



Connecting the dots: Market reactions to forecasts of policy rates and forward guidance provided by the Fed



Conference on the Future  
of Forward Guidance

Sveriges Riksbank



11-12 May 2017

# Connecting the dots: Market reactions to forecasts of policy rates and forward guidance provided by the Fed

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*The views expressed in this presentation are those of the authors and not necessarily those of the Bank for International Settlements, De Nederlandsche Bank, the Federal Reserve Board or the Clearing House.*



*Plan for the talk*

- Introduction
- Background
- Data
- Method/Results
- Conclusion



## Introduction

- In January 2012, the FOMC made two important changes to its post-meeting communications.
  - It lengthened its then date-based forward guidance.
  - It added projections of the federal funds rate to its quarterly economic forecast
- Unfortunately, the two did not agree



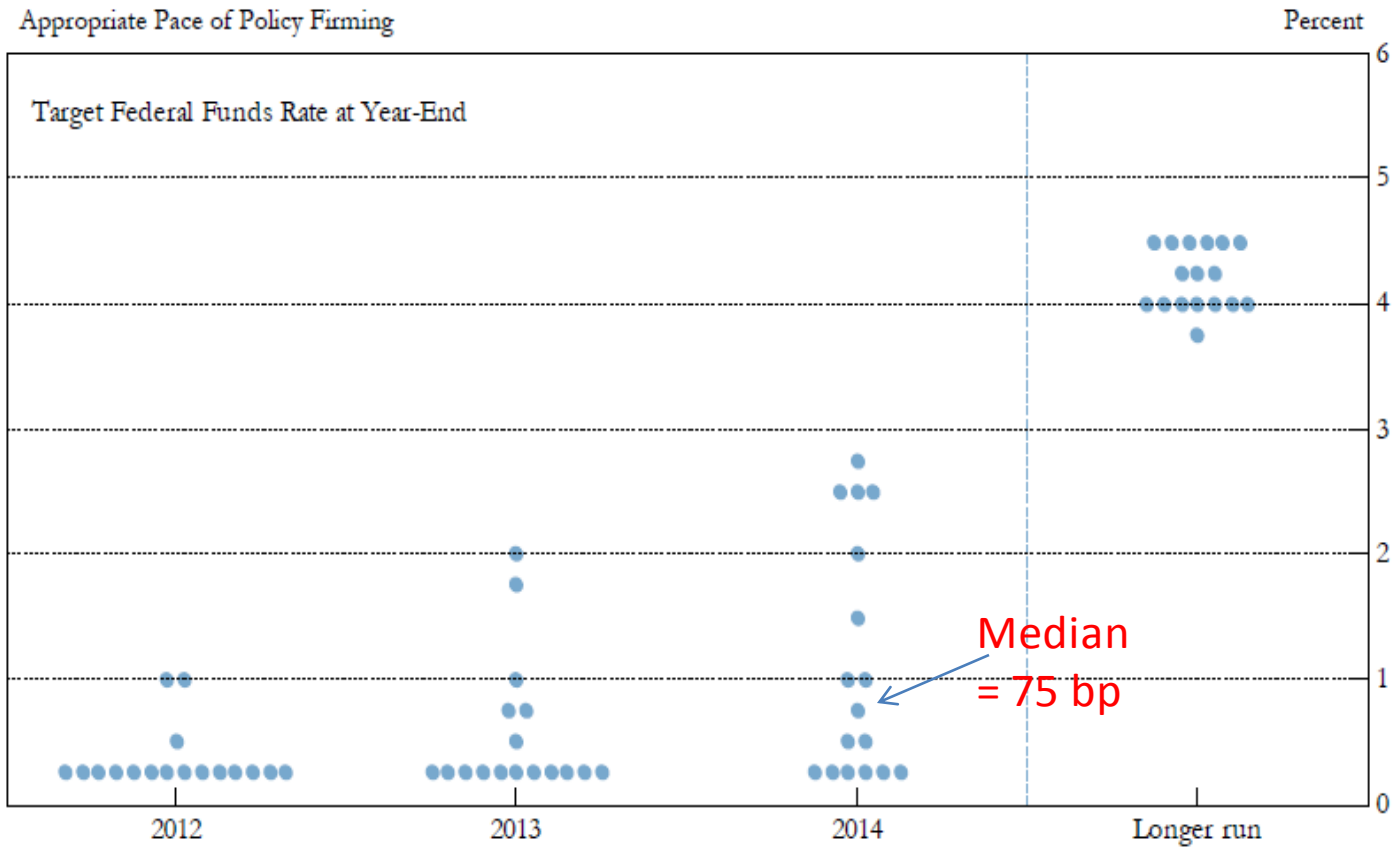
## Forward guidance

...the Committee decided today to keep the target range for the federal funds rate at 0 to 1/4 percent and currently anticipates that economic conditions—including low rates of resource utilization and a subdued outlook for inflation over the medium run—are likely to warrant exceptionally low levels for the federal funds rate at least through late 2014.

*January 25, 2012 post-FOMC meeting statement*



