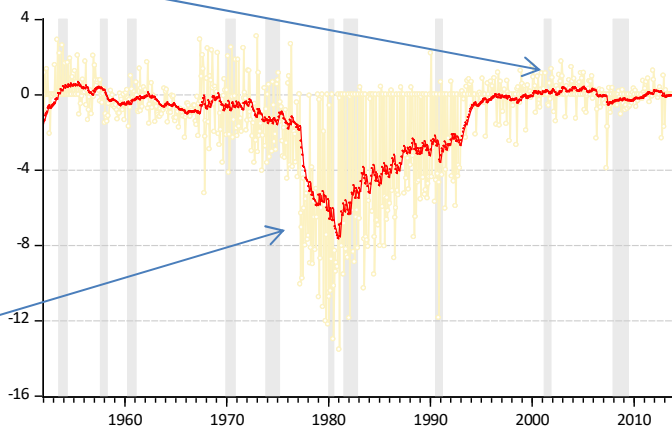
# More Wordscores



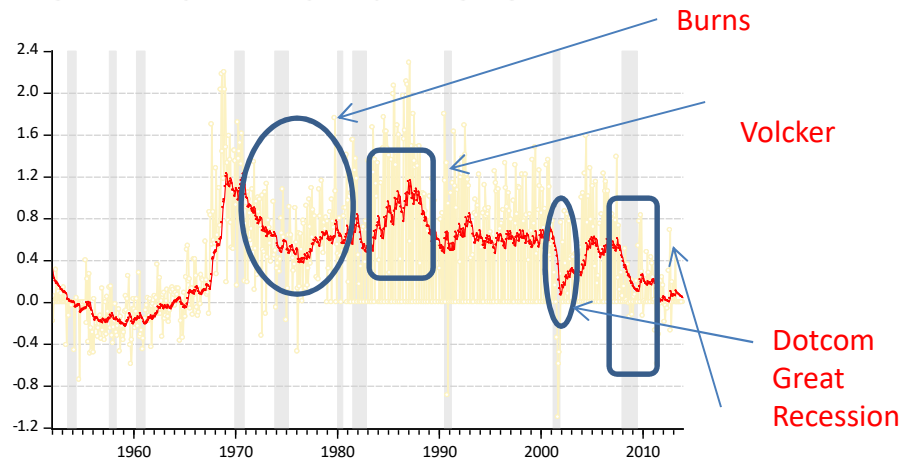
# DICTION: tone variables

Stability especially during the GM: complacency?

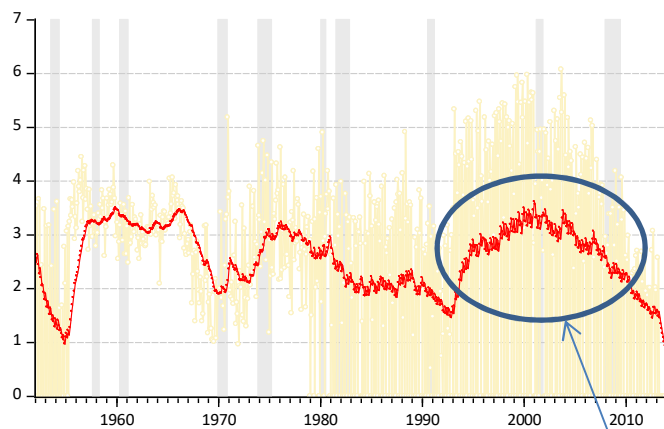
Lowest @ Volcker



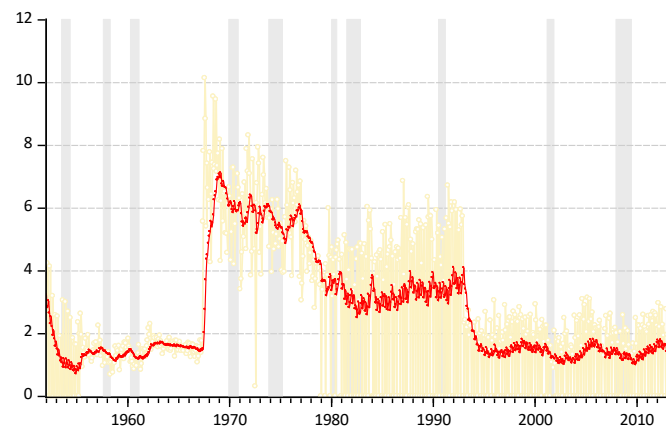
— CERTAINTY — CERTAINTY (smoothed)



