

# Lies, Damned Lies & Economic Forecasts

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Cantor Fitzgerald, LLP

# Lies, Damned Lies & Economic Forecasts

## Agenda

1

What's the big deal?

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2

Experts kNOw better than the rest of us, right?

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3

Financial/Economic experts kNOw better, right?

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4

A framework for thinking about economic forecasts

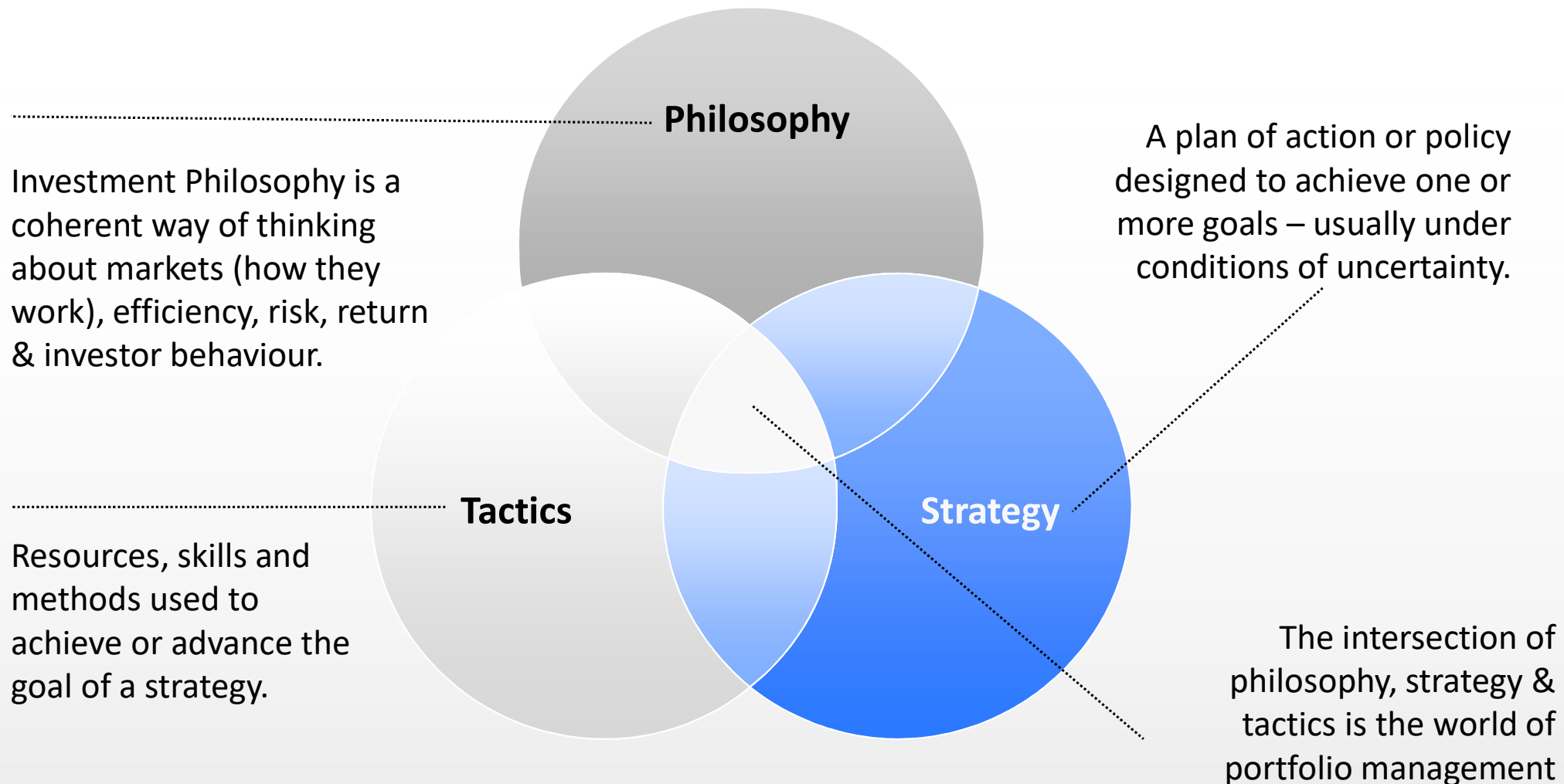
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5

Updated economic forecasts

# Philosophy, Strategy & Tactics

Where Does this Fit?



The difference between strategy and tactics: Strategy is done above the shoulders, Tactics are done below the shoulders.

# What Should I Benchmark?

## Prudence Person

Investments shall be made with judgment and care, under circumstances then prevailing, which persons of prudence, discretion and intelligence exercise in the management of their own affairs, not for speculation, but for investment, considering the probable safety of their capital as well as the probable income to be derived.

## Prudent Investor

A U.S. law that sets the standard of fiduciary duty for those entrusted with the responsibility of managing others' money, such as trustees and estate administrators. It requires that a trustee weigh risk versus reward when making investment decisions, taking into account the income that may be generated by the investment as well as the probable safety of the invested capital.

## Prudent Investor vs Prudent Man/Person

1. Trust accounts are judged on their entire portfolio, rather than whether the investment was prudent at the time of purchase.
2. Diversification is explicitly required under the Prudent Investor Act
3. Suitability is deemed more important than individual investments
4. Fiduciaries are allowed to delegate investment management to qualified third parties



# What Should I Benchmark?

## General Objectives

“The primary objectives, in priority order...

### 1. Safety

Safety of principal is the foremost objective... ***The goal will be to mitigate credit risk and interest rate risk.***

### 2. Liquidity

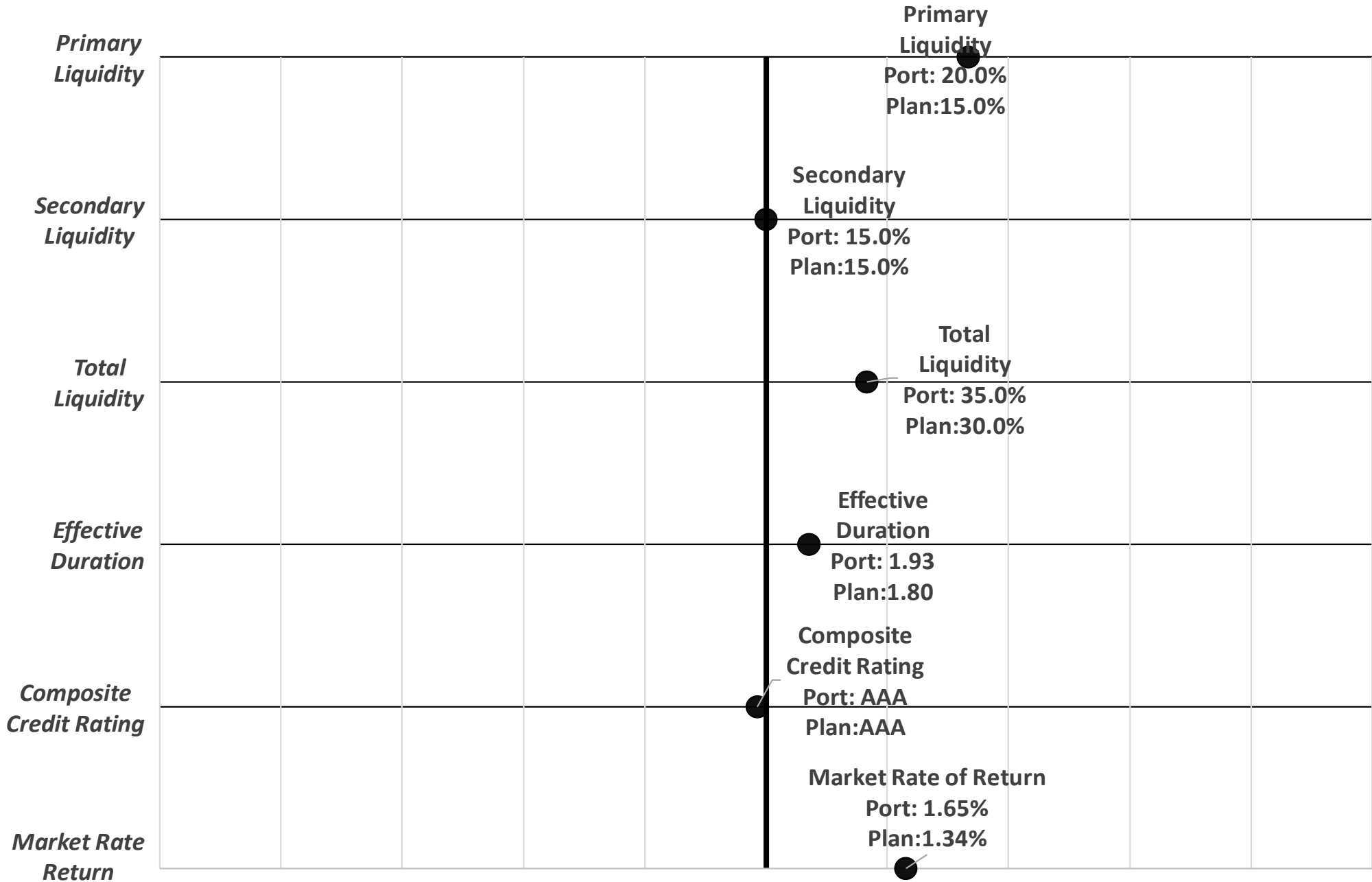
The investment portfolio shall ***remain sufficiently liquid*** to meet all operating requirements that may be reasonably anticipated.

### 3. Return

The investment portfolio shall be designed with the objective of attaining a ***market rate of return throughout budgetary and economic cycles***, taking into account the investment risk constraints of safety and liquidity needs.”

# Benchmark Suitability

Gain/Loss is not listed! Why not?



# Prediction ↔ Forecast

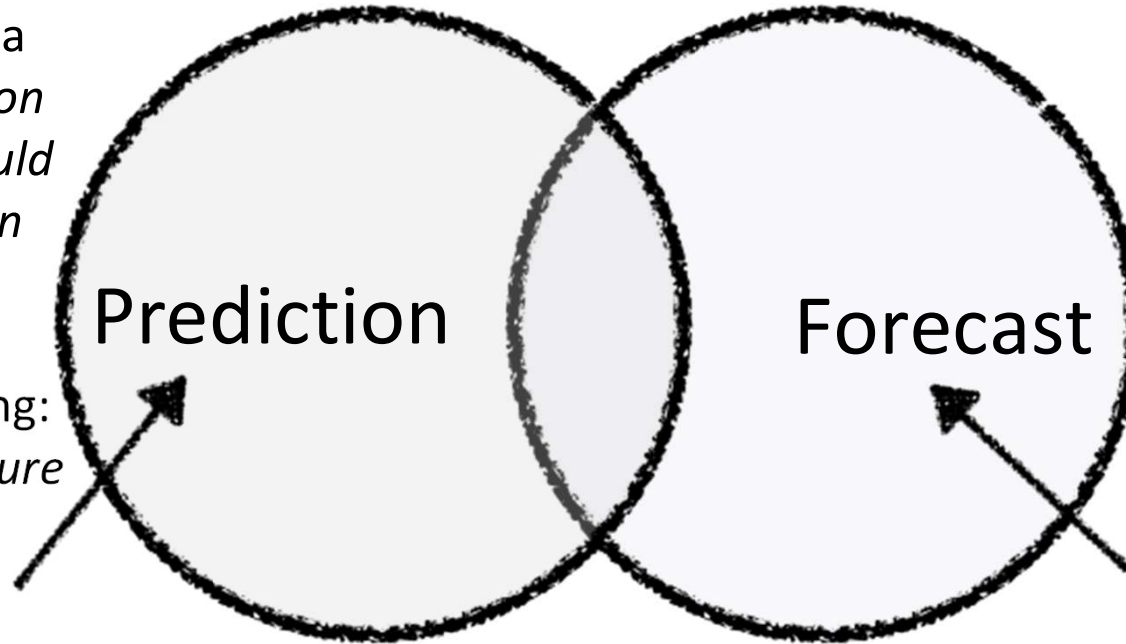
## noun

a thing predicted; a forecast: *a prediction that the Greeks would destroy the Persian empire.*

- the action of predicting something: *the prediction of future behavior.*

## ORIGIN

mid 16th cent.: from Latin *praedictio(n-)*, from *praedicere* 'make known beforehand' (see [predict](#)).



## Verb

(past and past participle **forecast** or **forecasted**) [*with obj.*]

predict or estimate (a future event or trend): *rain is forecast for eastern Ohio* | [*with obj. and infinitive*]: *coal consumption is forecast to increase.*

## noun

a prediction or estimate of future events, especially coming weather or a financial trend.

forecaster | 'fôr,kastər| noun: a person who predicts or estimates a future event or trend: economic forecasters are predicting a downturn.

Experts kNOw better, right?

**Rock n' roll? It will be gone  
by June**



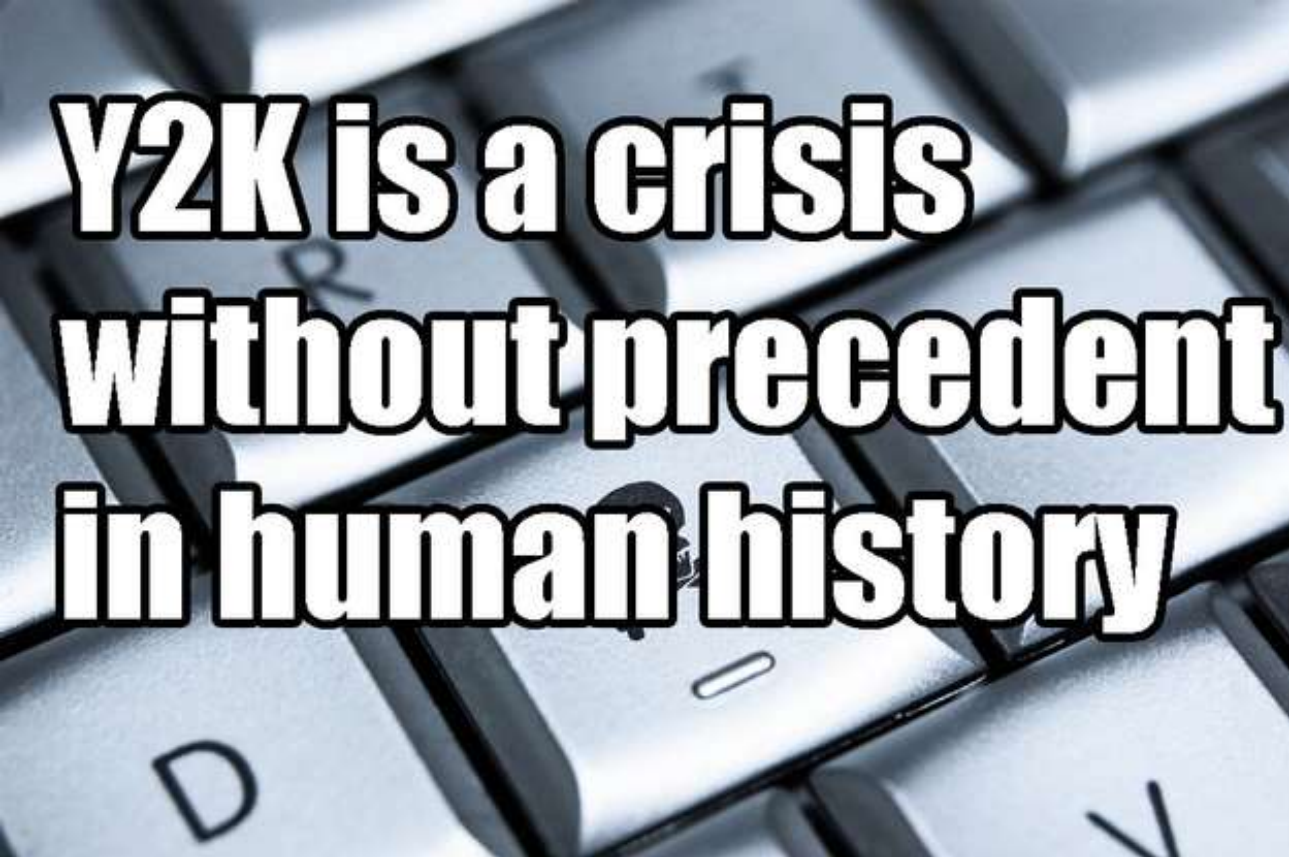
**Variety  
magazine,  
1955.**

# Experts kNOw better, right?



**A Decca Records executive to the band's manager, Brian Epstein, following an audition in 1962. He continued: "We don't like your boys' sound. Groups are out. Four-piece groups with guitars, particularly, are finished."**

Experts kNOw better, right?



**Y2K is a crisis  
without precedent  
in human history**

**Byte magazine  
editor Edmund  
DeJesus, 1998.**

# Experts kNOw better, right?



**Next Christmas  
the iPod will be  
dead, finished,  
gone, kaput**

**Alan Sugar, 2005.**



# Experts kNOw better, right?



**There's no chance that the iPhone is going to get any significant market share. No chance**

**Microsoft CEO  
Steve Ballmer,  
2007.**

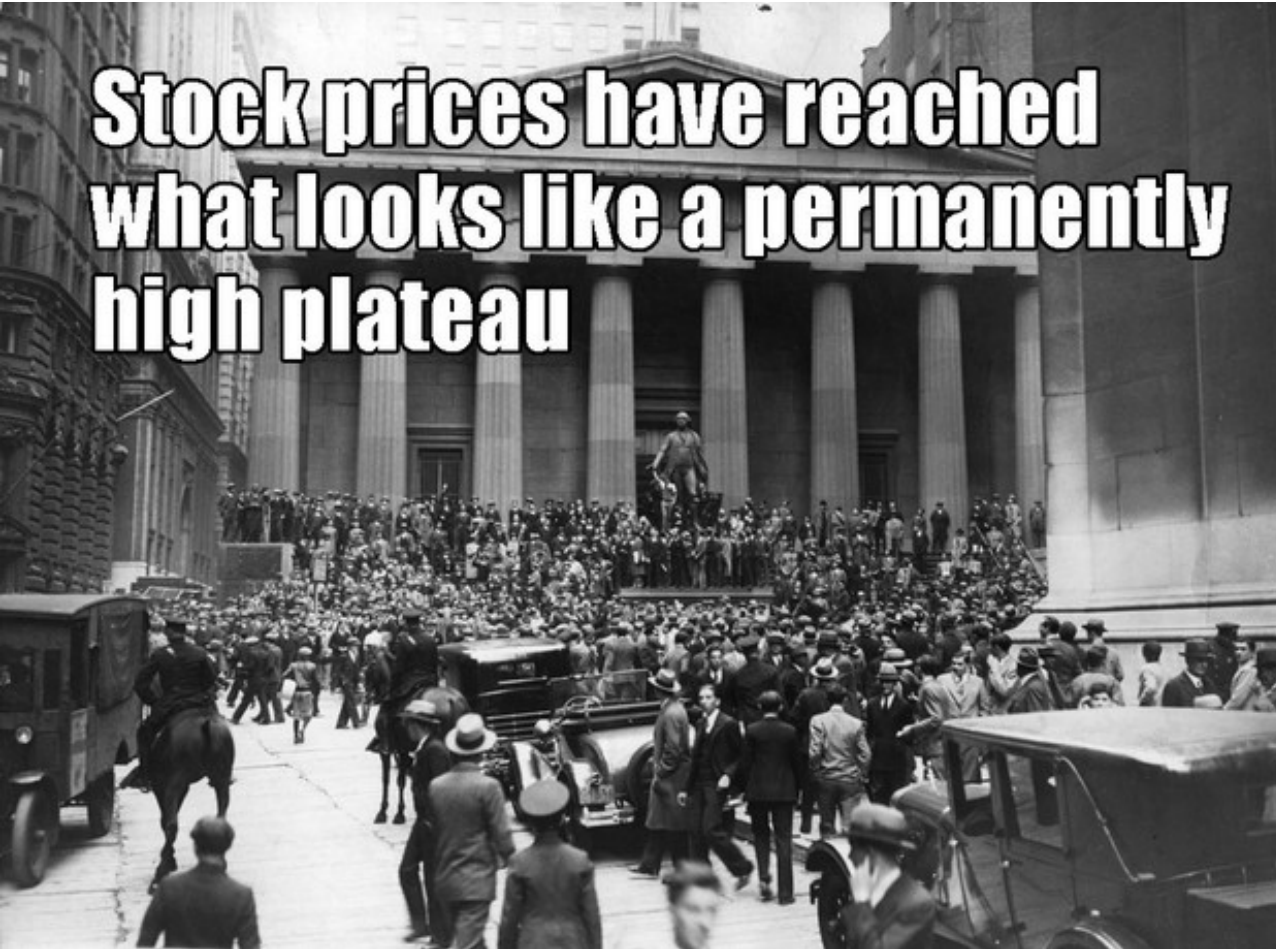




*"The only function of economic forecasting is to make astrology look respectable." - John Kenneth Galbraith*

# Financial experts kNOw better, right?

**Stock prices have reached  
what looks like a permanently  
high plateau**



Economist Irving Fisher in October 1929, three days before the stock market crash that triggered the Great Depression.

# Financial experts kNOw better, right?



Franklin Raines (CEO of Fannie Mae), 10th June 2004: "These subprime assets are so riskless that their capital for holding them should be under 2 percent."

# Financial experts kNOw better, right?



Joseph Cassano (Head of Financial Products at AIG), 2007: "It is hard for us, without being flippant, to even see a scenario within any kind of realm of reason that would see us losing one dollar in any of these Credit Default Swap transactions."