# Projection of the Federal Funds rate



## Our paper addresses two questions –

- **Does the market listen to forward guidance, the projections, or both?**
  - ✓ **Answer – “both”**
- **What does the market listen to when the guidance and the projections disagree?**
  - ✓ **Fed answer: They should listen to the guidance**

*The projections reported in the SEP, including of course the interest-rate projections, are submitted by individual FOMC participants in a decentralized way. The projections do not necessarily reflect the FOMC consensus and they certainly do not bind future FOMC actions. If the FOMC as a whole is going to make a commitment or provide explicit guidance about future rate policy, it will do that in its post-meeting statement, or the chair will communicate it.*

*Ben Bernanke, November 2016*

- ✓ **Our answer: They listen to the one that indicates the longest commitment.**



## Background: Projections of the target federal funds rate

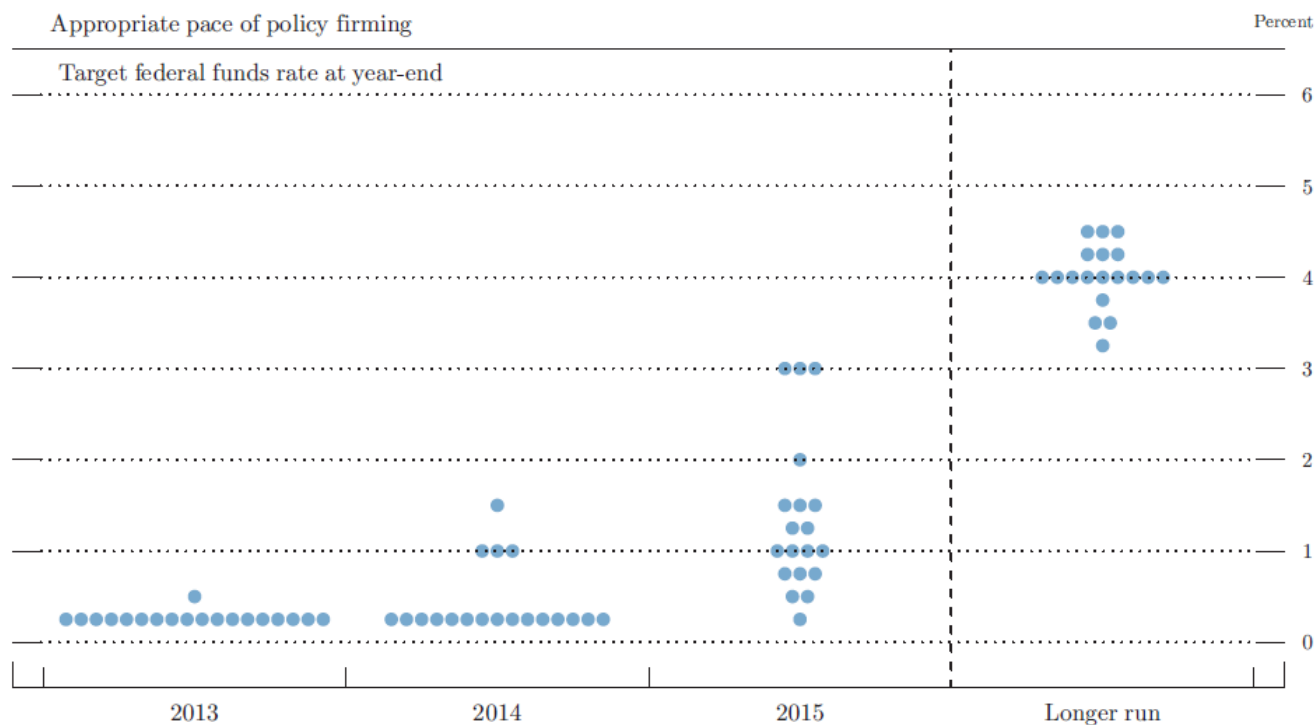
- Since September 2007, the FOMC has been providing on a quarterly basis each participant's (voting members plus other Reserve Bank presidents) forecasts of GDP growth, inflation, and unemployment.
- The results are referred to as the Summary of Economic Projections (SEP) and are discussed at the post-meeting press conference and, in more detail, in the minutes released 3 weeks later.
- The forecasts represent each participant's view of the most likely outcome under appropriate monetary policy.