— OPTIMISM — OPTIMISM (smoothed)



— ACTIVITY — ACTIVITY (smoothed)

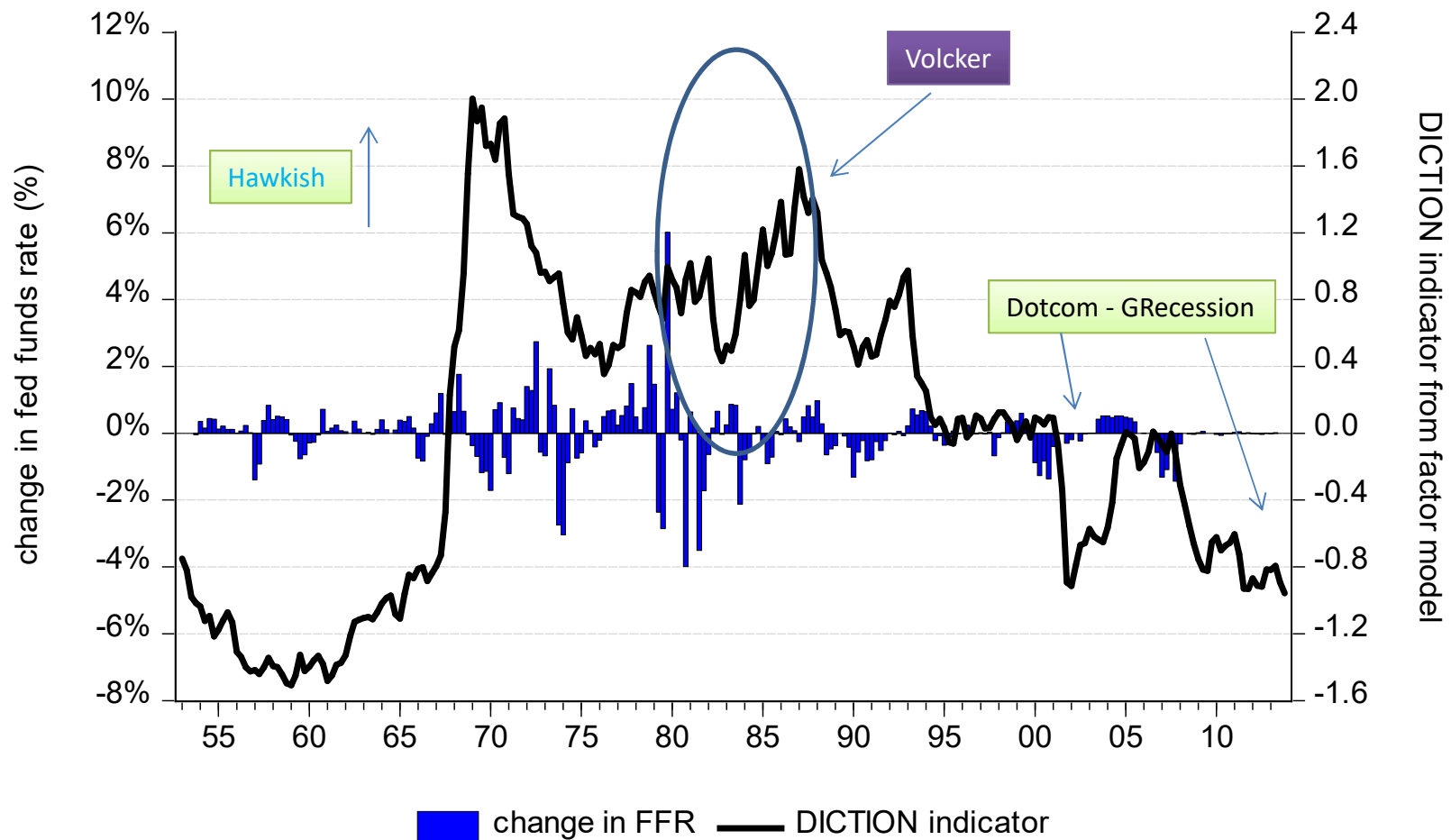


— COMMONALITY — COMMONALITY (smoothed)