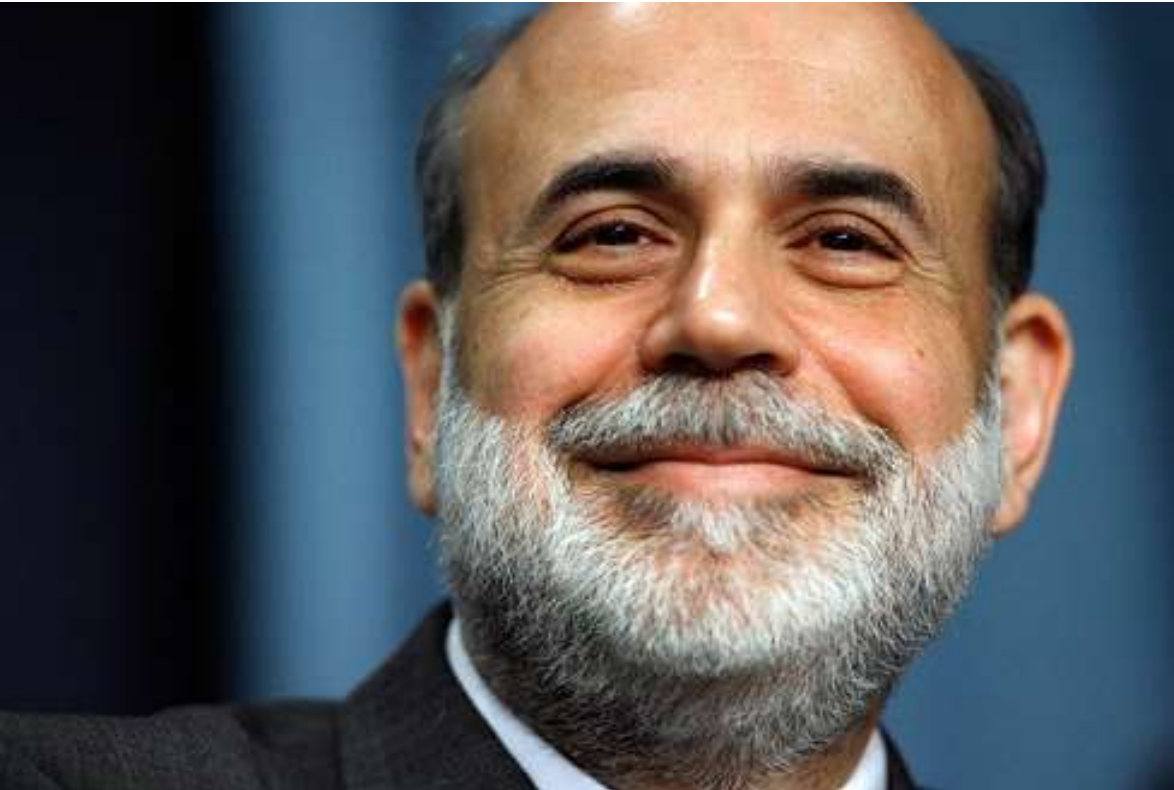
# Financial experts kNOw better, right?



In December 2007, Goldman Sachs chief investment strategist Abby Joseph Cohen made a Fisher-like prediction of her own. She suggested the S&P 500 would hit 1,675 by the end of 2008, a climb of 14% — it actually ended below 900.



# Financial experts kNOw better, right?



Ben Bernanke, 10th  
January 2008 - "The  
Federal Reserve is  
currently not  
forecasting a  
recession."

# Financial experts kNOw better, right?



Donald Luskin (US investment guru), 14th September 2008: "Anyone who says we're in a recession, or heading into one—especially the worst one since the Great Depression—is making up his own private definition of 'recession'."

# Coin Flipping as Insight



Named by *Fortune*  
ONE OF THE SMARTEST BOOKS OF ALL TIME

*F O L E D*

*BY*

*R A N D O M N E S S*

*The Hidden Role of Chance  
in Life and in the Markets*

NASSIM NICHOLAS TALEB

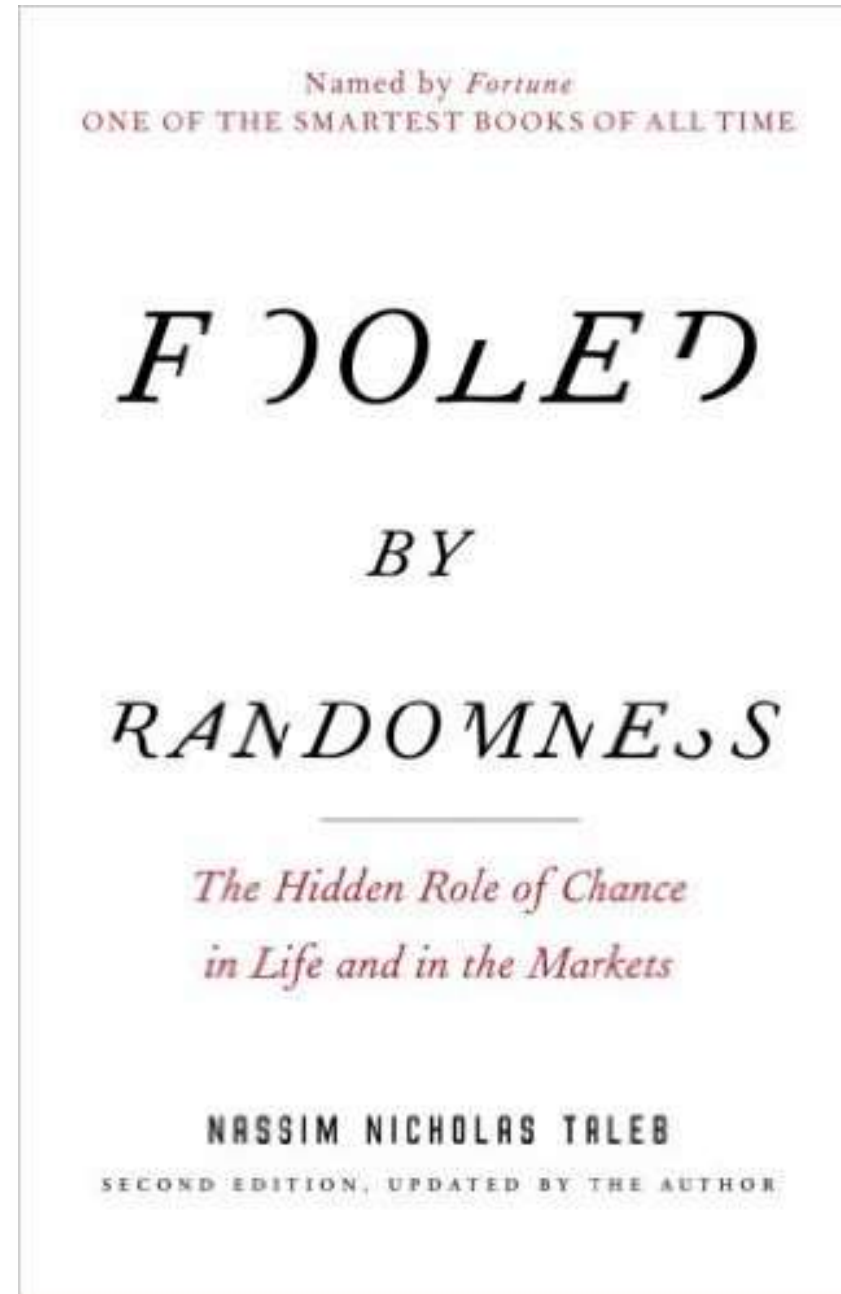
SECOND EDITION, UPDATED BY THE AUTHOR

Are Coin Flips Really Random?

Adler, David E. "A Reliable Randomizer, Turned on Its Head." *The Washington Post*, August 2, 2009.  
<http://www.washingtonpost.com/wp-dyn/content/article/2009/07/31/AR2009073104170.html>



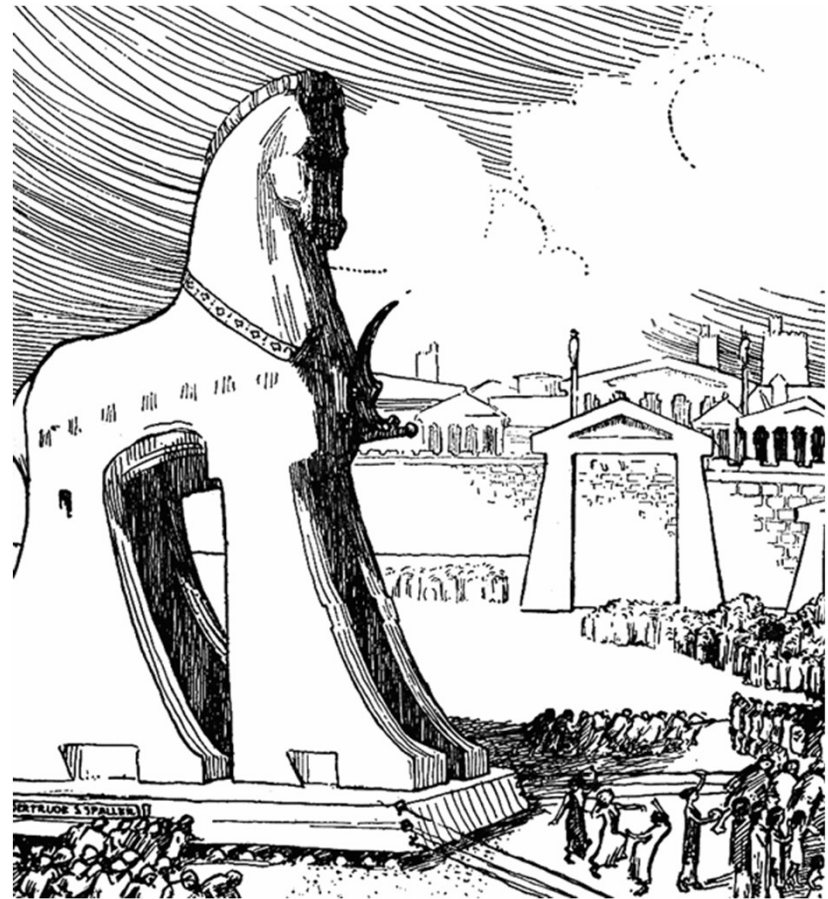
“Generate a long series of coin flips producing heads and tails with 50% odds each and fill up sheets of paper. If the series is long enough you may get eight heads or eight tails in a row, perhaps even ten of each. Yet you know that in spite of these wins the conditional odds of getting a head or a tail is still 50%.”



# The Flip Side of the Coin

“DR. THEODORE P. HILL asks his mathematics students at the Georgia Institute of Technology to go home and either flip a coin 200 times and record the results, or merely pretend to flip a coin and fake 200 results. The following day he runs his eye over the homework data, and to the students' amazement, he easily fingers nearly all those who faked their tosses.”

# Hurricanes & The Iliad



Technically the Trojan Horse is not mentioned in The Iliad  
Trojan Horse. (2016, January 6). In Wikipedia, The Free Encyclopedia. Retrieved 19:02, January 10, 2016, from [https://en.wikipedia.org/w/index.php?title=Trojan\\_Horse&oldid=698496365](https://en.wikipedia.org/w/index.php?title=Trojan_Horse&oldid=698496365)

# Hurricane Rita 9/19/05

## Rita Projected Path



DEVIATIONS IN TRACK AND/OR INTENSITY FROM CURRENT PROJECTIONS COULD RESULT IN SIGNIFICANT DIFFERENCES FROM THE INFORMATION ON THIS GRAPHIC

19 Sep 2005 13:42 GMT / 19 Sep 2005 09:42 AM EDT

The  
Weather  
Channel  
weather.com

# Hurricane Rita 9/22/05

## Rita Projected Path



DEVIATIONS IN TRACK AND/OR INTENSITY  
FROM CURRENT PROJECTIONS COULD  
RESULT IN SIGNIFICANT DIFFERENCES  
FROM THE INFORMATION ON THIS GRAPHIC

22 Sep 2005 21:42 GMT / 22 Sep 2005 05:42 PM EDT

The  
Weather  
Channel  
weather.com

# Hurricane Rita Final

Hurricane Rita Storm Track (2005)

LawrencevilleWeather.com



# Hurricane Ike 9/6/08



# Hurricane Ike 9/10/08





# Chalcas the wise

“...Chalcas the wise, the Grecian priest and guide,  
That sacred seer, whose comprehensive view,  
The past, the present, and the future knew...”



# Wall Street Journal Economic Forecast Survey

## Economic Forecasting Survey

The Wall Street Journal surveys a group of more than 60 economists on more than 10 major economic indicators on a monthly basis.

### Economic Indicators

GDP (quarterly)

GDP (annual)

CPI

Oil Prices

Unemployment

Nonfarm Payrolls

Federal Funds Rate

10 Year Note

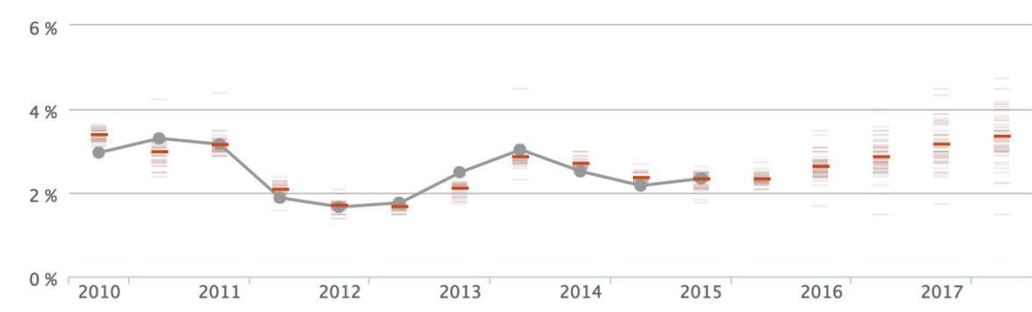
Home Prices

Housing Starts

Recession Probability

### 10 Year Note

Actual  Estimates 12 yr. **8 yr.** 4 yr.



Share view:   
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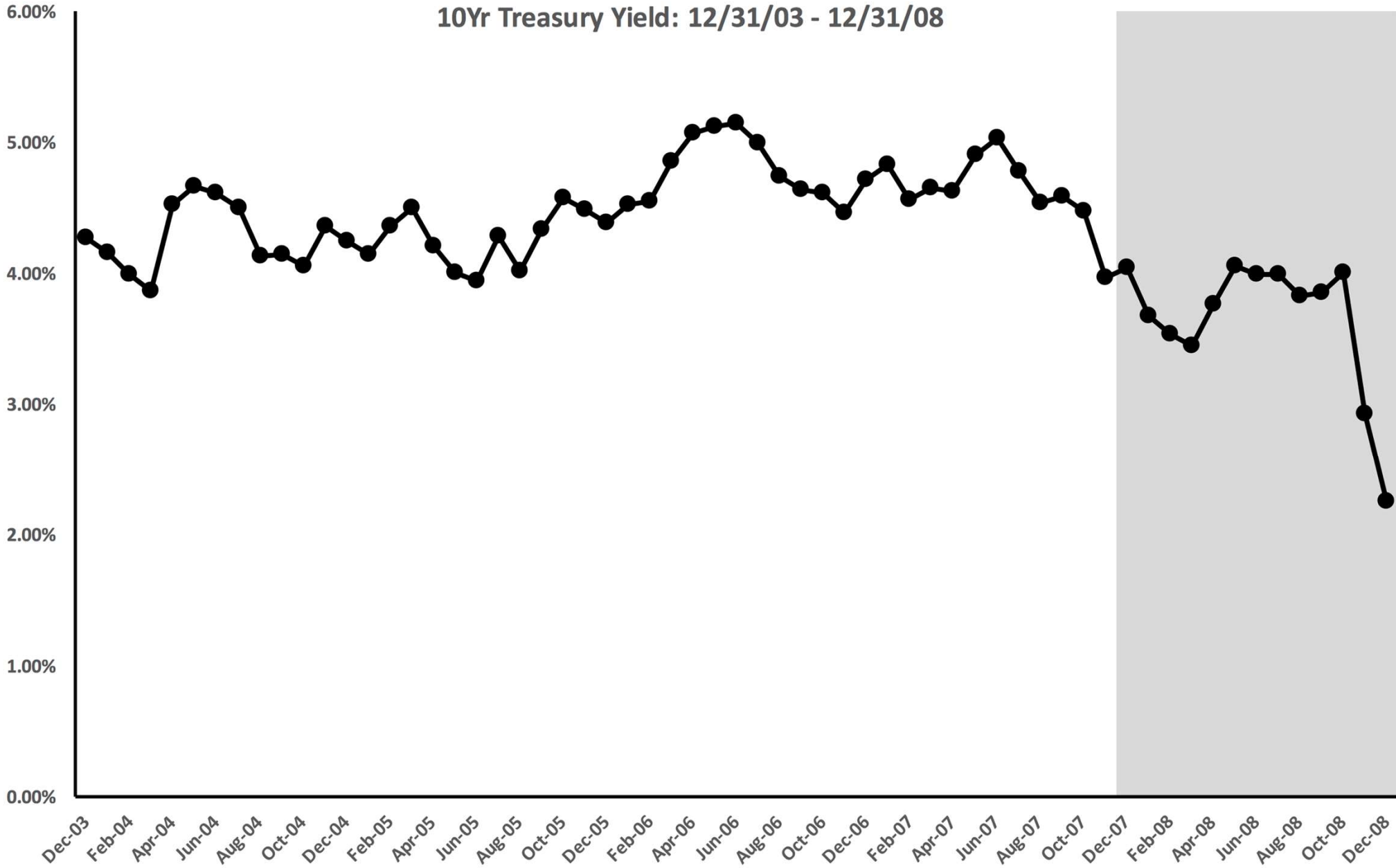
### 10 Year Note



Download data for December 2015  
Edition 2015-12-01

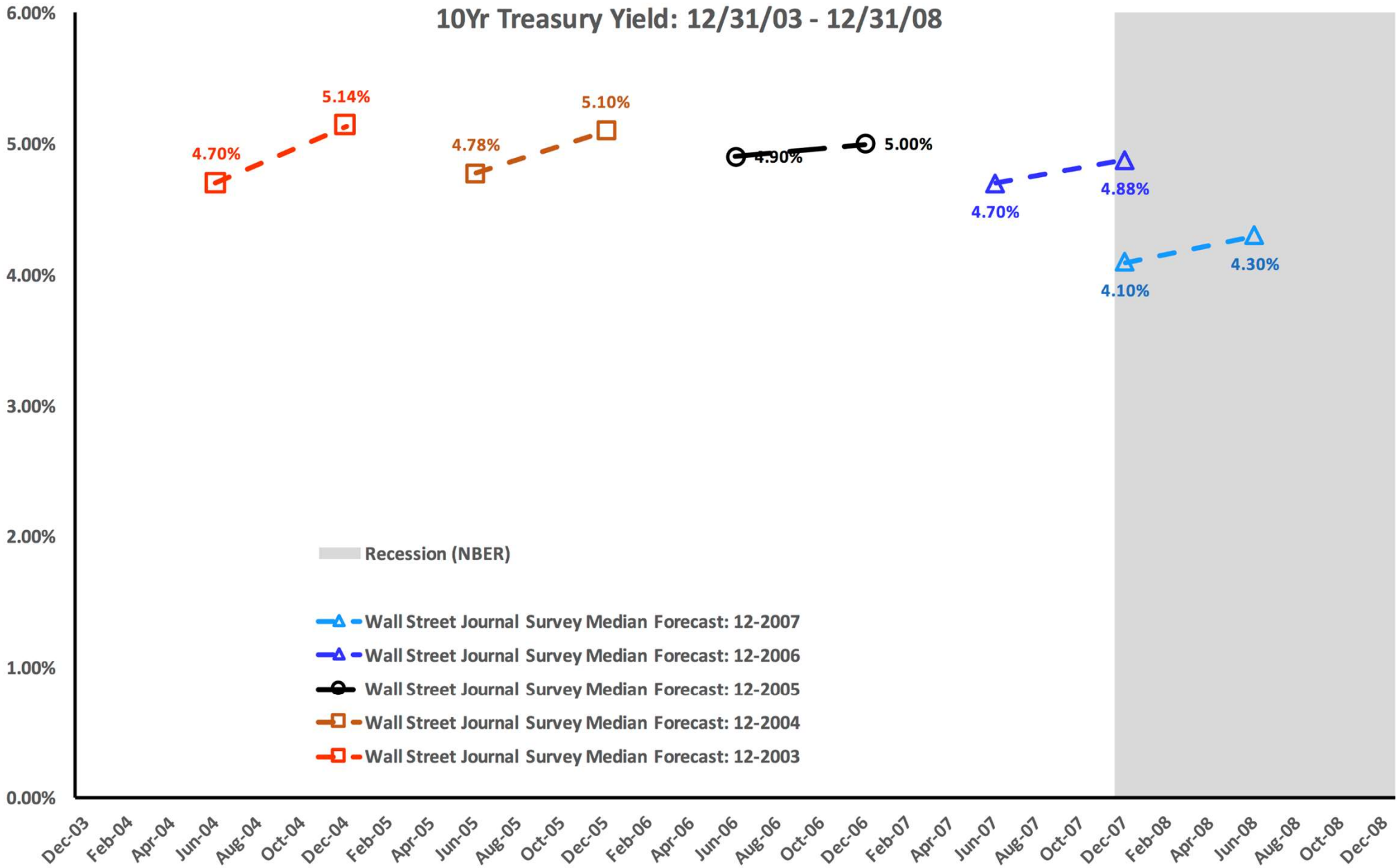
- Updated Monthly
- Includes Identities
- Spreadsheet Data