## Background: Projections of the target federal funds rate

- Since January 2012, the SEP also includes the participants' view of appropriate monetary policy.



## Background: Forward guidance

- **The FOMC used forward guidance about its target federal funds rate to provide added stimulus once the target hit the zero lower bound (a range of 0 to 25 bp) in December 2008.**
- **The Committee used three types of forward guidance**
  - **Qualitative (December 2008 through June 2011)**

*“The Committee continues to anticipate that economic conditions--including low rates of resource utilization and a subdued outlook for inflation over the medium run--are likely to warrant exceptionally low levels for the federal funds rate for an **extended period.**”*  
June 2011
  - **Date-based (August 2011 to October 2012)**

*“In particular, the Committee also decided today to keep the target range for the federal funds rate at 0 to 1/4 percent and currently anticipates that exceptionally low levels for the federal funds rate are likely to be warranted **at least through mid-2015.**”* October 2012



## Background: Forward guidance

- (Types of forward guidance, continued)
  - **Thresholds (not triggers) (December 2012 to January 2014)**

*“The Committee also reaffirmed its expectation that the current exceptionally low target range for the federal funds rate of 0 to 1/4 percent will be appropriate at least as long as the unemployment rate remains above 6-1/2 percent, inflation between one and two years ahead is projected to be no more than a half percentage point above the Committee's 2 percent longer-run goal, and longer-term inflation expectations continue to be well anchored.” January 2014*
  - **From March 2014 through September 2014, it was a mix of date based and qualitative**
    - *“...considerable time after the asset purchase program ends.” September 2014*
  - **And then back to qualitative from October 2014 to April 2015**



## Data

- **We basically ask two questions**
  - Does the market listen to forward guidance, the projections, both, or neither?
  - What does the market listen to when the guidance and the projections disagree?
- **To answer those questions we need measures of**
  - When did the market expect liftoff?
  - When does the forward guidance indicate liftoff will occur?
  - When does the SEP indicate liftoff will occur?
  - When do economic conditions alone suggest liftoff will occur?
  - (for some specifications) Market expectations about forward guidance and the SEP



## Data: When did the market expect liftoff?

- Market participants' expectations of the time to Fed lift-off from ZLB: derived from a range of fed funds futures contracts (from Bloomberg).
  - Interpolation of a range of fed funds contracts is used to estimate the days, *FEDFDAYS*, to the future date at which the mean expectation of the federal funds rate has reached 37.5 basis points, which we define as the date of lift-off from the ZLB.
- Sample period 1 January 2012 to 31 July 2015



## Data: When does the forward guidance indicate liftoff will occur?

- Estimate of the days to lift-off from FOMC forward guidance statements, *FGDAYS*, calculated by interpreting statements to derive days until the date at which the policy rate is expected to be increased by 25 basis points, with lift-off restricted to occur on FOMC dates
  - For threshold-based guidance (i.e. unemployment rate greater than 6.5%) we use the Summary of Professional Forecasters (SPF) data to assess when the forecast would cross the threshold at the time of the statement.