More ↑  
Less ↓  
dissent

Broadly parallels tightening/loosening of MP

# Diction (Factor) vs FFR



Factor loadings: -.26 (activity), -.53 (certainty), 0,73 (optimism), 0,88(commonality)

# VARs & FAVARs

PRE 1994:  $[\dot{y}_t, \Delta\pi_t^{PCE}, \Delta i_t^{FFR}, CM_t]$

Exogenous:  
-Oil prices  
-Real time revisions  
-Chair's tenure  
-Greenbook forecasts

Unlikely to influence other variables

Stationarity concerns

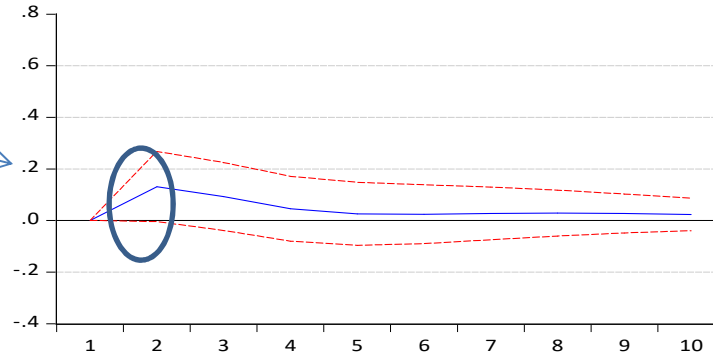
POST 1994:  $[CM_t, \dot{y}_t, \pi_t^{PCE}, \Delta i_t^{FFR}]$

Content does not respond contemporaneously to others

Relative positions?

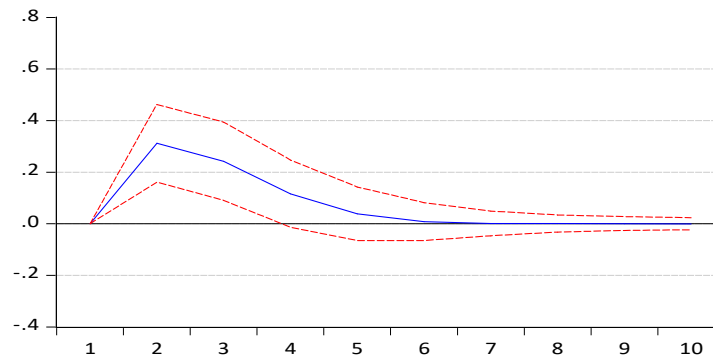
**Wordscores &  
Economic Activity  
POST 1994 ends  
In 2008Q4**

Response of WScore to real GDP growth: post-1993



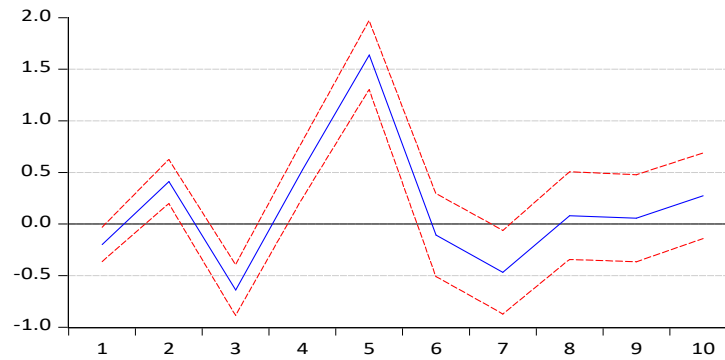
Positive real GDP shock  
Produces small, but positive,  
hawkish tone. Impact is  
Temporary.