# History Alone

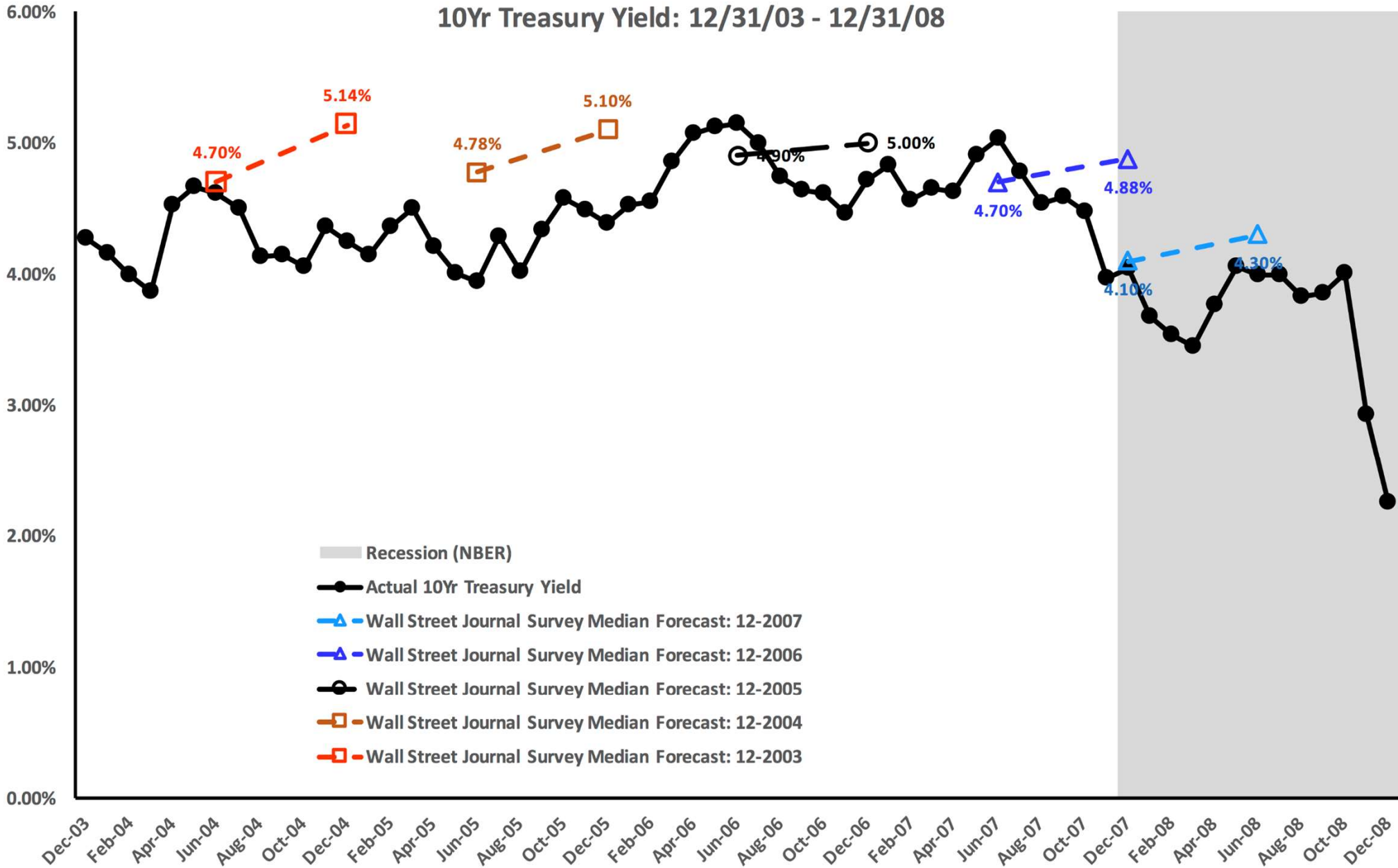


Analysis by Kevin Webb, CFA (kwebb@cantor.com). WSJ and Bloomberg forecasts as published. Econ data from FRED.

# Forecast Alone

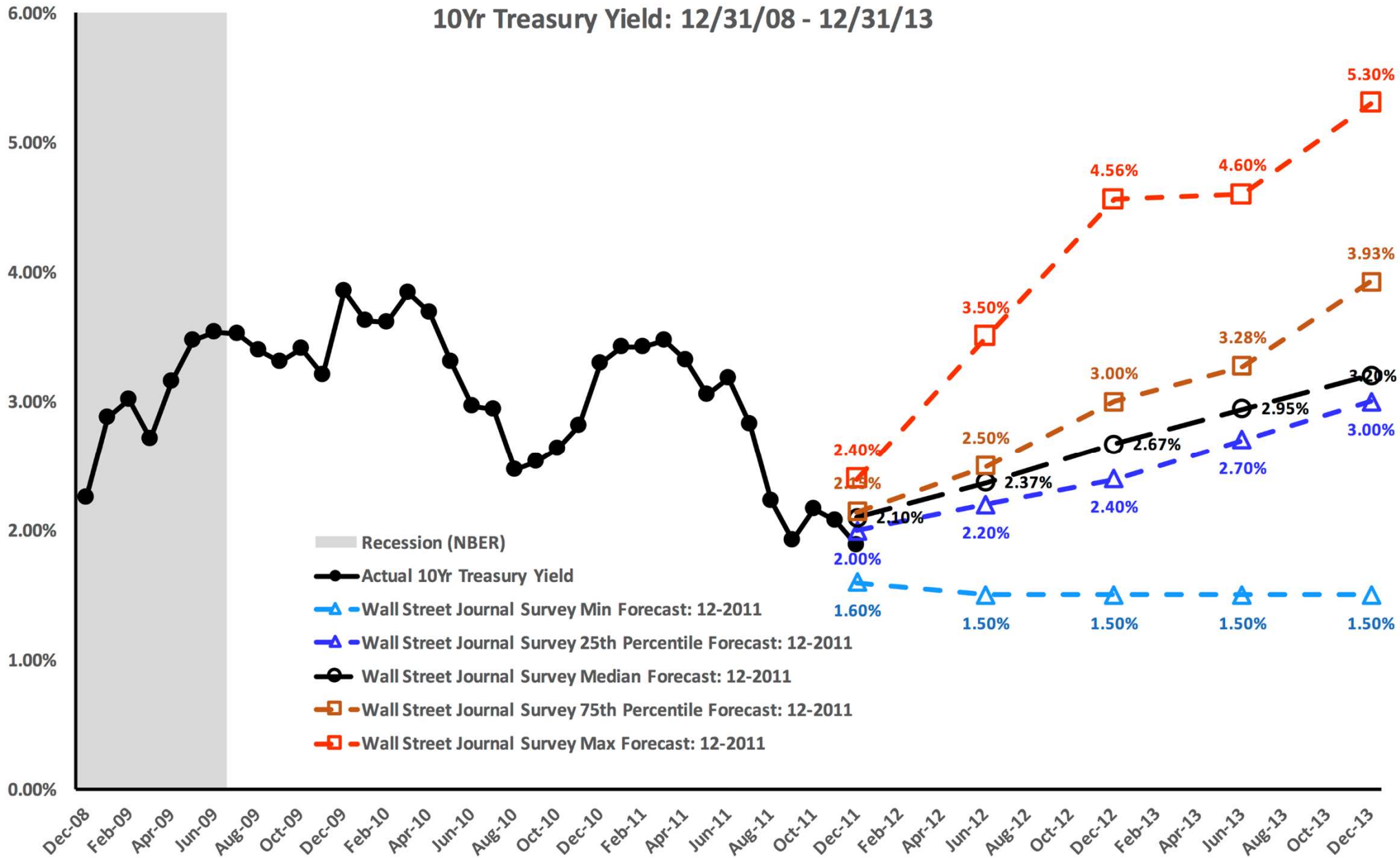


# All Together



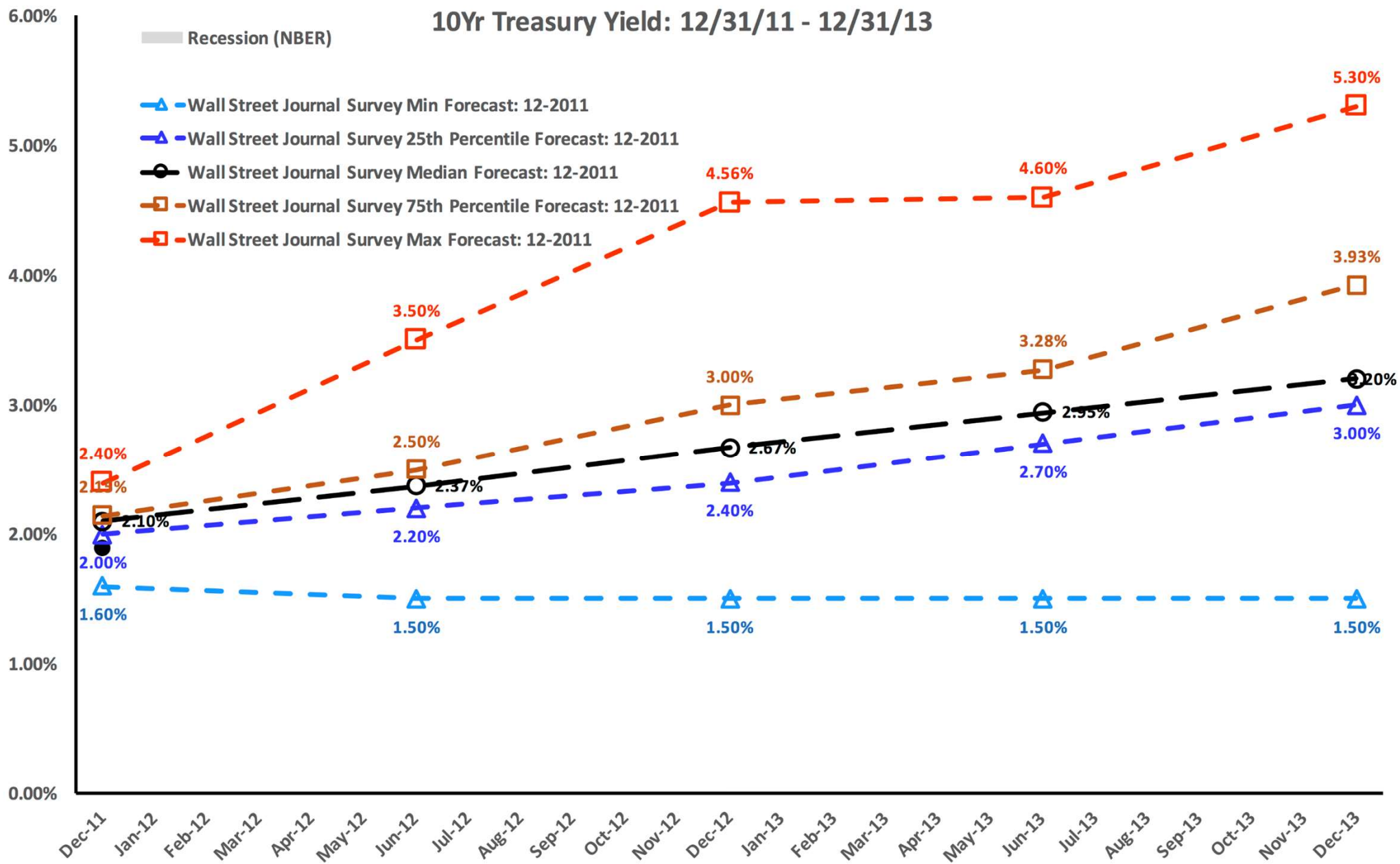
# Chalcas Chart: Dec-08 to Dec-13 on Dec-11

10Yr Treasury Yield: 12/31/08 - 12/31/13



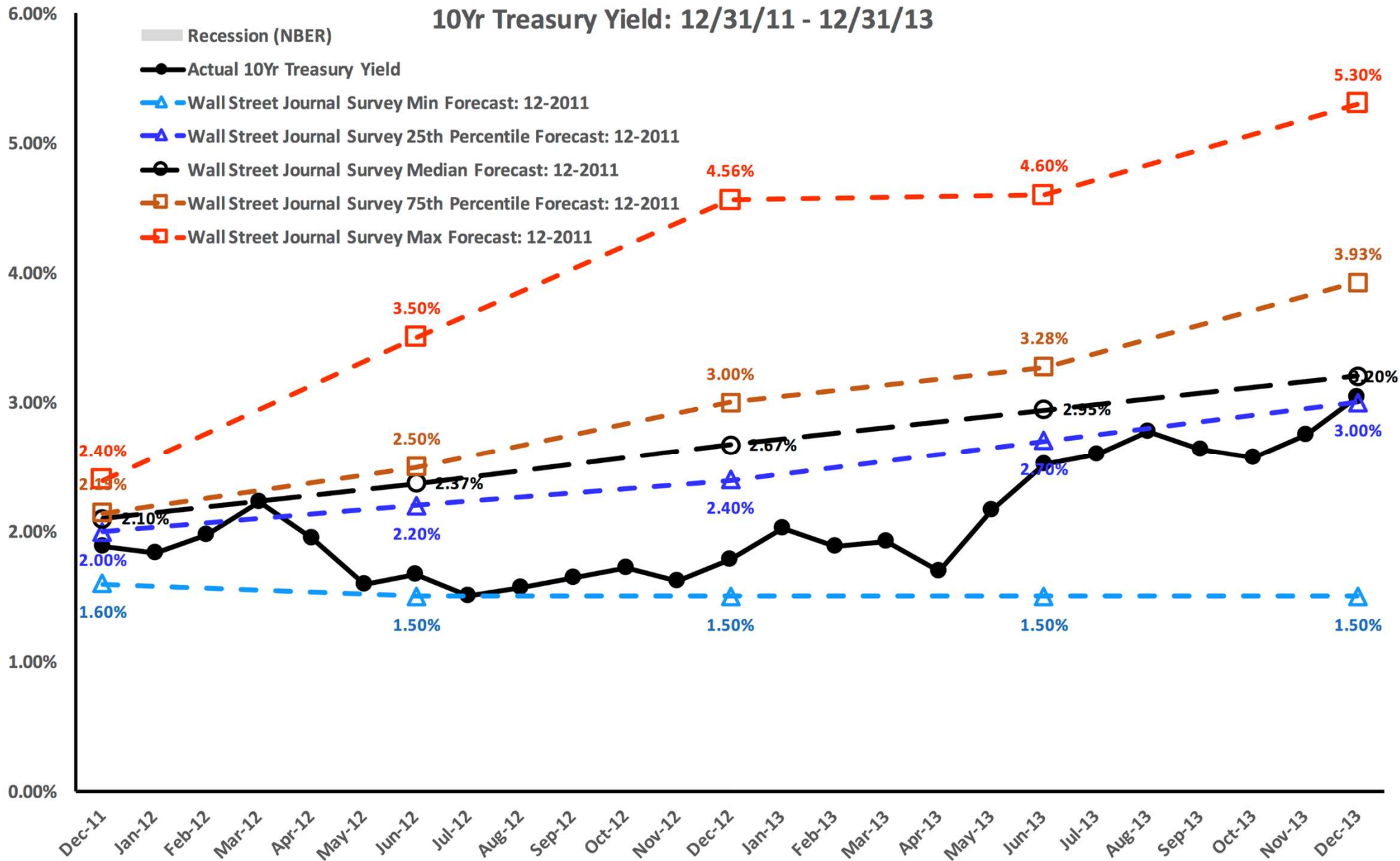


# Let's Focus. How did they do? Your Guess?



# How did “they” do? Did You Remember?

10Yr Treasury Yield: 12/31/11 - 12/31/13



Analysis by Kevin Webb, CFA (kwebb@cantor.com). WSJ and Bloomberg forecasts as published. Econ data from FRED.



# Who did the best?

Overall Rank for Wall Street Journal 12-2011 Survey Forecasts for 06/30/12						
Overall Rank	Forecaster	Fed Funds Rate	10Yr Treasury Yield	Unemployment Rate	CPI YoY	GDP
1	Moody's Investors Service	9	11	21	12	9
2	Univ of Central FL	9	24	25	4	3
3	IHS Global Insight	9	24	30	4	6
4	NEMA Business Information Services	1	9	25	27	15
5	Capital Economics	24	1	41	4	9
6	The Conference Board	9	6	41	19	7
7	Mesirow Financial	1	11	21	8	43
8	Credit Suisse	24	3	30	8	25
9	Goldman Sachs & Co.	9	18	30	27	9
10	PNC Financial Services Group	1	17	21	21	34
11	Comerica Bank	9	32	6	16	32
12	<i>Morgan Stanley</i>	8	6	37	13	32
12	<i>UCLA Anderson Forecast</i>	9	22	52	10	3
14	<i>Bank of America Securities-Merrill</i>	24	3	41	14	15
14	<i>JPM</i>	24	32	30	2	9
16	Societe Generale	45	3	48	3	1
17	California State University	1	18	14	32	38
18	The Northern Trust	20	8	21	27	30
19	<i>Macroeconomic Advisers</i>	24	31	30	10	15
19	<i>Parsec Financial</i>	24	27	4	1	54
21	Fannie Mae	42	11	41	14	3
22	Decision Economics Inc.	1	32	6	35	38
23	Barclays	9	45	6	19	34
24	Vanderbilt University	24	11	41	16	25
25	Nomura Securities International Inc.	24	28	25	16	25

# Who did the best the next time? Not the same firms.

Overall Rank for Wall Street Journal 12-2011 Survey Forecasts for 12/31/12						
Overall Rank	Forecaster	Fed Funds Rate	10Yr Treasury Yield	Unemployment Rate	CPI YoY	GDP
1	NEMA Business Information Services	1	6	30	12	2
2	Mesirow Financial	1	17	20	2	28
3	Capital Economics	24	1	43	2	3
4	Univ of Central FL	9	24	30	6	5
5	IHS Global Insight	9	23	34	2	9
6	The Conference Board	9	4	30	32	5
7	Bank of America Securities-Merrill	24	9	43	10	1
8	Morgan Stanley	8	3	34	26	19
9	Credit Suisse	24	6	34	11	18
10	California State University	1	17	20	20	36
11	JPM	24	17	34	6	22
12	Nationwide Insurance	9	16	24	46	9
13	PNC Financial Services Group	1	26	24	32	22
14	Economic Analysis	7	33	3	44	19
15	Vanderbilt University	24	5	43	20	16
16	<i>Goldman Sachs &amp; Co.</i>	9	17	43	18	22
16	<i>Economic and Revenue Forecast</i>	24	28	17	12	28
18	<i>UCLA Anderson Forecast</i>	9	33	52	2	16
18	<i>Decision Economics Inc.</i>	1	30	7	27	47
20	Fannie Mae	42	9	43	15	4
21	Nomura Securities International Inc.	24	30	24	8	28
22	Perna Associates	1	41	17	27	31
23	<i>Comerica Bank</i>	9	33	10	27	39
23	<i>Moody's Investors Service</i>	9	28	20	20	41
25	International Council of Shopping	52	9	10	40	9

# What about the FED? 12/18/2013 Forecasts

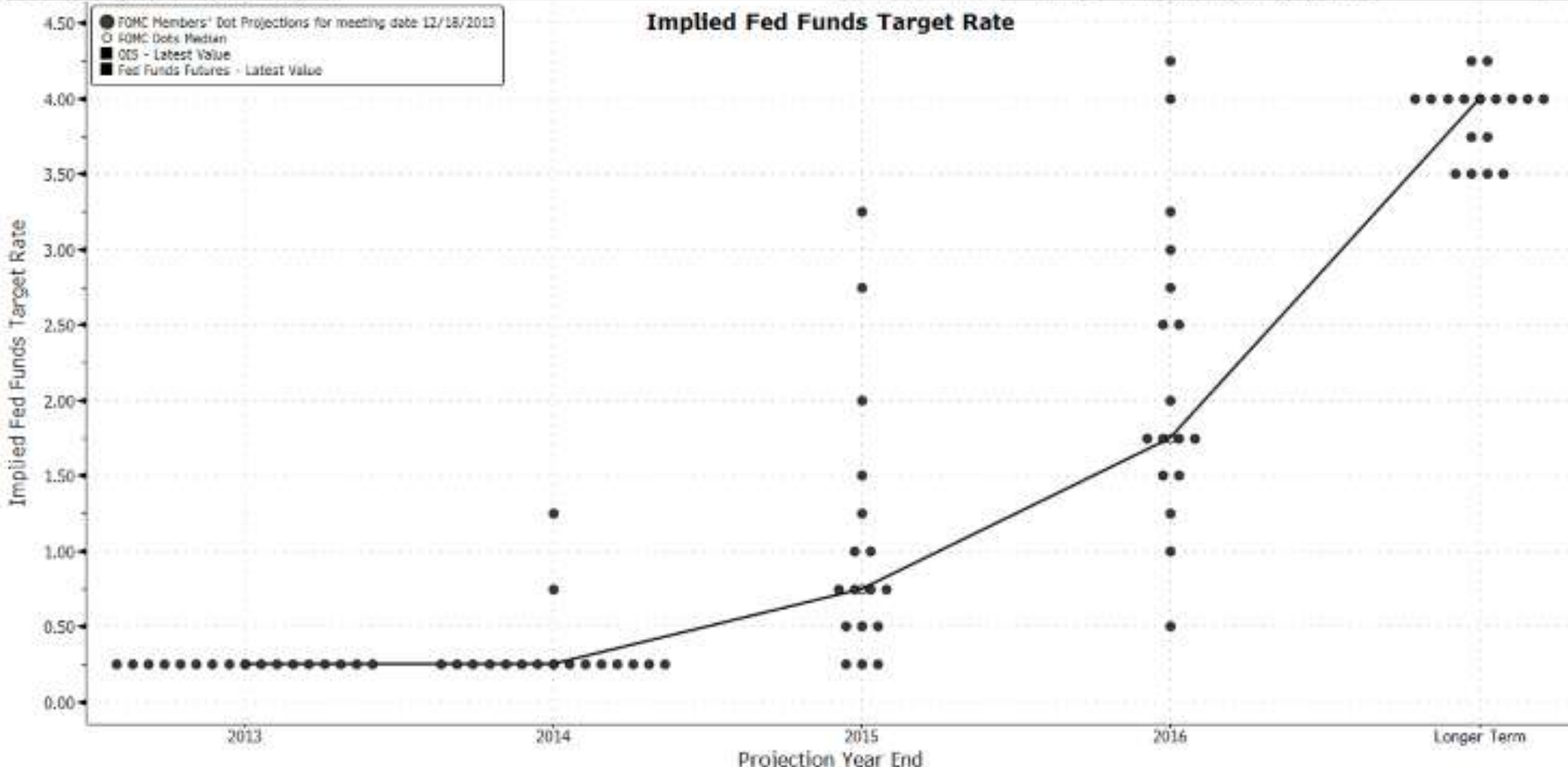
FOMC Dot Plot

View  Projection  Historical

Meeting Date

Chart **Table**

BE Fed Spectromete-  Compare with



Australia 61 2 9777 8600 Brazil 5511 2395 9000 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000  
 Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000