## Data: When does the SEP indicate liftoff will occur?

- Estimate the expected days to lift-off from the SEP forecasts, *SEPDAYS*, by estimating the time until the date at which the mean expectation across the different forecasts has reached 37.5 basis points (using linear interpolation)
  - In a second measure, *SEPDAYS2*, we do the same but exclude the bottom 2 and top 3 SEP responses, since market participants reportedly discount the most extreme responses in order to focus on the consensus responses



## Data: When do economic conditions alone suggest liftoff will occur?

- We measure expected days to lift-off suggested by economic conditions alone using a Taylor rule, estimated using private sector forecasts of inflation and unemployment

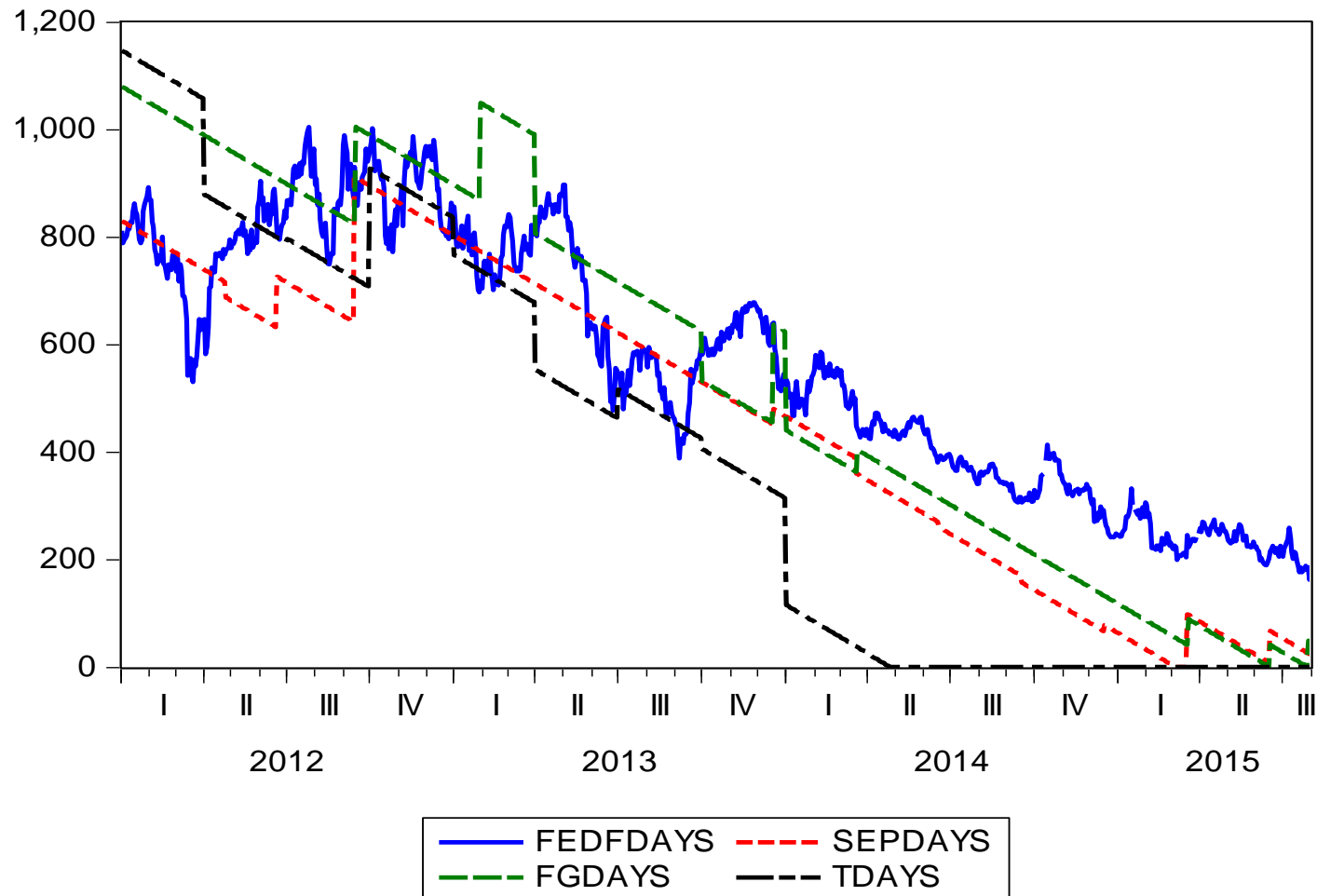
$$r_t^e = 4 + 1.5(\pi_t^e - 2) - 2.5(u_t^e - 5.5)$$