Response of WScore to fed funds rate: post-1993



FFR shock leads  
to more hawkish  
tone but earlier

Response of WScore to fedfunds: pre-1994



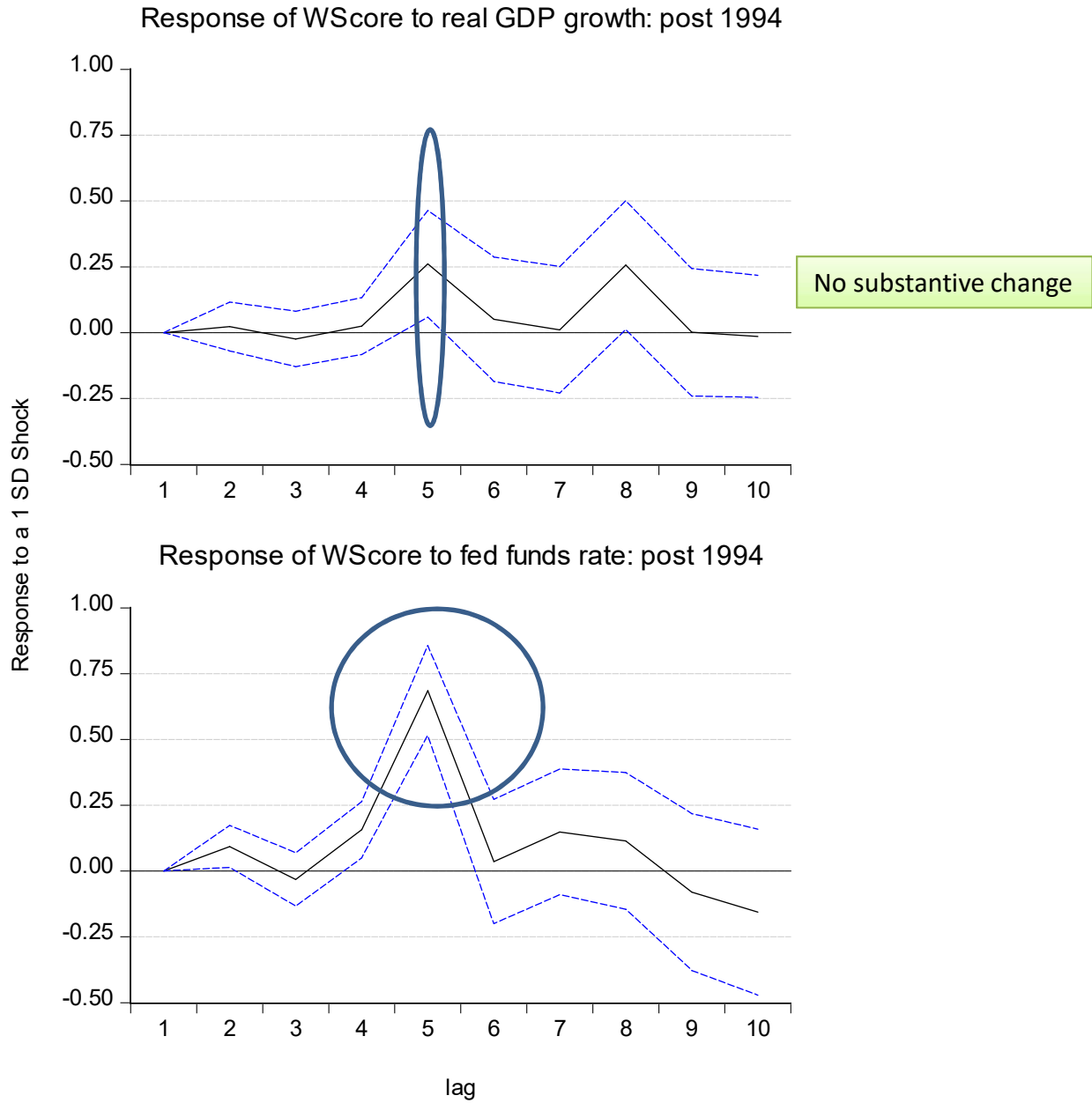
FFR shock leads  
to more hawkish  
tone but later