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 SN 710249 CST GMT-6:00 6729-3167-3 06-Jan-2018 14:57:22

# What about the FED? 12/17/2014 Forecasts

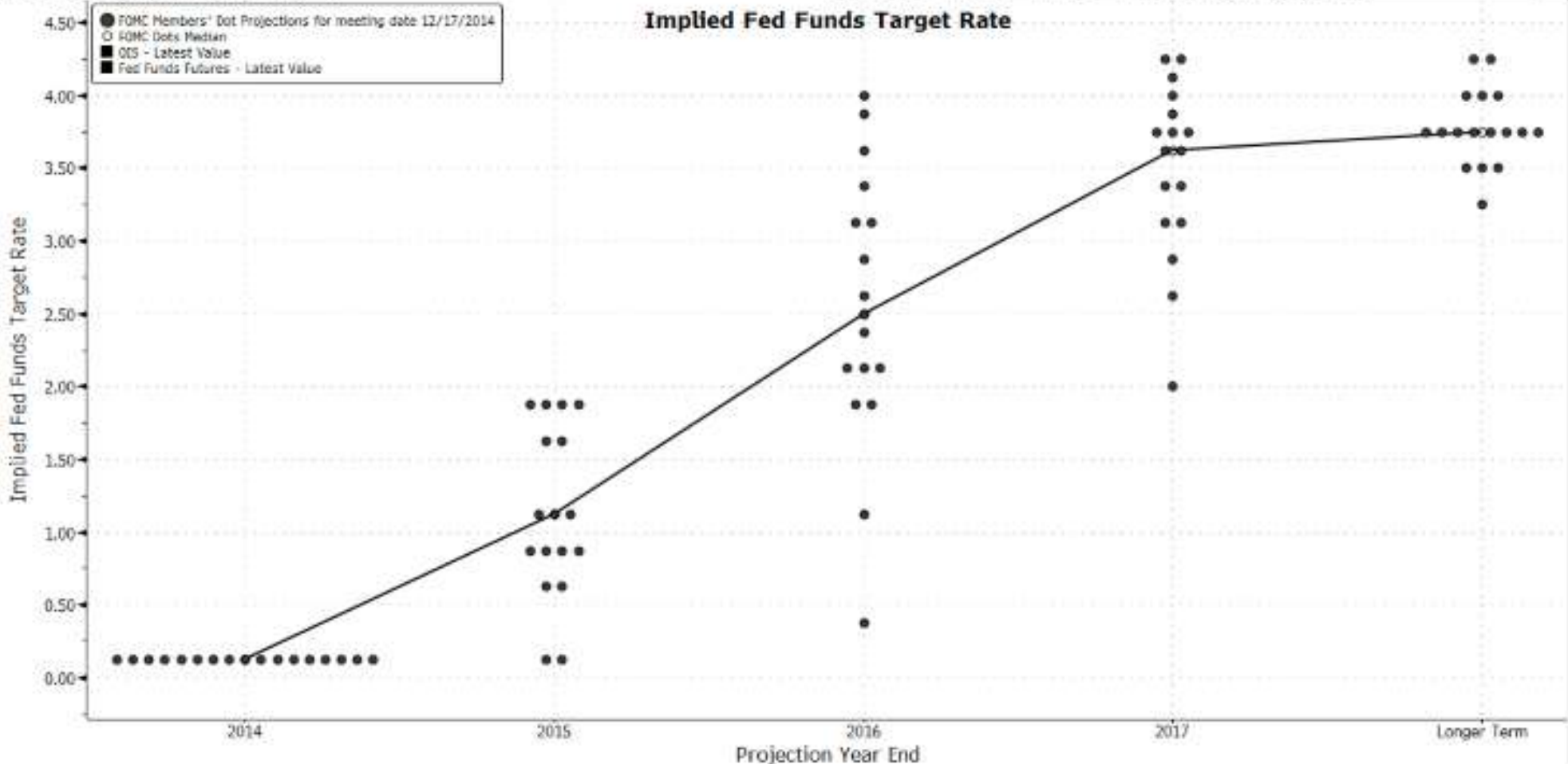
FOMC Dot Plot

View  Projection  Historical

Meeting Date

Chart **Table**

BE Fed Spectromete-



Australia 61 2 9777 8600 Brazil 5511 2395 9000 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000  
 Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000

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# What about the FED? 12/16/2015 Forecasts

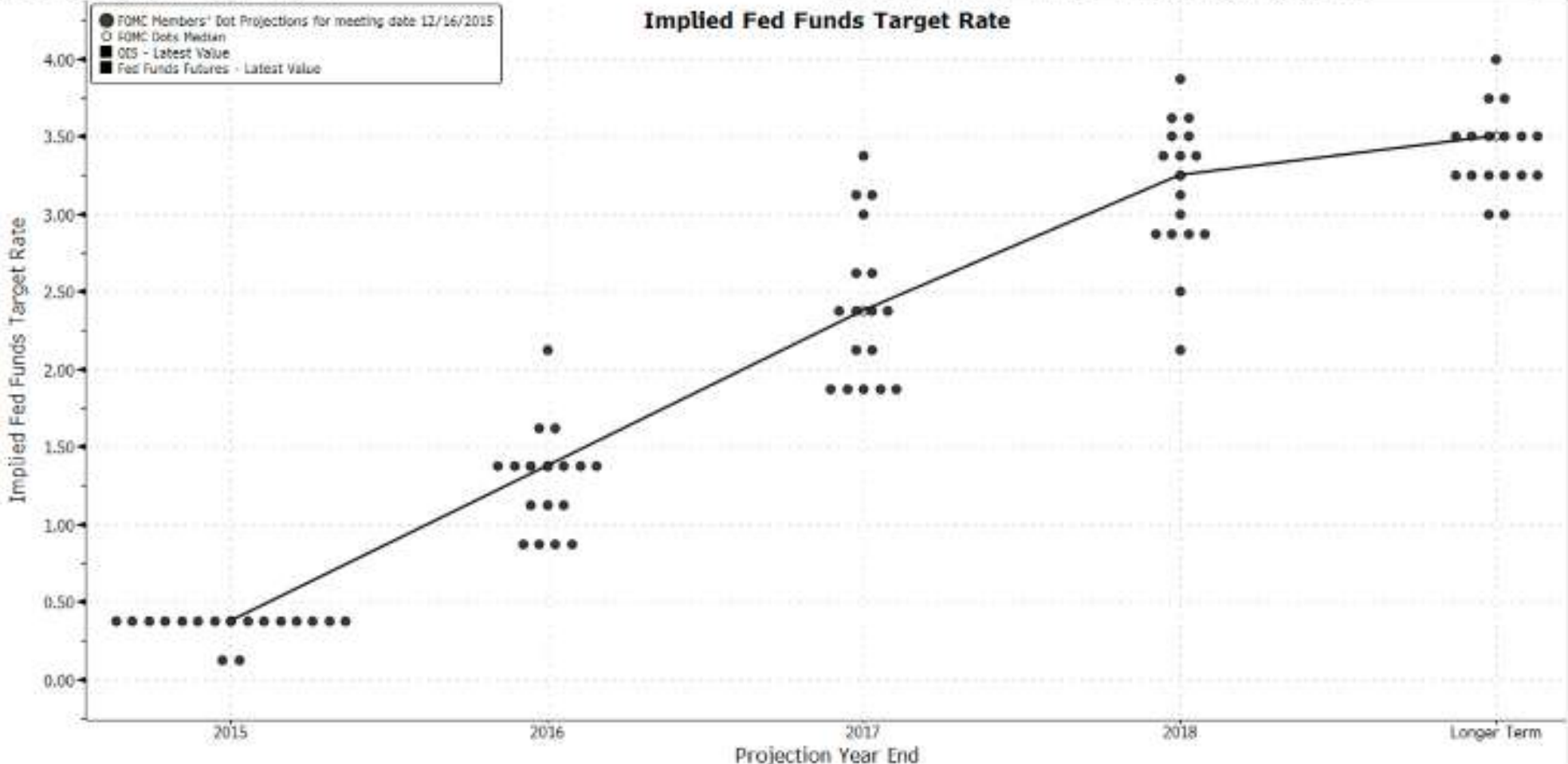
FOMC Dot Plot

View  Projection  Historical

Meeting Date

Chart **Table**

BE Fed Spectromete-  Compare with

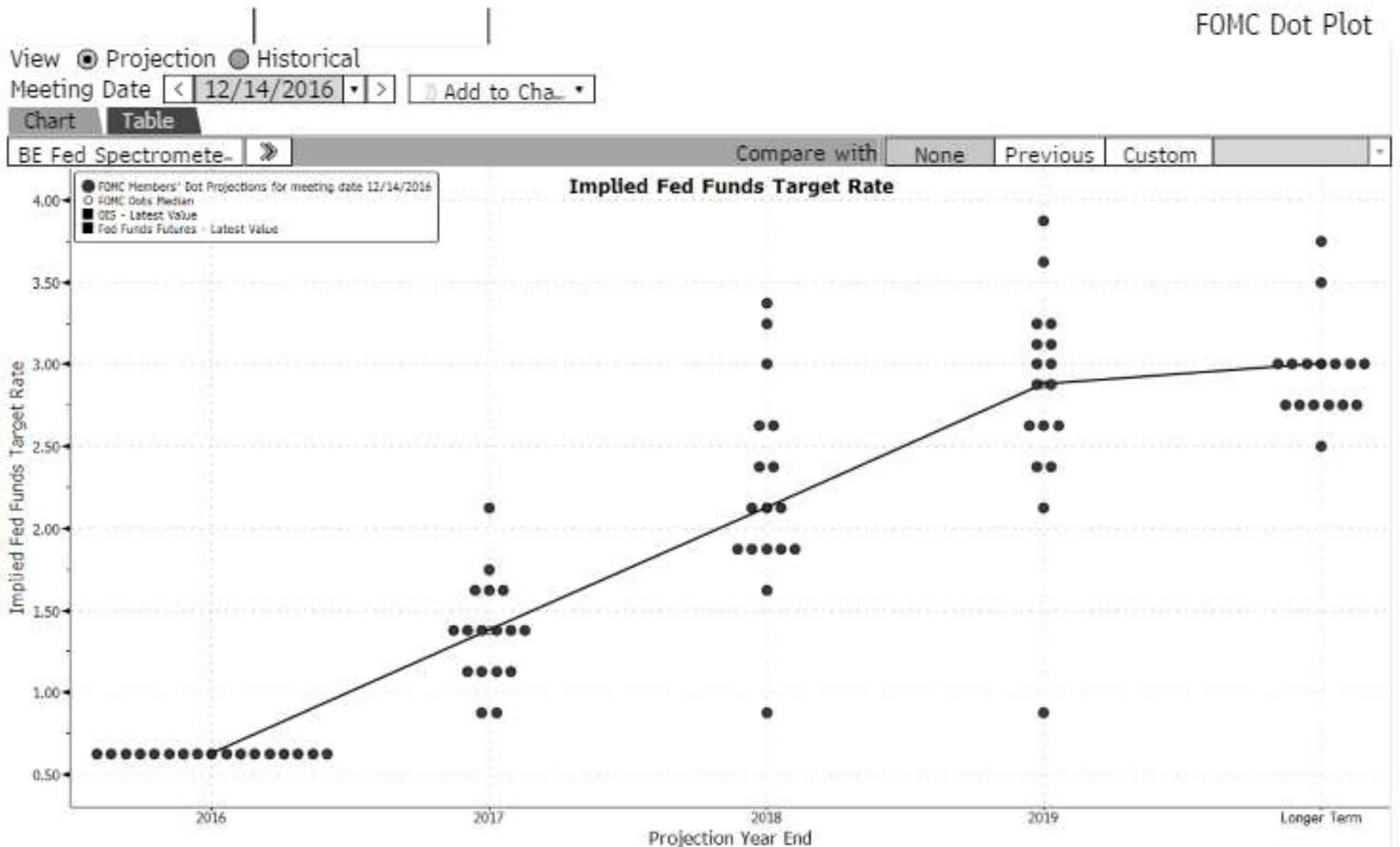


Australia 61 2 9777 8600 Brazil 5511 2395 9000 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000  
 Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2018 Bloomberg Finance L.P.

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# What about the FED? 12/14/2016 Forecasts



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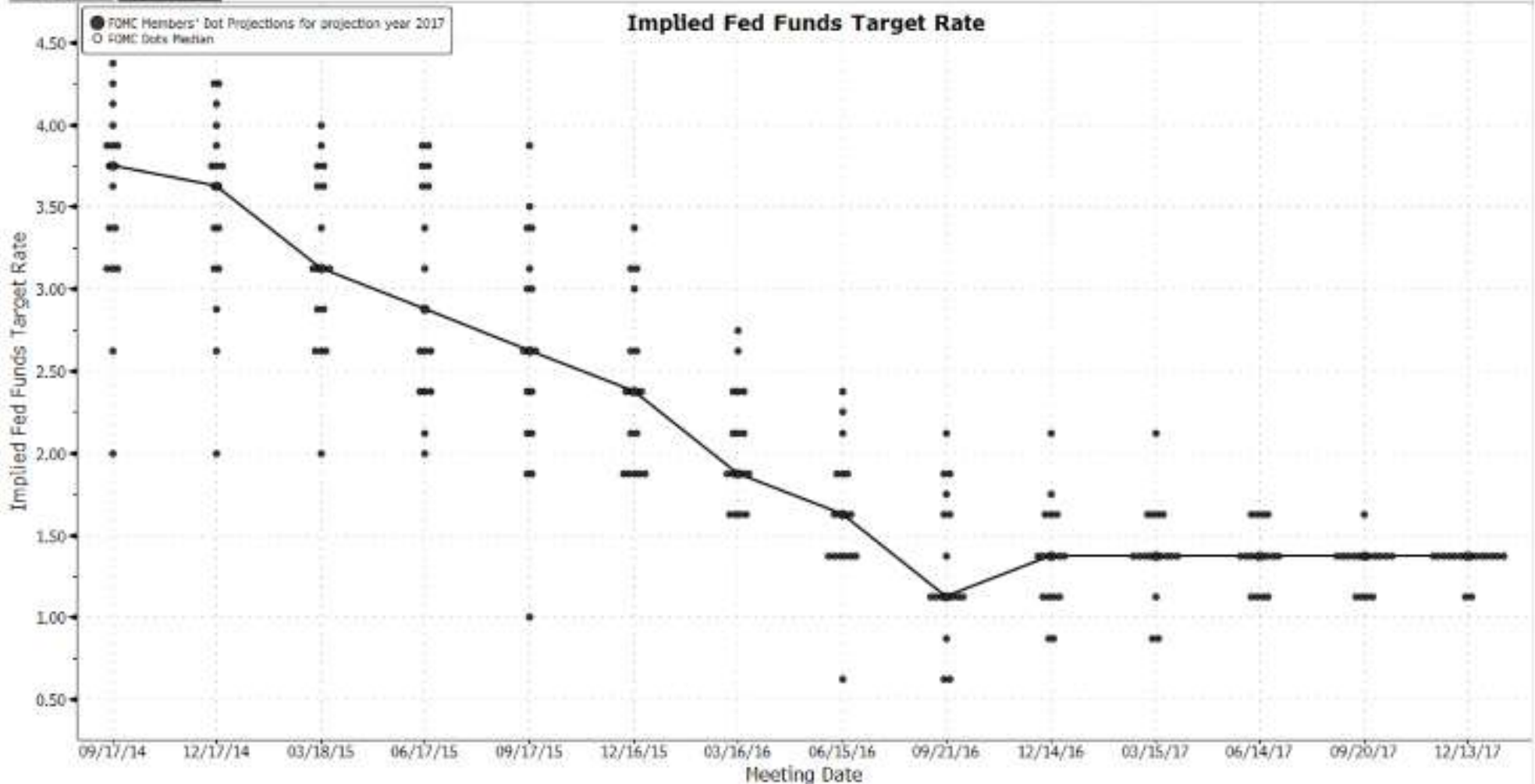
# Fed Funds 12/31/17 Forecasts Historical

FOMC Dot Plot

View  Projection  Historical

Projection Year End < 2017 > Add to Cha... ▾

Chart Table



Australia 61 2 9777 8600 Brazil 5511 2395 9000 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000  
 Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000

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# Which forecaster should you follow?

## The average/median forecast

*the signal and the noise and the noise and the noise and the noise why so many predictions fail—but some don't the noise and the noise nate silver noise noise and the noise*

**“If you’re looking for an economic forecast, the best place to turn is the average or aggregate prediction rather than that of any one economist. ... This property— group forecasts beat individual ones— has been found to be true in almost every field in which it has been studied.”**

*Silver, Nate (2012-09-27). The Signal and the Noise: Why So Many Predictions Fail-but Some Don't (p. 197-198). Penguin Group US. Kindle Edition.*

*“The group mean forecasts from a series of surveys are on the average over time more accurate than most of the corresponding sets of individual predictions. This is a strong conclusion, which applies to all variables and predictive horizons covered and is consistent with evidence for different periods and from other studies.” - Zarnowitz, Victor (January 1992). Business Cycles: Theory, History, Indicators, and Forecasting (p. 457). University of Chicago Press. Downloadable from <http://www.nber.org/books/zarn92-1>*

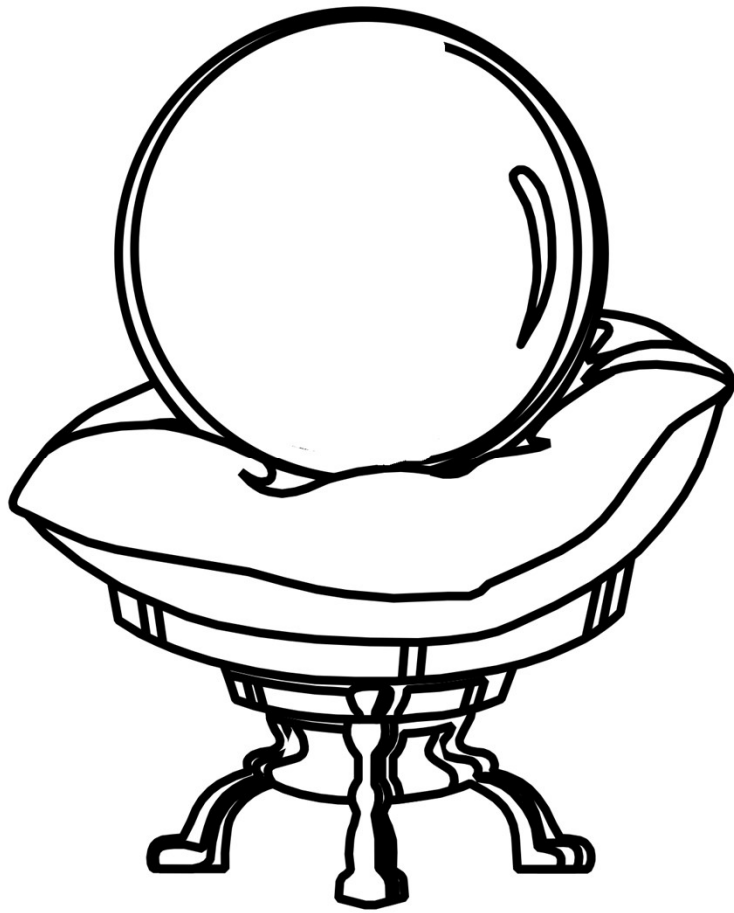
# Required for planning purposes...