- Date of lift-off (TDAYS) is the date at which the Taylor rule reaches 37.5 bp
- If the interest rate implied by the Taylor rule was already above 37.5 bp, the days to lift off was set to 1





**Figure 2: Different measures of expected days to lift-off from the ZLB**



## Data: Market expectations about forward guidance

- We measure market participants' expectations for the FOMC's forward guidance using the New York Fed's Primary Dealers' survey
- The survey is conducted one week before each FOMC meeting; some of the surveys contain questions about how respondents expect forward guidance to change at the next FOMC announcement date.
- The responses about the FOMC's forward guidance are often qualitative; we interpret these responses to derive our measure of expected forward guidance (in days to liftoff),  $PDDAYS_t$



## Data

- We also control for 11 US macroeconomic surprises
- We calculate surprises of these data releases by taking the difference between the real-time data releases and Bloomberg survey expectations, normalized by their standard deviations to make the coefficients comparable.
- Appendices to the paper include
  - Mapping from forward guidance to “promised” dates of liftoff and
  - Mapping from Primary Dealer Survey to market expectations for forward guidance.



## Method: Simple levels regression

- Explain market forecasts of time to lift-off,  $FEDFDAYS_t$ , as a function of the days to lift-off inferred from the FOMC's forward guidance announcement in FOMC statements,  $FGDAYS_t$ , and the "dots",  $SEPDAYS_t$  :

$$FEDFDAYS_t = \alpha + \beta_1 SEPDAYS_t + \beta_2 FGDAYS_t + \beta_3 TDAYS_t + \varepsilon_t \quad (2)$$

- Also control for time to lift-off inferred from Taylor rule,  $TDAYS_t$ , based on private sector forecasts of inflation and unemployment
- Estimated in log-levels, with OLS using Newey-West adjusted standard errors



## Results: Simple levels regression

**Table 1**

Dependent variable: LOG(FEDFDAYS)	
Variable	
c	4.653***
LOG(SEPDAYS)	0.075***
LOG(FGDAYS)	0.150***
LOG(TDAYS)	0.069***
Adj. R <sup>2</sup>	0.91
No. of observations	932

\*\*\*, \*\* and \* represent significance at the 1%, 5% and 10% levels, respectively. Newey-West adjusted standard errors. Sample period: 1 January 2012 to 31 July 2015.

## Results: Identifying most binding variable

- Introduce interaction terms with dummy variable which equals one when expected days to lift-off are largest for this variable among:

$$FEDFDAYS_t = \alpha + \beta_1 SEP DAYS_t + \gamma_1 DUMMAXSEP_t * SEP DAYS_t + \beta_2 FG DAYS_t + \gamma_2 DUMMAXFG_t * FG DAYS_t + \beta_3 TDAYS_t + \gamma_3 DUMMAXTR_t * TDAYS_t + \varepsilon_t \quad (2b)$$

- Estimated in log-levels, with OLS using Newey-West adjusted standard errors



## Results: Identifying most binding variable

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Dependent variable: LOG(FEDFDAYS)

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Variable	
<i>c</i>	4.322***
<i>LOG(SEPDAYS)</i>	0.031**
<i>DUMMAXSEP*LOG(SEPDAYS)</i>	0.273***
<i>LOG(FGDAYS)</i>	-0.024
<i>DUMMAXFG*LOG(FGDAYS)</i>	0.277***
<i>LOG(TDAYS)</i>	0.058***
<i>DUMMAXTR*LOG(TDAYS)</i>	0.261***

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Adj. R<sup>2</sup> 0.918

No. of observations 932

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\*\*\*, \*\* and \* represent significance at the 1%, 5% and 10% levels, respectively. Newey-West adjusted standard errors. Sample period: 1 January 2012 to 31 July 2015.