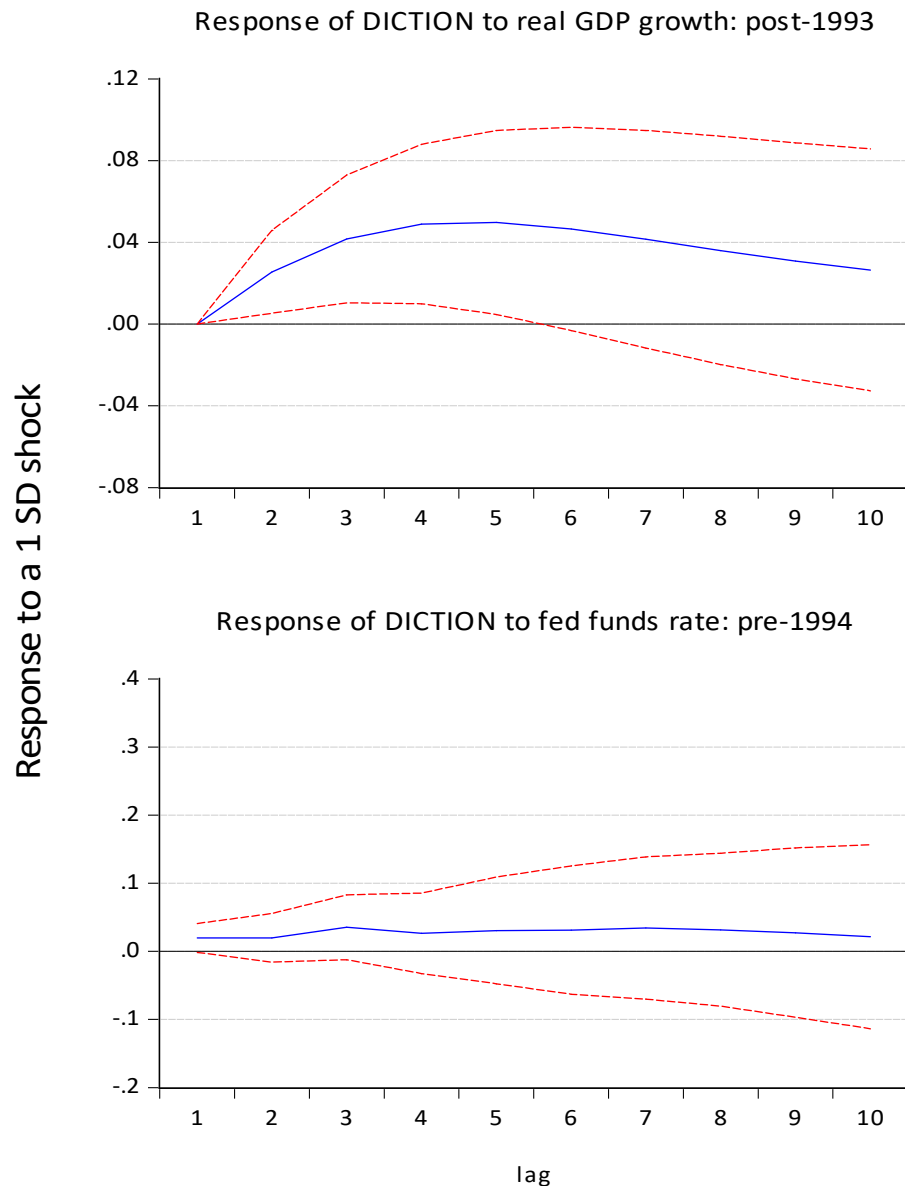


**Extended to  
2012Q4**

Shape of response generally  
The same but SIZE half of  
what it was until 2008Q4