“Nobel laureate Kenneth Arrow has warned, “[O]ur knowledge of the way things work, in society or in nature, comes trailing clouds of vagueness. Vast ills have followed a belief in certainty.””

“... The young statisticians in the Weather Division ... finding that prevailing techniques were not significantly more reliable than the null ... sent a memo to the General of the Air Corps suggesting that the group be disbanded. Six months later ... ‘The general is well aware that your forecasts are no good. However, they are required for planning purposes.’ The group remained intact.”

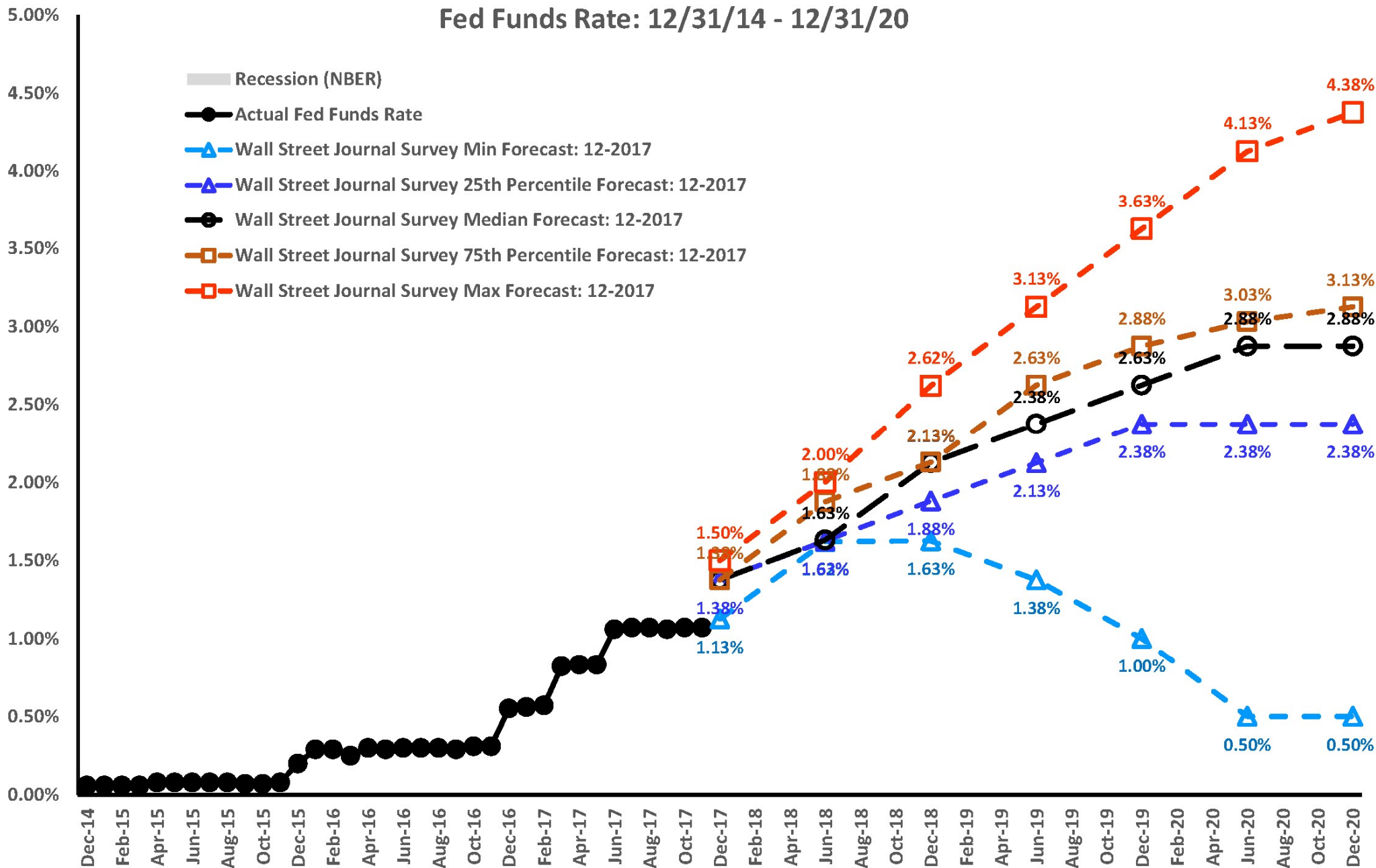
**For fools rush in where  
angels fear to tread**



**“He who lives by the crystal  
ball soon learns to eat  
ground glass.”**

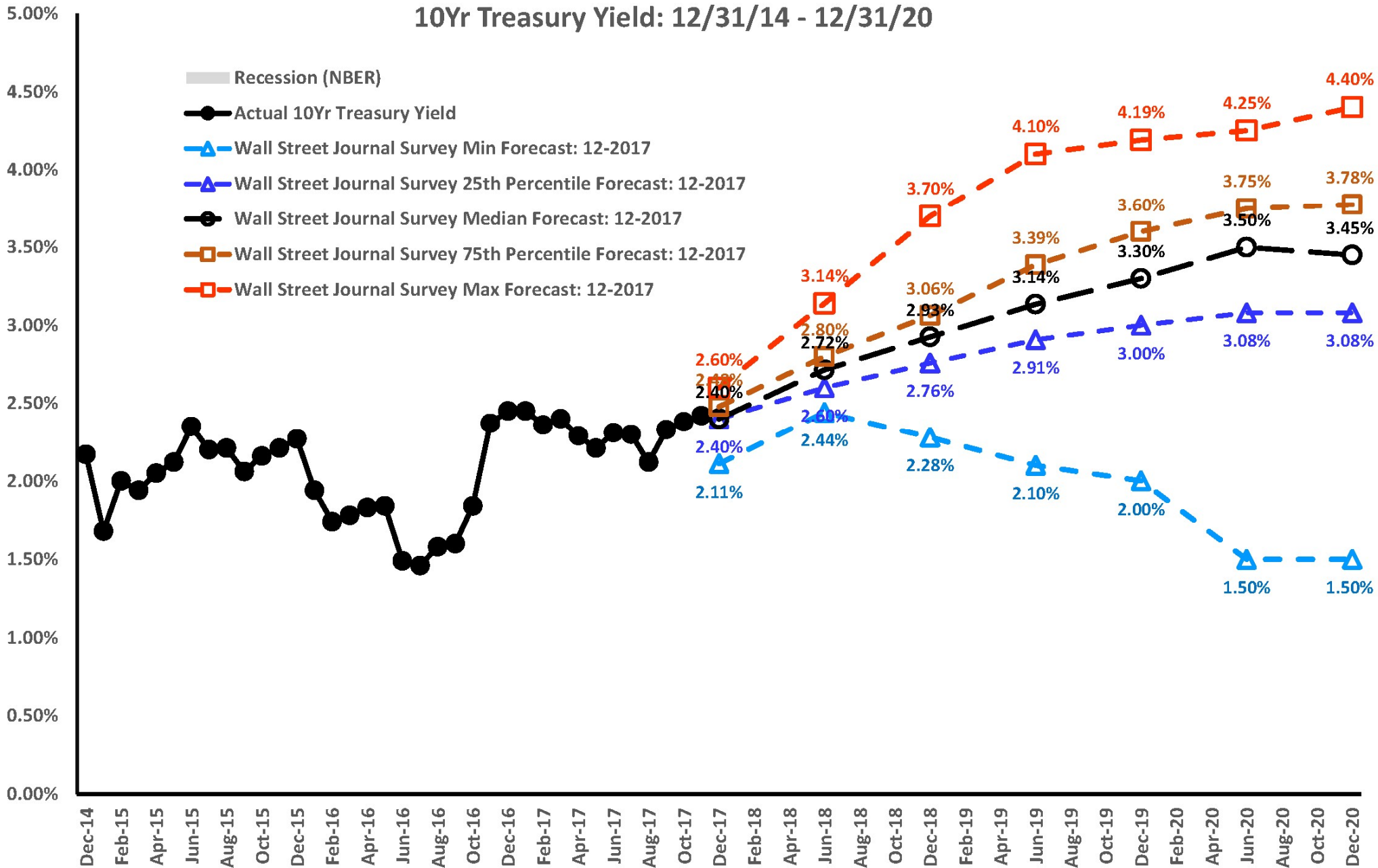
**C.C. Gaither;Alma E Cavazos-Gaither. Statistically Speaking: A  
Dictionary of Quotations (Kindle Locations 960-961). Kindle Edition.**

# Chalcas Chart: Dec-14 to Dec-20 on Dec-17

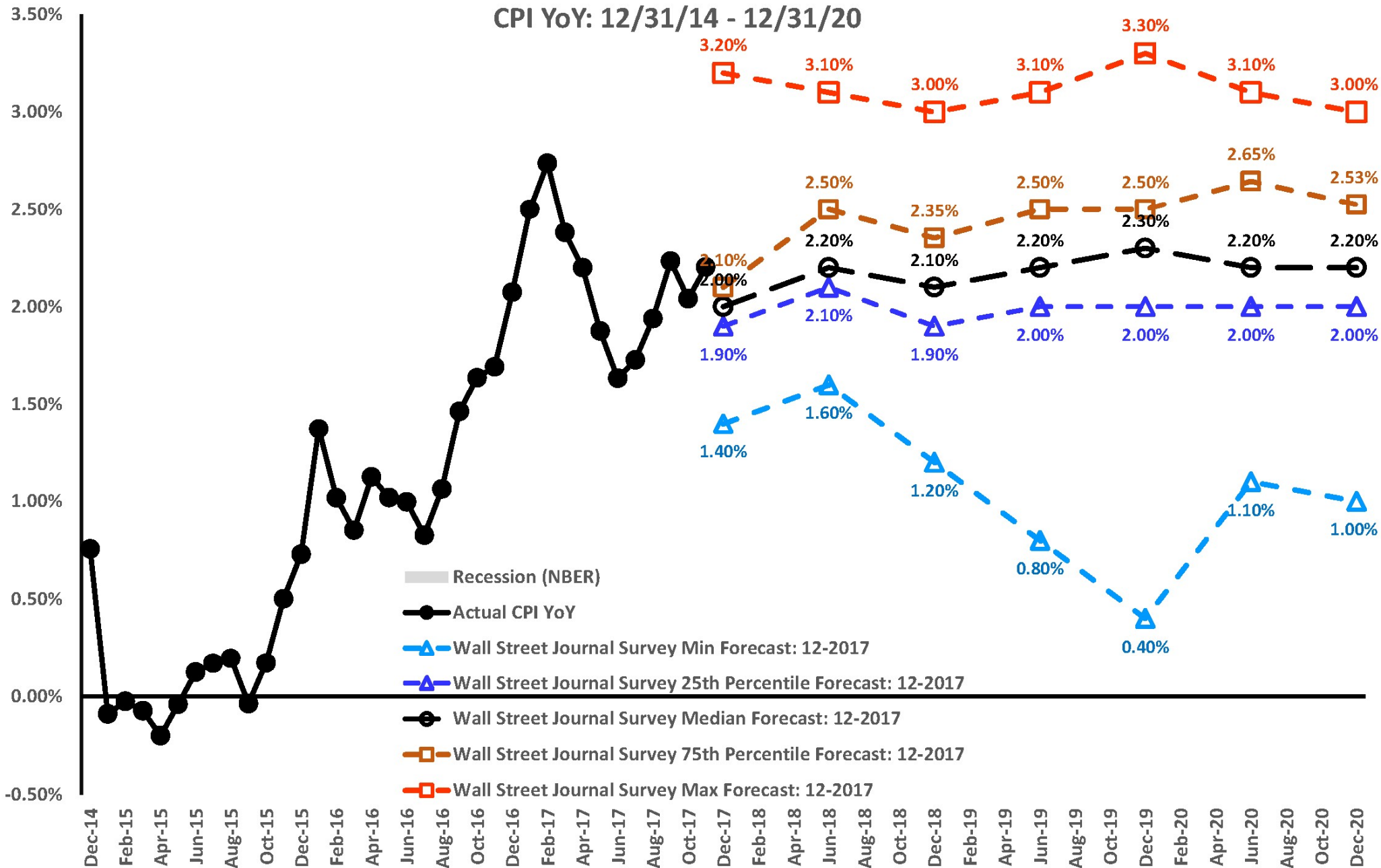


# Chalcas Chart: Dec-14 to Dec-20 on Dec-17

10Yr Treasury Yield: 12/31/14 - 12/31/20

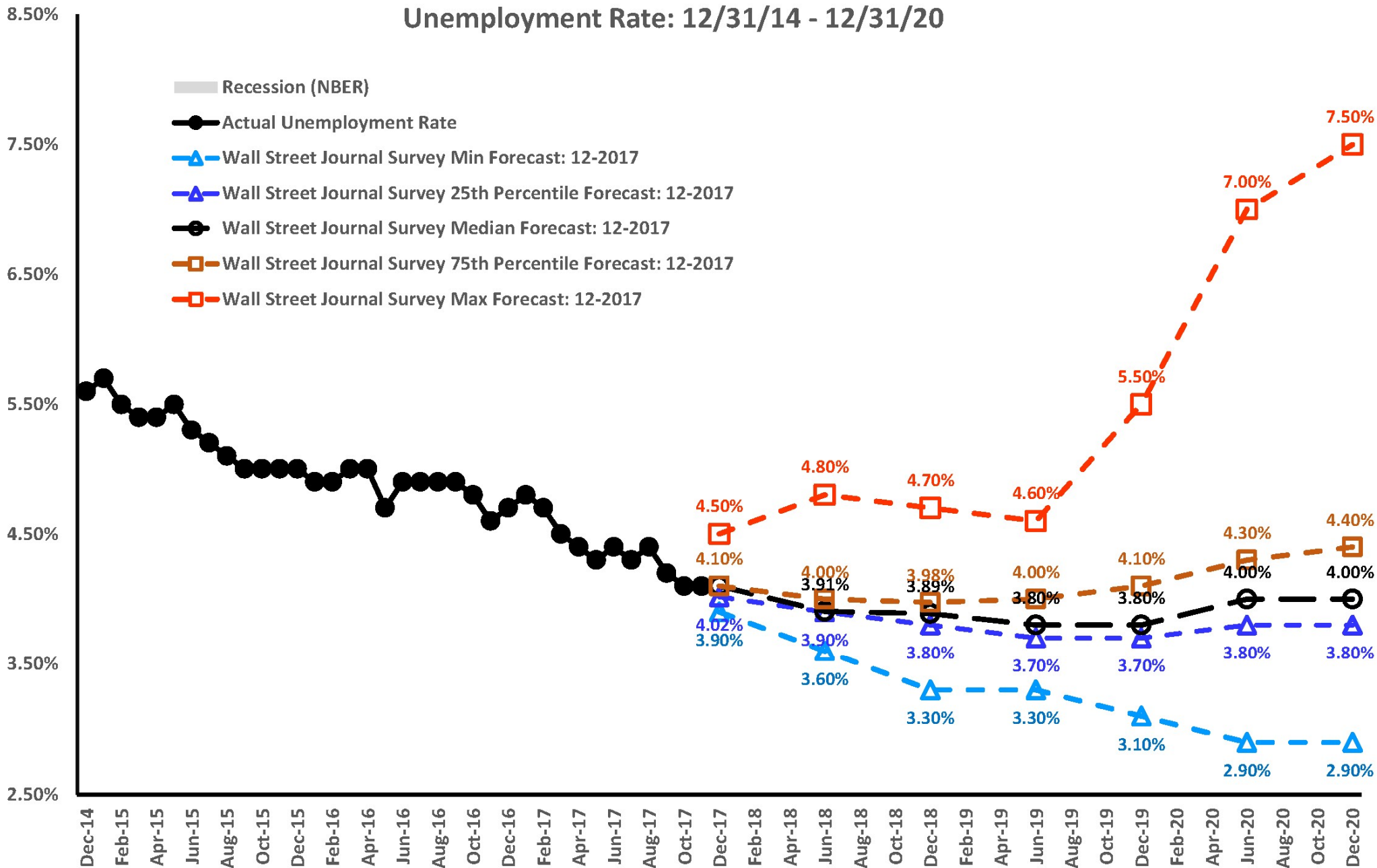


# Chalcas Chart: Dec-14 to Dec-20 on Dec-17





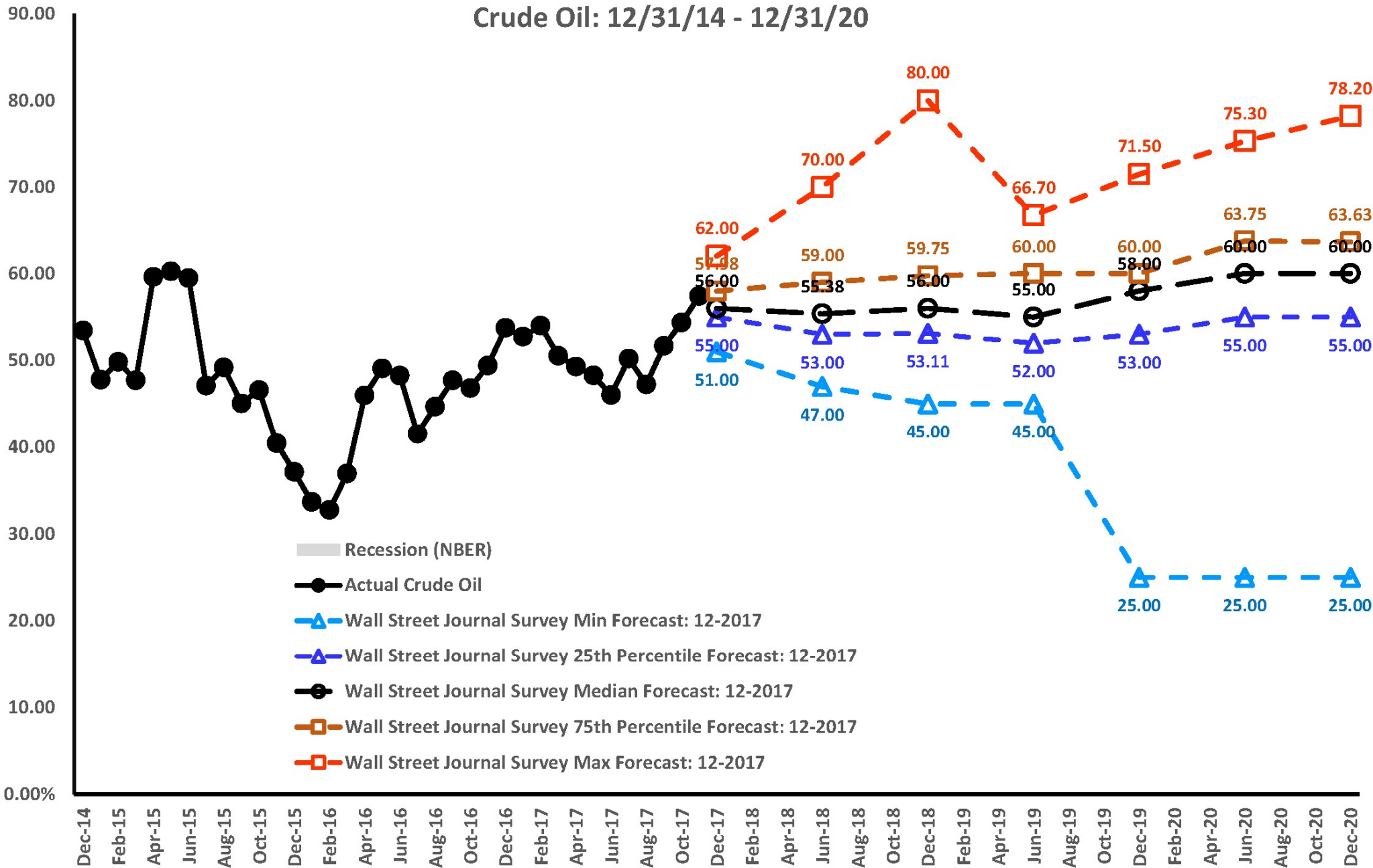
# Chalcas Chart: Dec-14 to Dec-20 on Dec-17