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## Method: Isolating impact of surprises

- Regress daily changes in the market's expected time to lift-off on surprises in SEP policy rate forecast and surprises in FOMC forward guidance

$$\Delta FEDFDAYS_t = \alpha + \beta_1 SEP DAYS_t^{sur} + \beta_2 FG DAYS_t^{sur} + \beta_3 X_t + \varepsilon_t$$

- Where
  - $X_t$  is a vector of surprises in 11 macroeconomic variables
  - $FG DAYS_t^{sur}$  is the surprise in the forward guidance using the expectations inferred from the primary dealer survey





## Method: Isolating impact of surprises

And

$SEPDAYS_t^{sur} = SEPDAYS_t - E_{t-1}SEPDAYS_t$  with

$$E_{t-1}SEPDAYS_t = SEPDAYS_{tp} + (FEDFDAYS_{t-1} - FEDFDAYS_{tp})$$

Where  $tp$  is the date of publication of the previously made SEP forecast

- That is, expectations for the SEP equal the previous expectations plus the change in market expectations.
- This proxy measure incorporates information from the previous SEP forecast, as well as information available to market participants up to the day prior to publication of the central bank's new forecasts.



## Method: Isolating impact of surprises

Inserting the terms yields

$$\begin{aligned} \Delta FEDFDAYS_t = & \alpha \\ & + \beta_1 (SEPDAYS_t - SEPDAYS_{tp} - FEDFDAYS_{t-1} + FEDFDAYS_{tp}) + \\ & \beta_2 (FGDAYS_t - PDDAYS_{t-1}) + \beta_3 X_t + \varepsilon_t \end{aligned}$$

estimation via OLS with Newey-West adjusted standard errors



## Results: Isolating impact of surprises

Dependent variable: $\Delta(\text{FEDFDAYS})$	
Variable	
$\alpha$	-0.907
$\beta_1$	0.258**
$\beta_2$	0.106*
<i>Non-farm payrolls</i>	-31.392***
<i>ISM</i>	-3.751
<i>Unemployment rate</i>	0.564
<i>Retail sales</i>	-13.702***
<i>Industrial production</i>	-1.110
<i>Housing starts</i>	-12.709***
<i>CPI</i>	3.207
<i>PPI</i>	2.108
<i>Hourly earnings</i>	-9.656***
<i>Trade</i>	0.768
<i>GDP (advance)</i>	-2.546
Adj. R <sup>2</sup>	0.083
No. of observations	928

\*\*\*, \*\* and \* represent significance at the 1%, 5% and 10% levels, respectively. Newey-West adjusted standard errors. Sample period: 1 January 2012 to 31 July 2015.



## Method: Isolating impact of surprises

- Surprises of both SEP dots and of FOMC forward guidance are positive and significant
- Coefficient on SEP surprises of 0.26 is significant at the 5% level; effect is larger and more significant than that of forward guidance, for which the coefficient is 0.11, significant at the 10% level
- The smaller coefficient on forward guidance may reflect the increasing irrelevance and vagueness of the forward guidance later in the sample.
- Coefficients on surprises of SEP dots and forward guidance are positive but less than one, consistent with market participants understanding conditionality of both forms of communication about future policy rates



## Results: Isolating impact of surprises

- Results for SEP surprises are similar to those results found by Moessner and Nelson (2008) for New Zealand
  - We estimated the reactions of daily changes in NZ interest rate futures (2 to 6 quarters ahead) to surprises in RBNZ interest rate forecasts to be about 0.2
- Results when the SEP measure is created after first dropping outliers (the bottom two and top three responses) are similar.



## Conclusion

- **Does the market listen to forward guidance or the projections or both?**
  - ✓ Answer – “both”
  - ✓ Market also listens to economic conditions
- **What does the market listen to when the guidance and the projections disagree ?**
  - ✓ They listen to the one that indicates the longest commitment.



## Conclusion

- **The results make sense; each piece of information on the outlook for policy provides additional information.**
  - The Taylor rule measure summarizes the implications for policy of the economic outlook.
  - The SEP provides information on the Participants' views on the economic outlook and their reaction function.
  - The guidance provides information on the Committee's agreed plan.
- **Moreover, it also makes sense to put the most weight on the measure that suggests the longest time to liftoff.**
  - The guidance was being used to provide stimulus, so it often conveyed an intention to remain at zero longer than implied by the economic situation and the FOMC's normal reaction function.
  - But the guidance also got stale, in part because reaching agreement is hard.
  - And neither the Taylor rule, nor any rule, can capture the complexities involved in setting policy.