# Diction & Economic Activity Until 2008Q4



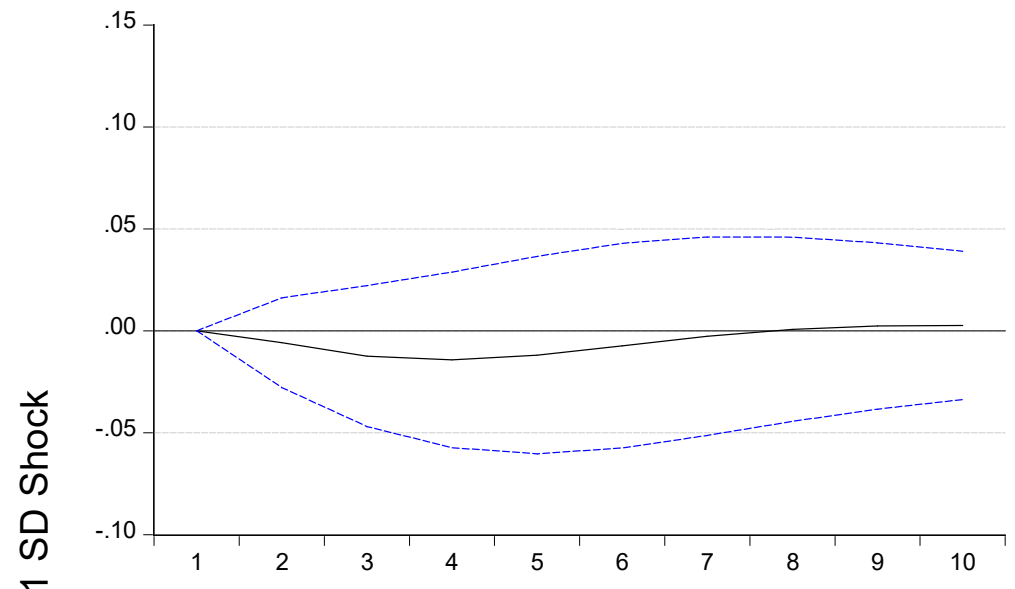
Hawkish response is more apparent in DICTION

Disconnect between tone and FFR changes

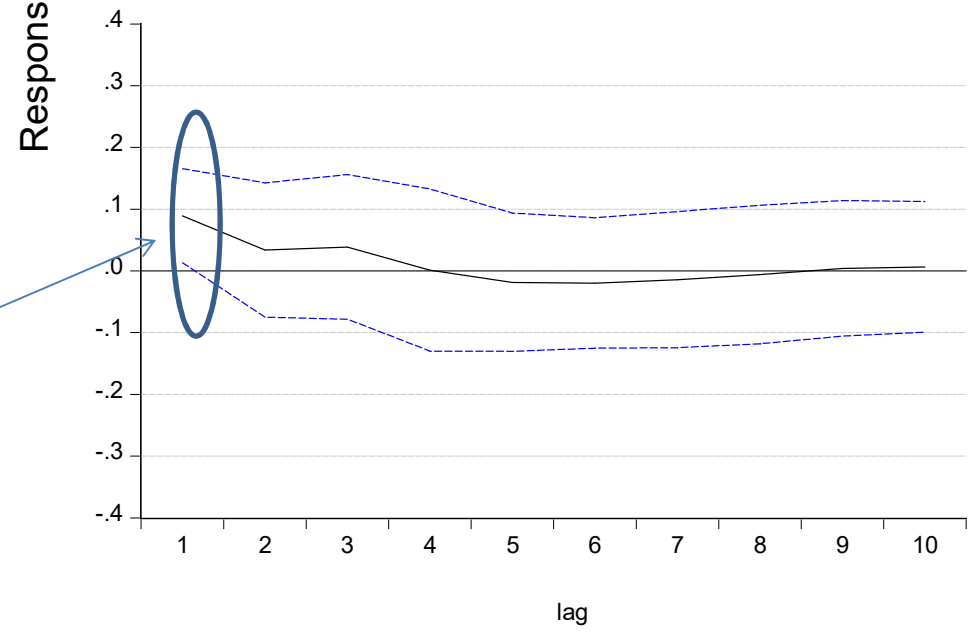
Hawkish response disappears

Extended to 2012Q4

Response of DICTION to real GDP growth: post-1994



Response of DICTION to fed funds rate: post-1994



Slightly, but not Impressively, Positive response

# Bottom Lines?

- Fed funds rate and content of minutes are related but not contemporaneously and a function of how content is measured
- Content of minutes influenced by real economic environment but not the other way around
- Content is not influenced by and does not influence inflation

# Extensions?

- Are there consequences from aggregating individual members' views?
- How to best control for changing length of minutes
- What about forward vs backward-looking language?
- Do the algorithms accurately capture sentiment?
- To what extent is sentiment/WS related to Greenbook forecasts? Or, could Wordscores & Diction measures indirectly affect economic activity through forecasts?
- Should a distinction be made between 'dovish' versus 'hawkish language'?