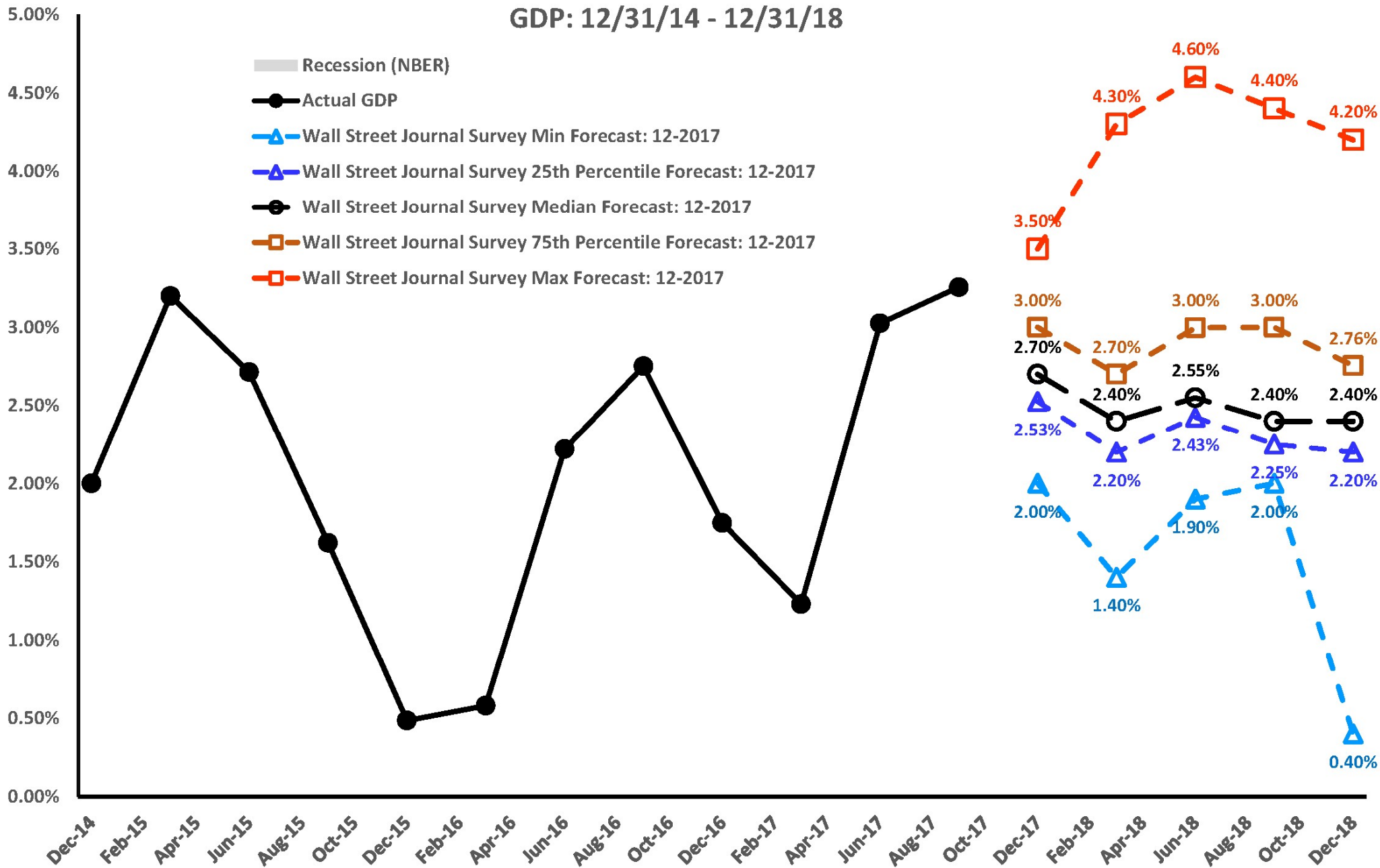


# Chalcas Chart: Dec-14 to Dec-20 on Dec-17

Crude Oil: 12/31/14 - 12/31/20

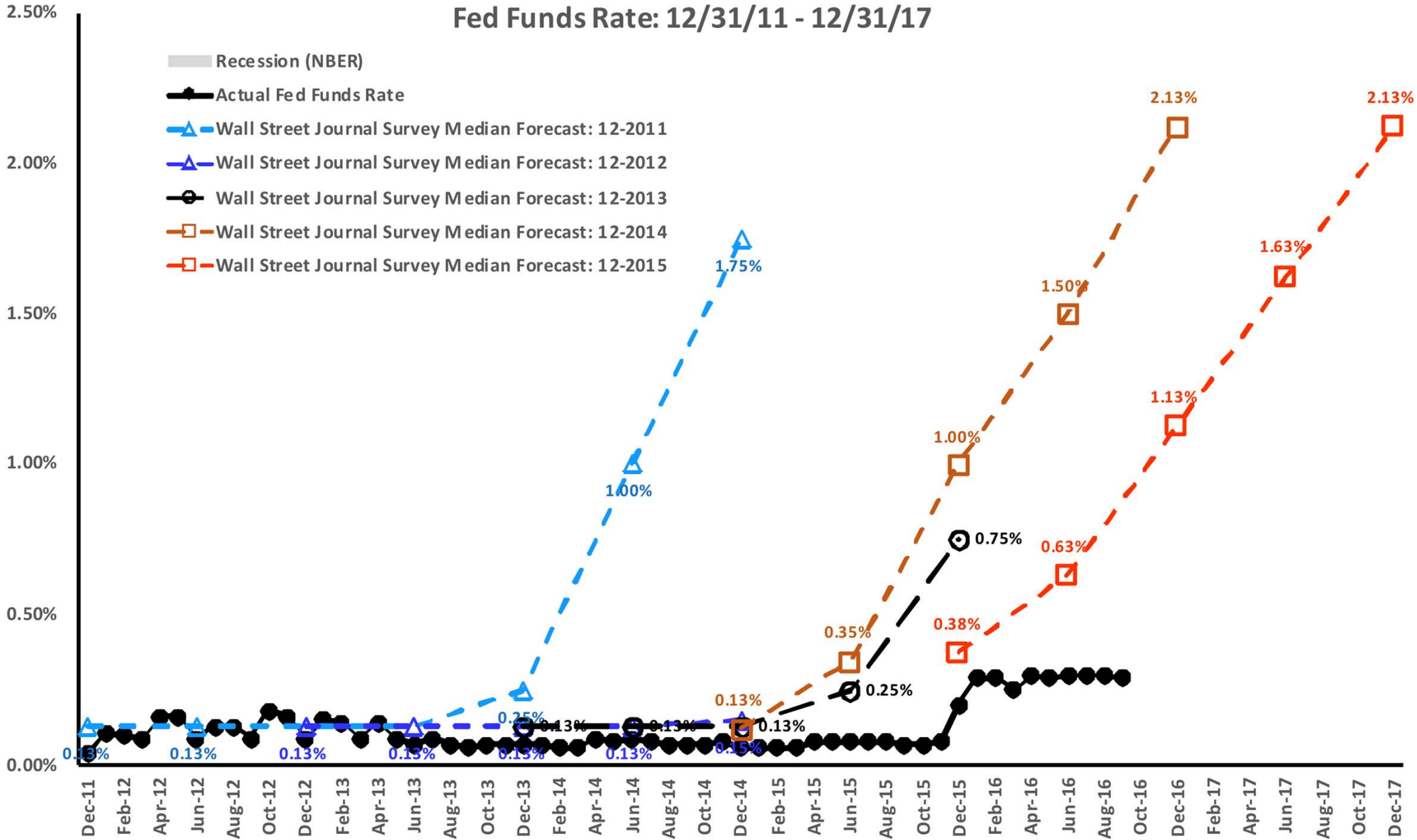


# Chalcas Chart: Dec-14 to Dec-20 on Dec-17

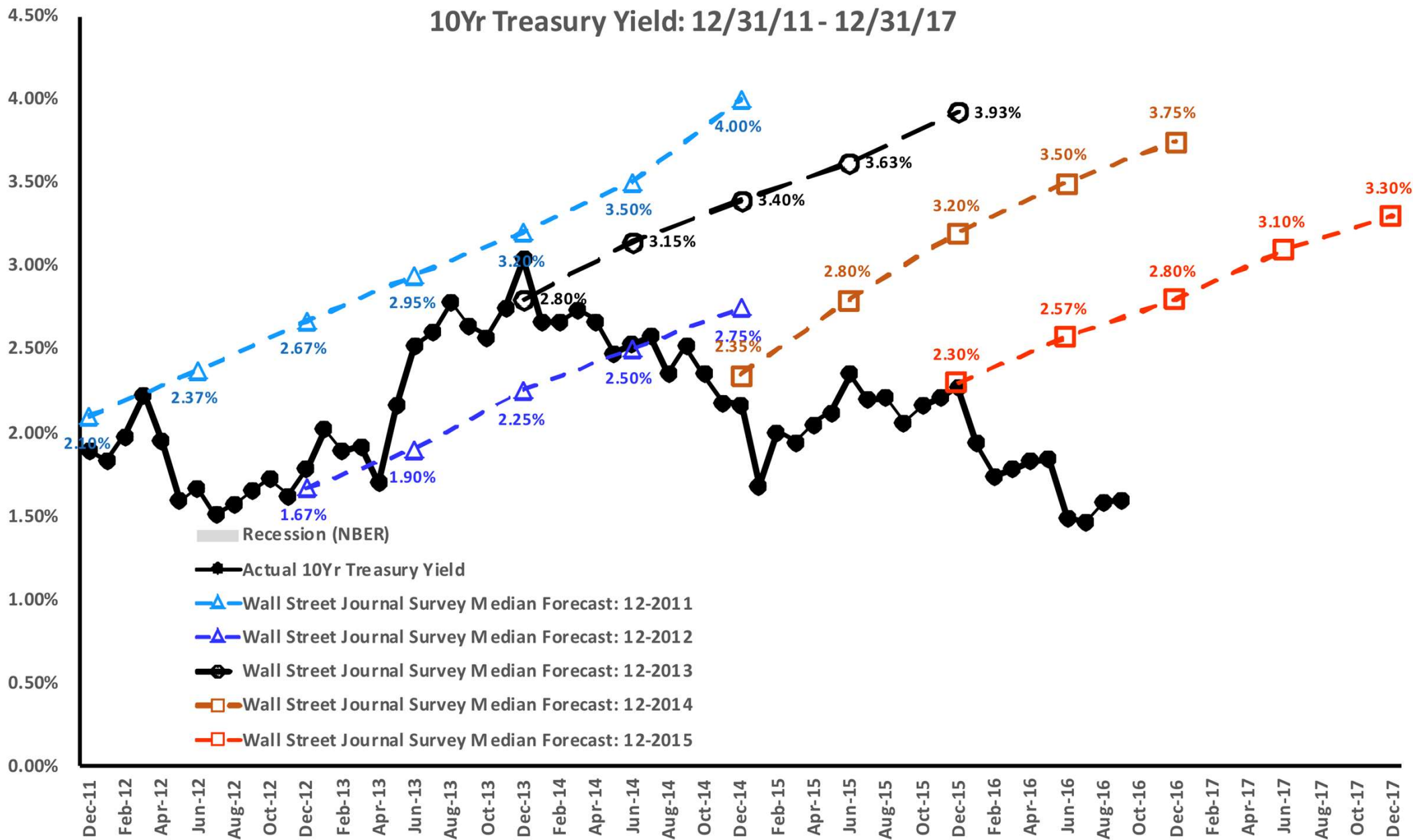


# Fed Funds Visual Accuracy Test

Fed Funds Rate: 12/31/11 - 12/31/17

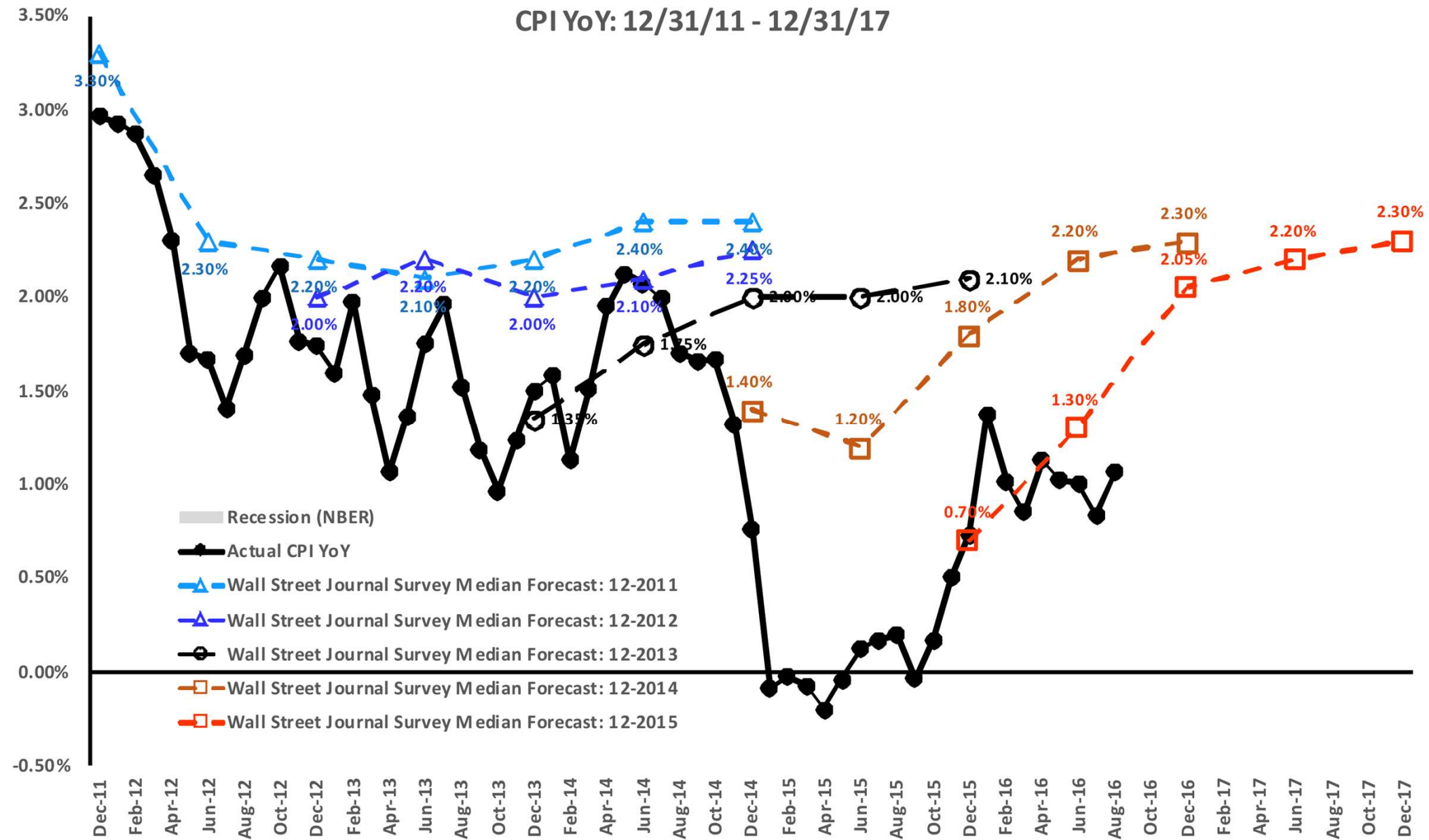


# 10Yr Treasury Yield Visual Accuracy Test



# CPI YoY Visual Accuracy Test

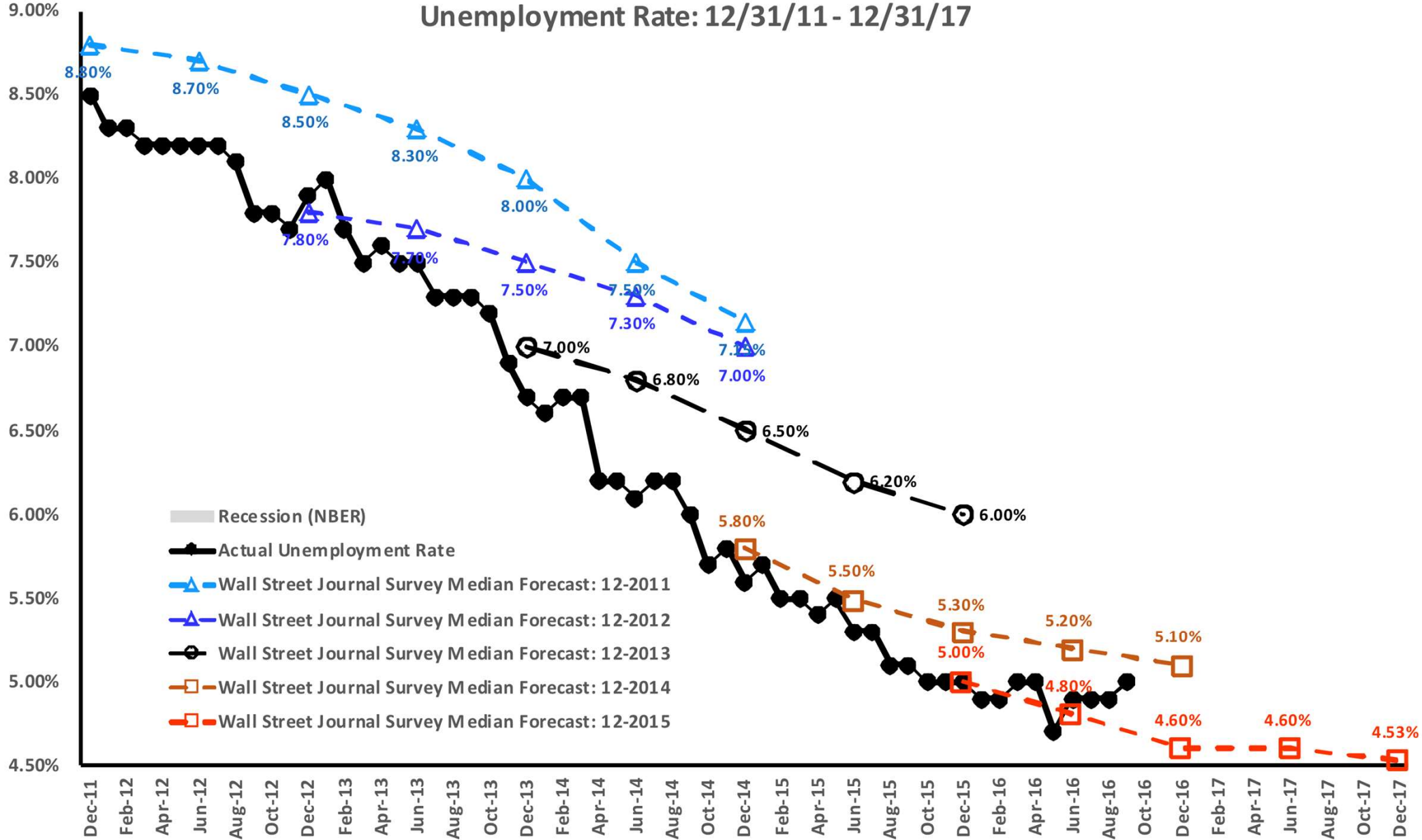
CPI YoY: 12/31/11 - 12/31/17





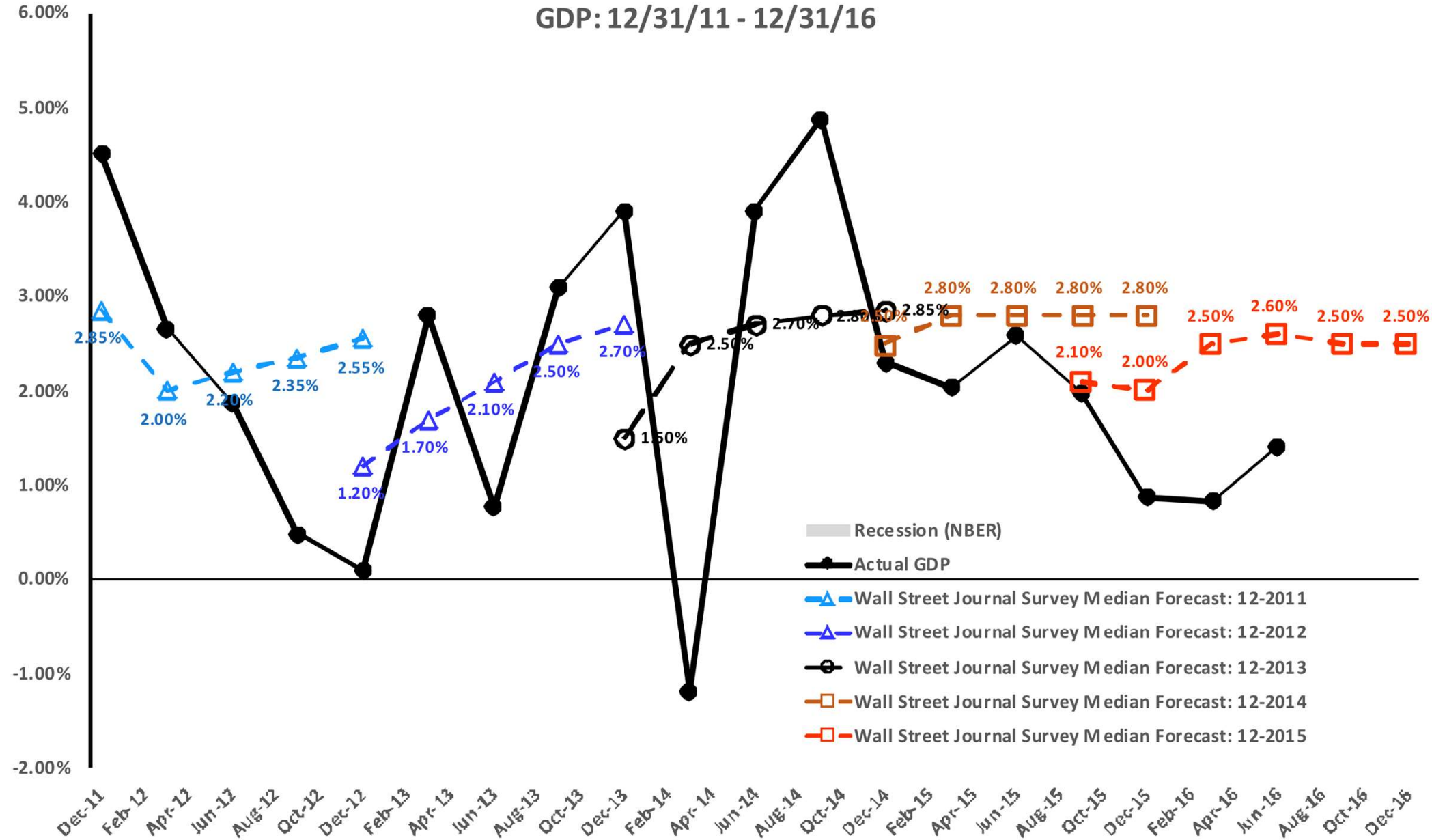
# Unemployment Rate Visual Accuracy Test

Unemployment Rate: 12/31/11 - 12/31/17



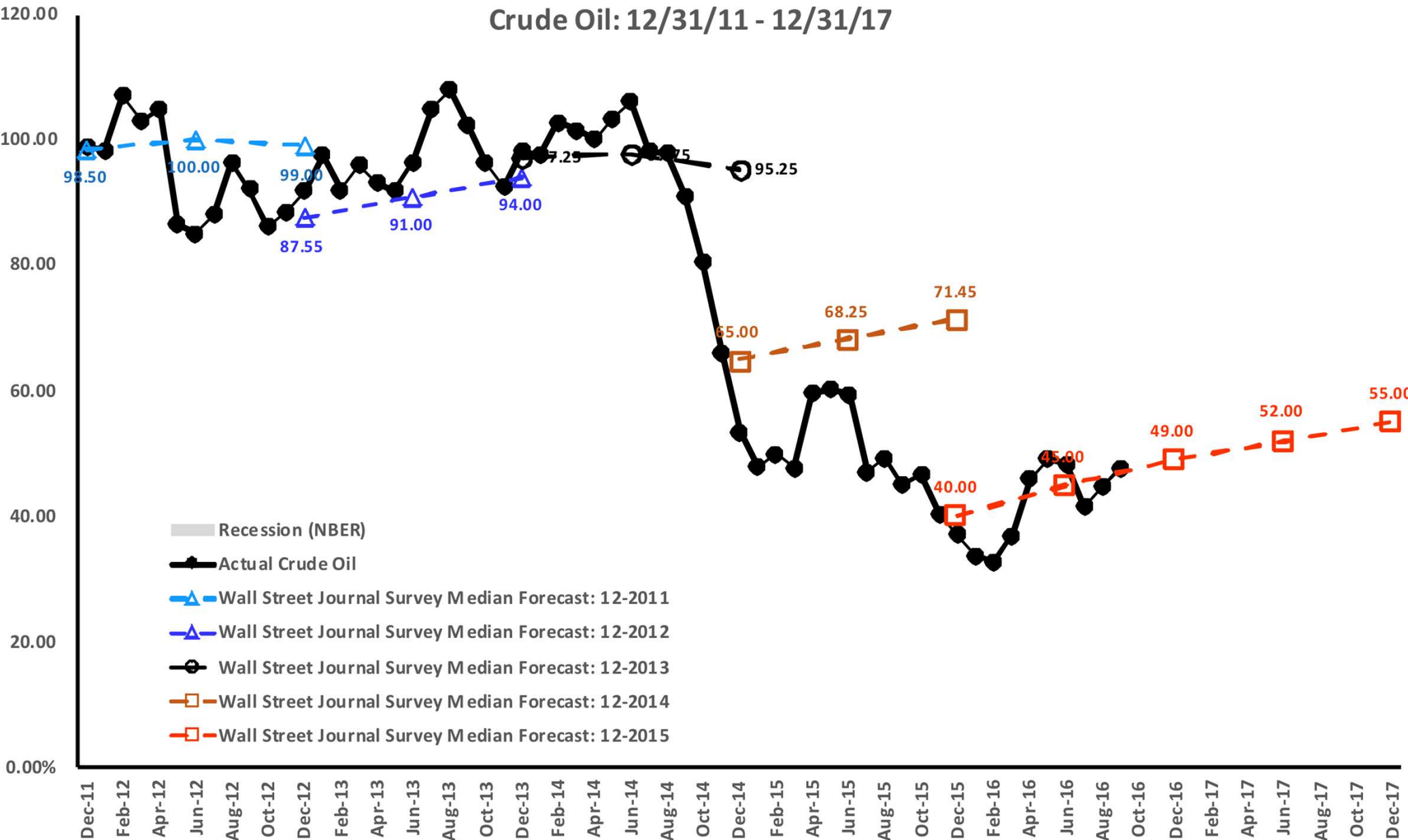
# GDP Visual Accuracy Test

GDP: 12/31/11 - 12/31/16





# Crude Oil Visual Accuracy Test



Analysis by Kevin Webb, CFA (kwebb@cantor.com). WSJ and Bloomberg forecasts as published. Econ data from FRED.

# Federal Reserve

[About the Fed](#)[News & Events](#)[Monetary Policy](#)[Supervision & Regulation](#)[Payment Systems](#)[Economic Research](#)[Data](#)[Consumers & Communities](#)[Home](#)

## Monetary Policy



Monetary policy is the Federal Reserve's actions, as a central bank, to achieve three goals specified by Congress: maximum employment, stable prices, and moderate long-term interest rates in the United States.

The Federal Reserve conducts the nation's monetary policy by managing the level of short-term interest rates and influencing the availability and cost of credit in the economy. Monetary policy directly affects interest rates; it indirectly affects stock prices, wealth, and currency exchange rates. Through these channels, monetary policy influences spending, investment, production, employment, and inflation in the United States.

[Learn more](#)

## Federal Open Market Committee

[FOMC Calendar](#)[About the FOMC](#)[Transcripts and other historical materials](#)[Rules and Authorizations](#)[FAQs](#)[FOMC Longer-Run Goals and Monetary Policy Strategy \(PDF\)](#)[Communications Policies: Committee \(PDF\) | Staff \(PDF\)](#)

### Recent Documents

[FOMC Statement: PDF | HTML](#)

Released December 13, 2017

[Projection Materials: PDF | HTML](#)

Released December 13, 2017

[Press Conference](#)

December 13, 2017

[FOMC Minutes: PDF | HTML](#)

Released January 3, 2018

### Upcoming Dates

**Jan. 30-31** FOMC Meeting  
Two-day meeting

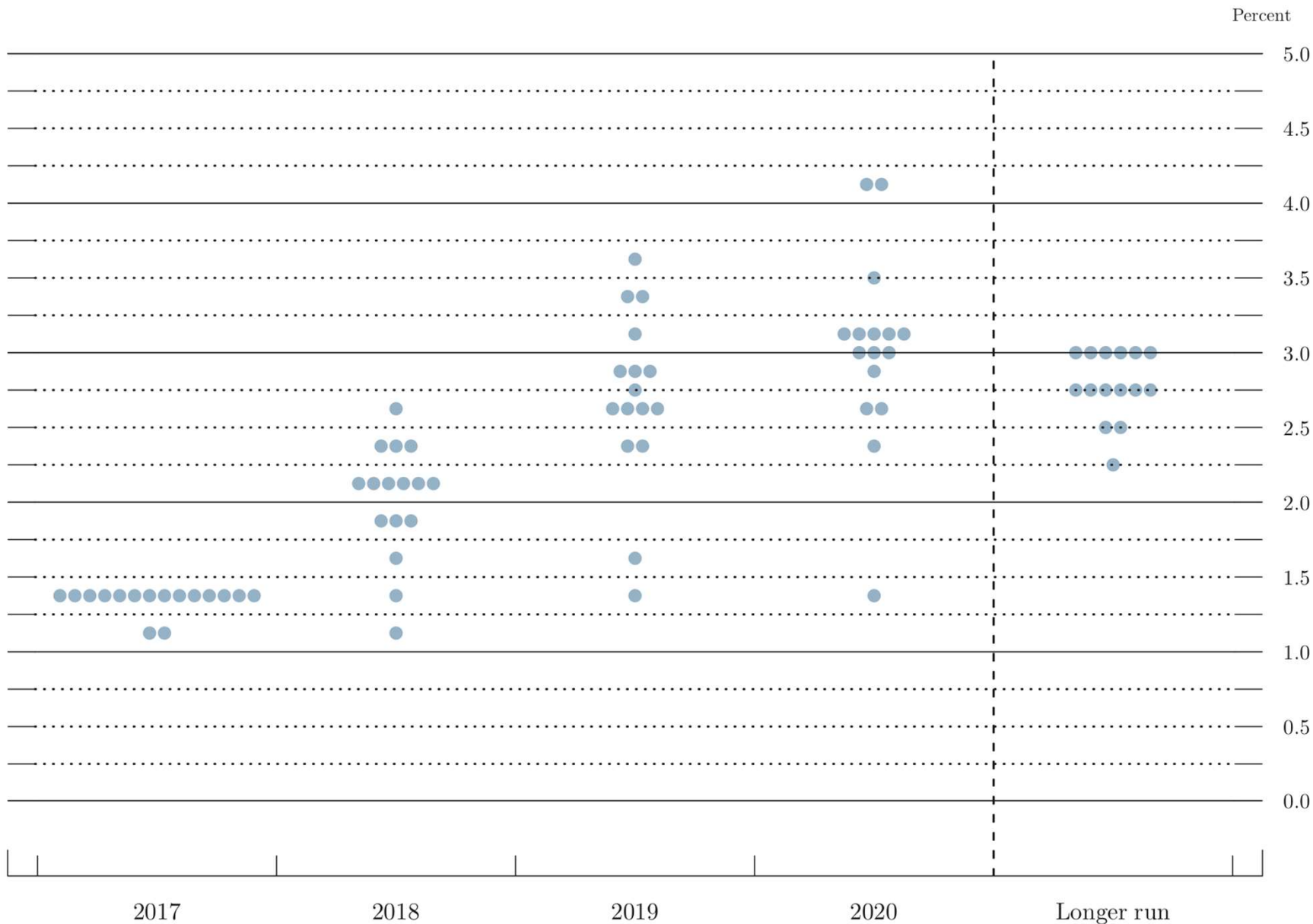
**Feb. 21** FOMC Minutes  
Meeting of Jan. 30-31

**March 20-21** FOMC Meeting  
Two-day meeting  
*Press Conference*

**April 11** FOMC Minutes  
Meeting of March 20-21

<https://www.federalreserve.gov/monetarypolicy.htm>

# Federal Reserve



NOTE: Each shaded circle indicates the value (rounded to the nearest 1/8 percentage point) of an individual participant's judgment of the midpoint of the appropriate target range for the federal funds rate or the appropriate target level for the federal funds rate at the end of the specified calendar year or over the longer run. One participant did not submit longer-run projections for the federal funds rate.



# Federal Reserve

## Economic projections of Federal Reserve Board members and Federal Reserve Bank presidents under their individual assessments of projected appropriate monetary policy, December 2017

Advance release of table 1 of the Summary of Economic Projections to be released with the FOMC minutes

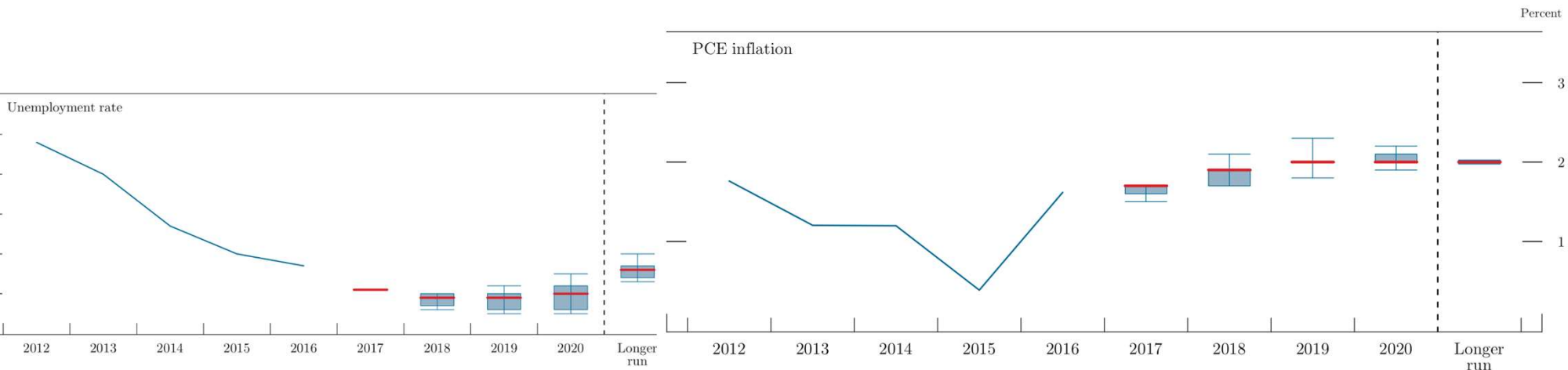
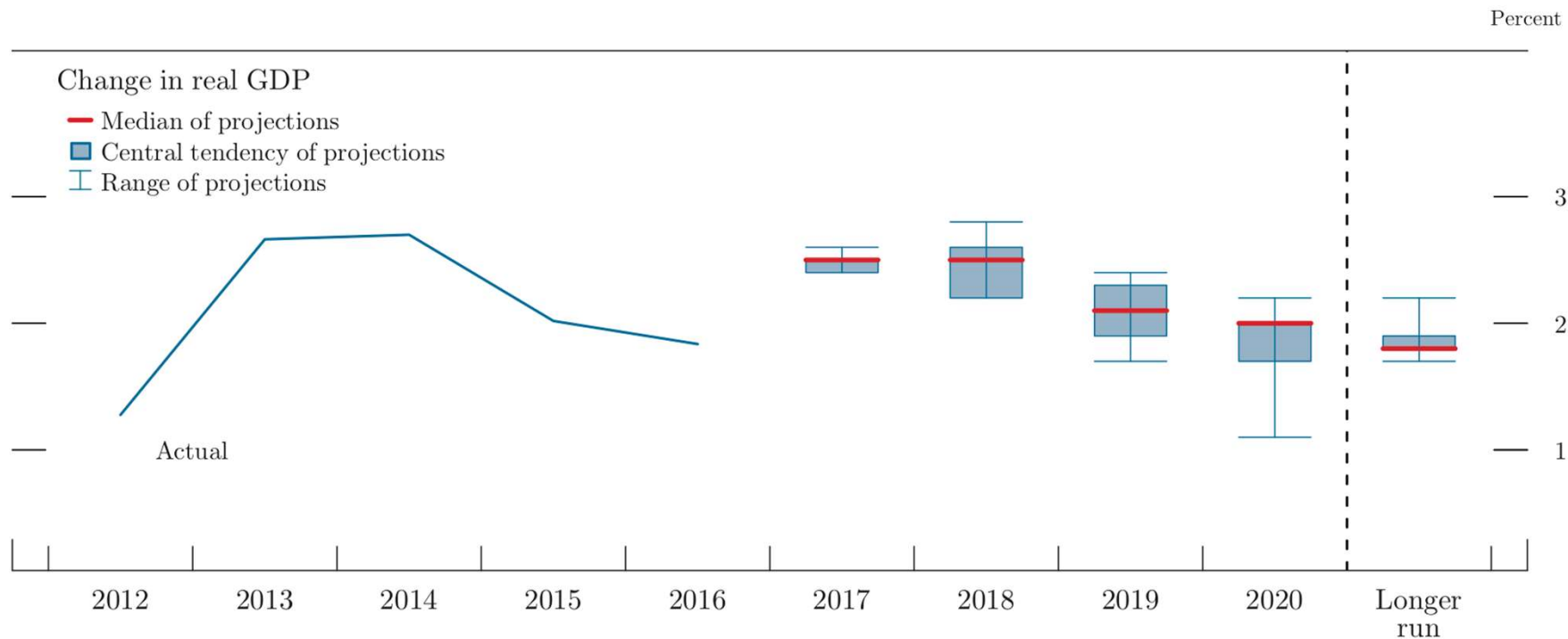
Percent

Variable	Median <sup>1</sup>					Central tendency <sup>2</sup>					Range <sup>3</sup>				
	2017	2018	2019	2020	Longer run	2017	2018	2019	2020	Longer run	2017	2018	2019	2020	Longer run
Change in real GDP	2.5	2.5	2.1	2.0	1.8	2.4–2.5	2.2–2.6	1.9–2.3	1.7–2.0	1.8–1.9	2.4–2.6	2.2–2.8	1.7–2.4	1.1–2.2	1.7–2.2
September projection	2.4	2.1	2.0	1.8	1.8	2.2–2.5	2.0–2.3	1.7–2.1	1.6–2.0	1.8–2.0	2.2–2.7	1.7–2.6	1.4–2.3	1.4–2.0	1.5–2.2
Unemployment rate	4.1	3.9	3.9	4.0	4.6	4.1	3.7–4.0	3.6–4.0	3.6–4.2	4.4–4.7	4.1	3.6–4.0	3.5–4.2	3.5–4.5	4.3–5.0
September projection	4.3	4.1	4.1	4.2	4.6	4.2–4.3	4.0–4.2	3.9–4.4	4.0–4.5	4.5–4.8	4.2–4.5	3.9–4.5	3.8–4.5	3.8–4.8	4.4–5.0
PCE inflation	1.7	1.9	2.0	2.0	2.0	1.6–1.7	1.7–1.9	2.0	2.0–2.1	2.0	1.5–1.7	1.7–2.1	1.8–2.3	1.9–2.2	2.0
September projection	1.6	1.9	2.0	2.0	2.0	1.5–1.6	1.8–2.0	2.0	2.0–2.1	2.0	1.5–1.7	1.7–2.0	1.8–2.2	1.9–2.2	2.0
Core PCE inflation <sup>4</sup>	1.5	1.9	2.0	2.0		1.5	1.7–1.9	2.0	2.0–2.1		1.4–1.5	1.7–2.0	1.8–2.3	1.9–2.3	
September projection	1.5	1.9	2.0	2.0		1.5–1.6	1.8–2.0	2.0	2.0–2.1		1.4–1.7	1.7–2.0	1.8–2.2	1.9–2.2	
Memo: Projected appropriate policy path															
Federal funds rate	1.4	2.1	2.7	3.1	2.8	1.4	1.9–2.4	2.4–3.1	2.6–3.1	2.8–3.0	1.1–1.4	1.1–2.6	1.4–3.6	1.4–4.1	2.3–3.0
September projection	1.4	2.1	2.7	2.9	2.8	1.1–1.4	1.9–2.4	2.4–3.1	2.5–3.5	2.5–3.0	1.1–1.6	1.1–2.6	1.1–3.4	1.1–3.9	2.3–3.5

NOTE: Projections of change in real gross domestic product (GDP) and projections for both measures of inflation are percent changes from the fourth quarter of the previous year to the fourth quarter of the year indicated. PCE inflation and core PCE inflation are the percentage rates of change in, respectively, the price index for personal consumption expenditures (PCE) and the price index for PCE excluding food and energy. Projections for the unemployment rate are for the average civilian unemployment rate in the fourth quarter of the year indicated. Each participant's projections are based on his or her assessment of appropriate monetary policy. Longer-run projections represent each participant's assessment of the rate to which each variable would be expected to converge under appropriate monetary policy and in the absence of further shocks to the economy. The projections for the federal funds rate are the value of the midpoint of the projected appropriate target range for the federal funds rate or the projected appropriate target level for the federal funds rate at the end of the specified calendar year or over the longer run. The September projections were made in conjunction with the meeting of the Federal Open Market Committee on September 19–20, 2017. One participant did not submit longer-run projections for the change in real GDP, the unemployment rate, or the federal funds rate in conjunction with the September 19–20, 2017, meeting, and one participant did not submit such projections in conjunction with the December 12–13, 2017, meeting.

1. For each period, the median is the middle projection when the projections are arranged from lowest to highest. When the number of projections is even, the median is the average of the two middle projections.
2. The central tendency excludes the three highest and three lowest projections for each variable in each year.
3. The range for a variable in a given year includes all participants' projections, from lowest to highest, for that variable in that year.
4. Longer-run projections for core PCE inflation are not collected.

# Federal Reserve



NOTE: Definitions of variables and other explanations are in the notes to the projections table. The data for the actual values of the variables are annual.

# Congressional Budget Office

## Budget and Economic Data

CBO regularly publishes data to accompany some of its key reports. These data have been published in the [Budget and Economic Outlook and Updates](#) and in their associated supplemental material, except for that from the [Long-Term Budget Outlook](#).

### BUDGET

- [10-Year Budget Projections](#)
- [Long-Term Budget Projections](#)
- [Historical Budget Data](#)
- [10-Year Trust Fund Projections](#)
- [Detailed Revenue Projections](#)
- [Spending Projections, by Budget Account](#)
- [Estimates of Automatic Stabilizers](#)

### ECONOMIC

- [10-Year Economic Projections](#)
- [Potential GDP and Underlying Inputs](#)

### 10-Year Economic Projections

Projections of output, prices, labor market measures, interest rates, and income.

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<a href="#">Jun 2017</a>	<a href="#">Jan 2017</a>	<a href="#">Aug 2016</a>	<a href="#">Jan 2016</a>	<a href="#">Aug 2015</a>	<a href="#">Jan 2015</a>	<a href="#">Aug 2014</a>
<a href="#">Feb 2014</a>	<a href="#">Feb 2013</a>					

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# Congressional Budget Office

## 2. June 2017 Baseline Forecast—Data Release (Calendar Year)

	Units	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
<b>Output</b>														
Gross Domestic Product (GDP)	Billions of dollars	18,037	18,569	19,310	20,118	20,847	21,566	22,378	23,262	24,186	25,150	26,150	27,191	28,273
	Percentage change, annual rate	3.7	3.0	4.0	4.2	3.6	3.4	3.8	4.0	4.0	4.0	4.0	4.0	4.0
Gross National Product (GNP)	Billions of dollars	18,242	18,776	19,529	20,316	21,036	21,753	22,566	23,442	24,367	25,333	26,332	27,372	28,456
	Percentage change, annual rate	3.4	2.9	4.0	4.0	3.5	3.4	3.7	3.9	3.9	4.0	3.9	4.0	4.0
Potential GDP	Billions of dollars	18,231	18,761	19,394	20,104	20,849	21,645	22,490	23,379	24,307	25,276	26,281	27,328	28,415
	Percentage change, annual rate	2.7	2.9	3.4	3.7	3.7	3.8	3.9	4.0	4.0	4.0	4.0	4.0	4.0
Real GDP	Billions of 2009 dollars	16,397	16,662	17,019	17,389	17,681	17,936	18,241	18,584	18,935	19,295	19,658	20,026	20,400
	Percentage change, annual rate	2.6	1.6	2.1	2.2	1.7	1.4	1.7	1.9	1.9	1.9	1.9	1.9	1.9
Real GNP	Billions of 2009 dollars	16,570	16,835	17,198	17,544	17,824	18,071	18,373	18,703	19,050	19,406	19,763	20,124	20,495
	Percentage change, annual rate	2.3	1.6	2.2	2.0	1.6	1.4	1.7	1.8	1.9	1.9	1.8	1.8	1.8
Real Potential GDP	Billions of 2009 dollars	16,573	16,833	17,093	17,376	17,682	18,001	18,333	18,677	19,031	19,392	19,757	20,127	20,503
	Percentage change, annual rate	1.6	1.6	1.5	1.7	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9
<b>Prices</b>														
Price Index, Personal Consumption Expenditures (PCE)	2009=100	109.5	110.7	112.7	114.9	117.1	119.5	122.0	124.4	126.9	129.4	132.0	134.7	137.3
	Percentage change, annual rate	0.4	1.1	1.8	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Price Index, PCE, Excluding food and energy	2009=100	109.5	111.4	113.2	115.4	117.7	120.0	122.4	124.8	127.3	129.8	132.4	135.0	137.7
	Percentage change, annual rate	1.4	1.7	1.6	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Consumer Price Index, All Urban Consumers (CPI-U)	1982-84=100	237.0	240.0	245.4	250.9	256.7	262.8	269.2	275.6	282.2	288.9	295.8	302.9	310.2
	Percentage change, annual rate	0.1	1.3	2.3	2.2	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
CPI-U, Excluding Food and Energy	1982-84=100	242.2	247.6	252.8	258.5	264.5	270.8	277.2	283.7	290.4	297.2	304.2	311.4	318.7
	Percentage change, annual rate	1.8	2.2	2.1	2.3	2.3	2.4	2.4	2.3	2.3	2.4	2.4	2.4	2.4
GDP Price Index	2009=100	110.0	111.5	113.5	115.7	117.9	120.2	122.7	125.2	127.7	130.3	133.0	135.8	138.6
	Percentage change, annual rate	1.1	1.3	1.8	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1
Employment Cost Index (ECI), Private Wages and Salaries	December 2005=100	123.3	126.2	129.7	133.9	138.4	142.9	147.4	152.0	156.8	161.7	166.7	171.9	177.2
	Percentage change, annual rate	2.3	2.4	2.8	3.2	3.4	3.3	3.2	3.1	3.1	3.1	3.1	3.1	3.1
Refiners' Acquisition Cost of Crude Oil, Imported	Dollars per barrel	46.5	38.7	48.1	49.9	52.1	54.0	56.4	59.4	62.7	66.1	69.8	72.2	73.9
Price of Crude Oil, West Texas Intermediate (WTI)	Dollars per barrel	48.7	43.1	51.2	52.0	52.0	52.8	54.7	57.1	59.5	62.1	64.8	66.8	68.4
Price of Natural Gas, Henry Hub	Dollars per MMBtu	2.6	2.5	3.2	3.1	2.9	2.9	2.9	3.0	3.1	3.2	3.4	3.6	3.7
FHFA House Price Index, Purchase Only	1991Q1=100	219.2	232.6	244.3	250.5	256.4	263.4	271.5	280.5	289.6	298.7	307.7	316.9	326.2
Nominal Exchange Rate Index (Export Weighted)	1970Q1=100	160.9	167.8	170.6	168.3	167.4	166.8	166.1	165.4	164.7	163.7	162.6	161.4	160.3
<b>Labor</b>														
Unemployment Rate, Civilian, 16 Years or Older	Percent	5.3	4.9	4.4	4.2	4.4	4.7	4.9	5.0	4.9	4.9	4.9	4.9	4.9
Noninstitutional Population, Civilian, 16 Years or Older	Millions	250.8	253.5	255.1	257.3	259.6	261.8	264.0	266.3	268.6	270.9	273.0	275.0	276.8
	Percentage change, annual rate	1.2	1.1	0.6	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.7	0.7
Labor Force, Civilian, 16 Years or Older	Millions	157.1	159.2	160.5	161.7	162.6	163.4	164.2	165.0	165.8	166.6	167.4	168.1	168.9
	Percentage change, annual rate	0.8	1.3	0.8	0.7	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4
Labor Force Participation Rate, 16 Years or Older	Percent	62.7	62.8	62.9	62.8	62.6	62.4	62.2	62.0	61.7	61.5	61.3	61.1	61.0
Employment, Civilian, 16 Years or Older (Household Survey)	Millions	148.8	151.4	153.4	154.9	155.5	155.6	156.1	156.8	157.6	158.4	159.2	159.8	160.6
	Percentage change, annual rate	1.7	1.7	1.3	1.0	0.4	0.1	0.3	0.5	0.5	0.5	0.5	0.4	0.4
Employment, Total Nonfarm (Establishment Survey)	Millions	141.8	144.3	146.5	148.1	148.7	148.9	149.3	149.9	150.7	151.5	152.3	153.1	153.9
	Percentage change, annual rate	2.1	1.8	1.5	1.1	0.4	0.1	0.2	0.4	0.5	0.5	0.5	0.5	0.5
Labor Productivity Index (Nonfarm Business Sector)	2009=100	106.4	106.7	108.1	109.8	111.8	113.8	115.7	117.8	119.9	122.0	124.2	126.4	128.7
	Percentage change, annual rate	0.9	0.2	1.3	1.6	1.8	1.8	1.7	1.8	1.8	1.8	1.8	1.8	1.8



# Congressional Budget Office

## 2. June 2017 Baseline Forecast—Data Release (Calendar Year)

	Units	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
<b>Interest Rates</b>														
10-Year Treasury Note	Percent	2.1	1.8	2.4	2.8	3.2	3.5	3.6	3.7	3.7	3.7	3.7	3.7	3.7
3-Month Treasury Bill	Percent	0.1	0.3	0.9	1.5	2.2	2.6	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Federal Funds Rate	Percent	0.1	0.4	1.0	1.7	2.4	2.9	3.1	3.1	3.1	3.1	3.1	3.1	3.1
<b>Income</b>														
Income, Personal	Billions of dollars	15,459	16,012	16,688	17,450	18,215	18,986	19,820	20,687	21,580	22,510	23,458	24,479	25,534
	Percentage of GDP	85.7	86.2	86.4	86.7	87.4	88.0	88.6	88.9	89.2	89.5	89.7	90.0	90.3
Compensation of Employees, Paid	Billions of dollars	9,693	10,101	10,556	11,026	11,452	11,855	12,292	12,774	13,280	13,805	14,355	14,926	15,519
	Percentage of GDP	53.7	54.4	54.7	54.8	54.9	55.0	54.9	54.9	54.9	54.9	54.9	54.9	54.9
Wages and Salaries	Billions of dollars	7,855	8,189	8,567	8,948	9,292	9,616	9,966	10,351	10,758	11,181	11,621	12,080	12,558
	Percentage of GDP	43.5	44.1	44.4	44.5	44.6	44.6	44.5	44.5	44.5	44.5	44.4	44.4	44.4
Nonwage Income	Billions of dollars	4,290	4,385	4,554	4,746	4,961	5,188	5,447	5,698	5,940	6,184	6,424	6,680	6,950
	Percentage of GDP	23.8	23.6	23.6	23.6	23.8	24.1	24.3	24.5	24.6	24.6	24.6	24.6	24.6
Proprietors' income, farm, with IVA & CCAAdj	Billions of dollars	40	28	23	34	45	54	64	71	76	81	85	87	87
	Percentage of GDP	0.2	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Proprietors' income, nonfarm, with IVA & CCAAdj	Billions of dollars	1,337	1,390	1,459	1,508	1,555	1,601	1,653	1,715	1,783	1,855	1,931	2,011	2,095
	Percentage of GDP	7.4	7.5	7.6	7.5	7.5	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4
Income, rental, with CCAAdj	Billions of dollars	660	705	737	757	769	769	770	774	779	790	803	819	840
	Percentage of GDP	3.7	3.8	3.8	3.8	3.7	3.6	3.4	3.3	3.2	3.1	3.1	3.0	3.0
Interest income, personal	Billions of dollars	1,303	1,315	1,367	1,429	1,531	1,668	1,834	1,981	2,114	2,232	2,339	2,452	2,567
	Percentage of GDP	7.2	7.1	7.1	7.1	7.3	7.7	8.2	8.5	8.7	8.9	8.9	9.0	9.1
Dividend income, personal	Billions of dollars	951	948	968	1,018	1,062	1,096	1,126	1,157	1,188	1,225	1,266	1,311	1,361
	Percentage of GDP	5.3	5.1	5.0	5.1	5.1	5.1	5.0	5.0	4.9	4.9	4.8	4.8	4.8
Profits, Corporate, With IVA & CCAAdj	Billions of dollars	2,088	2,086	2,094	2,098	2,118	2,148	2,193	2,253	2,335	2,424	2,517	2,620	2,725
	Percentage of GDP	11.6	11.2	10.8	10.4	10.2	10.0	9.8	9.7	9.7	9.6	9.6	9.6	9.6
Profits, Corporate, Domestic, With IVA & CCAAdj	Billions of dollars	1,702	1,676	1,669	1,687	1,701	1,707	1,729	1,764	1,817	1,881	1,946	2,023	2,103
	Percentage of GDP	9.4	9.0	8.6	8.4	8.2	7.9	7.7	7.6	7.5	7.5	7.4	7.4	7.4
<b>Components of GDP (Nominal)</b>														
Personal Consumption Expenditures	Billions of dollars	12,284	12,758	13,312	13,875	14,382	14,884	15,467	16,101	16,772	17,497	18,239	18,995	19,793
	Percentage change, annual rate	3.5	3.9	4.3	4.2	3.7	3.5	3.9	4.1	4.2	4.3	4.2	4.1	4.2
Gross Private Domestic Investment	Billions of dollars	3,057	3,036	3,249	3,443	3,581	3,707	3,851	3,999	4,147	4,296	4,447	4,603	4,761
	Percentage change, annual rate	5.9	-0.7	7.0	6.0	4.0	3.5	3.9	3.8	3.7	3.6	3.5	3.5	3.4
Nonresidential fixed investment	Billions of dollars	2,311	2,309	2,442	2,564	2,650	2,719	2,799	2,900	3,015	3,142	3,275	3,412	3,551
	Percentage change, annual rate	2.7	-0.1	5.8	5.0	3.4	2.6	2.9	3.6	4.0	4.2	4.2	4.2	4.1
Residential fixed investment	Billions of dollars	652	706	771	828	888	949	1,005	1,043	1,073	1,093	1,110	1,126	1,142
	Percentage change, annual rate	14.4	8.3	9.1	7.4	7.3	6.9	5.8	3.8	2.8	1.9	1.5	1.5	1.4
Change in private inventories	Billions of dollars	93	21	37	51	43	39	47	55	58	61	63	65	68
Government Consumption Expenditures and Gross Investment	Billions of dollars	3,218	3,277	3,364	3,472	3,582	3,699	3,822	3,948	4,077	4,209	4,346	4,485	4,626
	Percentage change, annual rate	2.1	1.8	2.7	3.2	3.2	3.3	3.3	3.3	3.3	3.2	3.2	3.2	3.1
Federal	Billions of dollars	1,225	1,245	1,267	1,287	1,307	1,332	1,361	1,390	1,420	1,453	1,488	1,525	1,563
	Percentage change, annual rate	0.5	1.6	1.8	1.5	1.5	2.0	2.1	2.1	2.2	2.3	2.4	2.5	2.5
State and local	Billions of dollars	1,993	2,032	2,096	2,185	2,275	2,367	2,461	2,558	2,657	2,757	2,858	2,961	3,064
	Percentage change, annual rate	3.1	2.0	3.2	4.2	4.1	4.0	4.0	3.9	3.9	3.8	3.7	3.6	3.5
Net Exports of Goods and Services	Billions of dollars	-522	-501	-614	-672	-699	-725	-762	-786	-809	-853	-882	-892	-908
Exports	Billions of dollars	2,264	2,233	2,314	2,351	2,442	2,555	2,681	2,816	2,960	3,115	3,283	3,463	3,655
	Percentage change, annual rate	-4.7	-1.4	3.7	1.6	3.9	4.7	4.9	5.0	5.1	5.2	5.4	5.5	5.5
Imports	Billions of dollars	2,786	2,734	2,929	3,023	3,140	3,281	3,443	3,602	3,770	3,968	4,165	4,355	4,563
	Percentage change, annual rate	-3.4	-1.9	7.1	3.2	3.9	4.5	4.9	4.6	4.7	5.3	5.0	4.6	4.8
Memorandum: Balance on Current Account	Billions of dollars	-477	-468	-566	-656	-700	-740	-785	-829	-864	-917	-960	-985	-997

# Congressional Budget Office

## 2. June 2017 Baseline Forecast—Data Release (Calendar Year)

Components of GDP (Real)		Units	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Personal Consumption Expenditures	Billions of 2009 dollars		11,215	11,522	11,813	12,080	12,277	12,453	12,682	12,942	13,217	13,518	13,816	14,107	14,412
	Percentage change, annual rate		3.2	2.7	2.5	2.3	1.6	1.4	1.8	2.1	2.1	2.3	2.2	2.1	2.2
Gross Private Domestic Investment	Billions of 2009 dollars		2,869	2,825	2,974	3,106	3,188	3,252	3,322	3,390	3,454	3,515	3,572	3,631	3,689
	Percentage change, annual rate		5.0	-1.6	5.3	4.4	2.7	2.0	2.2	2.1	1.9	1.8	1.6	1.6	1.6
Nonresidential fixed investment	Billions of 2009 dollars		2,200	2,189	2,289	2,372	2,423	2,457	2,496	2,554	2,620	2,693	2,768	2,844	2,921
	Percentage change, annual rate		2.1	-0.5	4.6	3.6	2.2	1.4	1.6	2.3	2.6	2.8	2.8	2.8	2.7
Residential fixed investment	Billions of 2009 dollars		565	592	625	659	694	726	747	753	752	743	731	719	706
	Percentage change, annual rate		11.7	4.9	5.6	5.5	5.3	4.6	2.9	0.8	-0.2	-1.2	-1.6	-1.6	-1.7
Change in private inventories	Billions of 2009 dollars		84	22	33	45	37	32	39	44	46	47	47	48	49
Government Consumption Expenditures and Gross Investment	Billions of 2009 dollars		2,884	2,907	2,906	2,930	2,955	2,980	3,005	3,030	3,052	3,074	3,097	3,119	3,142
	Percentage change, annual rate		1.8	0.8	0.0	0.8	0.8	0.9	0.9	0.8	0.7	0.7	0.7	0.7	0.7
Federal	Billions of 2009 dollars		1,114	1,121	1,116	1,114	1,114	1,116	1,120	1,123	1,125	1,128	1,133	1,138	1,144
	Percentage change, annual rate		0.0	0.6	-0.4	-0.2	0.0	0.2	0.3	0.3	0.2	0.3	0.4	0.5	0.5
State and local	Billions of 2009 dollars		1,768	1,785	1,788	1,814	1,838	1,861	1,883	1,903	1,923	1,941	1,959	1,976	1,992
	Percentage change, annual rate		2.9	0.9	0.2	1.4	1.3	1.2	1.2	1.1	1.0	1.0	0.9	0.9	0.8
Net Exports of Goods and Services	Billions of 2009 dollars		-540	-563	-646	-698	-708	-717	-735	-743	-750	-774	-786	-787	-797
Exports	Billions of 2009 dollars		2,121	2,128	2,163	2,198	2,257	2,331	2,412	2,497	2,586	2,681	2,782	2,889	3,001
	Percentage change, annual rate		0.1	0.4	1.6	1.6	2.7	3.3	3.5	3.5	3.6	3.7	3.8	3.8	3.9
Imports	Billions of 2009 dollars		2,661	2,691	2,809	2,896	2,965	3,048	3,147	3,240	3,336	3,455	3,568	3,676	3,798
	Percentage change, annual rate		4.6	1.1	4.4	3.1	2.4	2.8	3.2	3.0	3.0	3.6	3.3	3.0	3.3

Source: Congressional Budget Office.

Actual values reflect data released as of early April 2017. Projected values are shaded.

CCAdj = capital consumption adjustment; FHFA = Federal Housing Finance Agency; IVA = inventory valuation adjustment; MMBtu = 1 million British thermal units.

# Survey of Professional Forecasters

The Survey of Professional Forecasters is the oldest quarterly survey of macroeconomic forecasts in the United States. The survey began in 1968 and was conducted by the American Statistical Association and the National Bureau of Economic Research. The Federal Reserve Bank of Philadelphia took over the survey in 1990.

The Survey of Professional Forecasters' web page offers the actual releases, documentation, mean and median forecasts of all the respondents as well as the individual responses from each economist. The individual responses are kept confidential by using identification numbers.

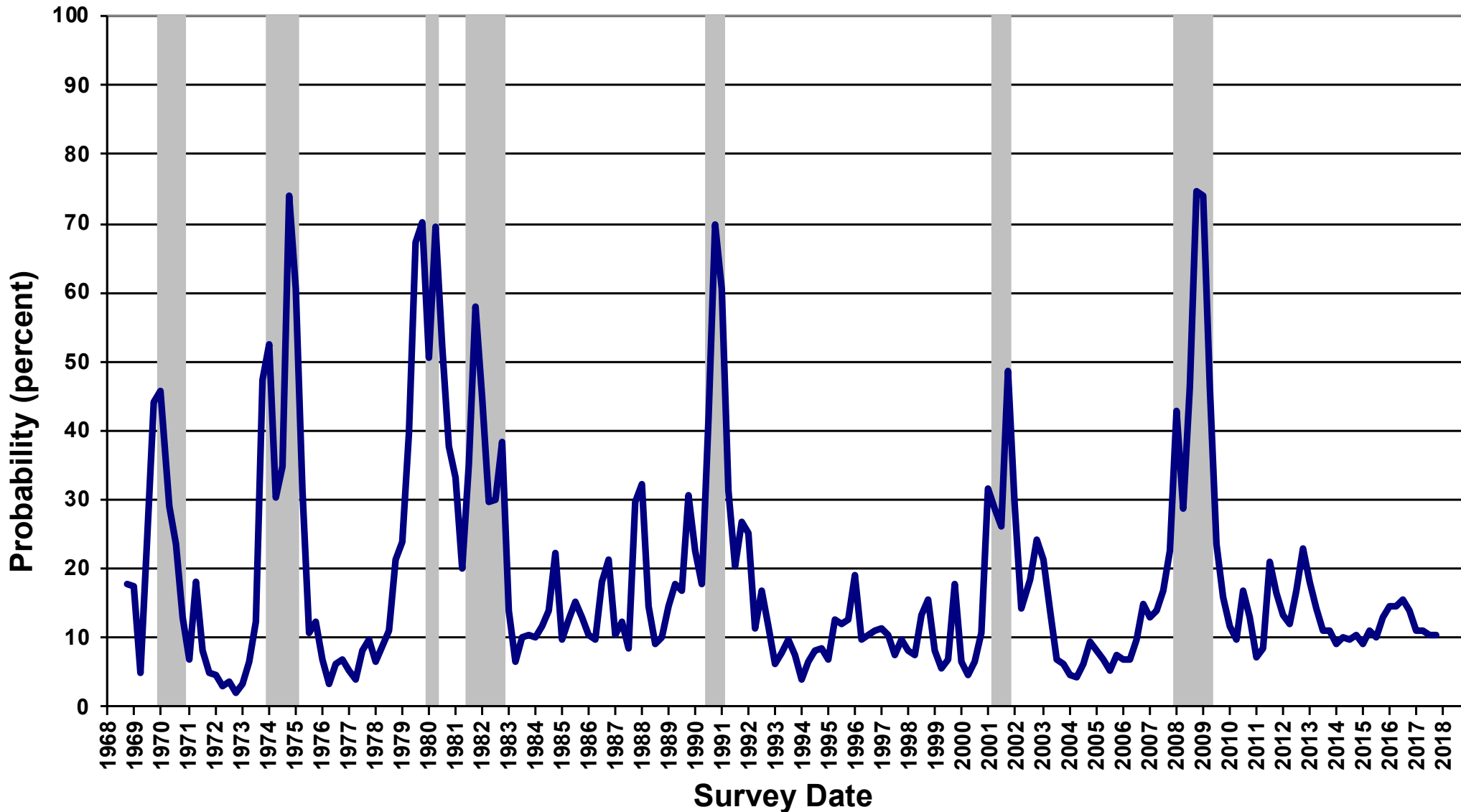
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# Survey of Professional Forecasters

The Anxious Index  
Probability of Decline in Real GDP in the Following Quarter  
Quarterly, 1968:Q4 to 2017:Q4



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