

Economics 460

Economic Forecasting

- Prerequisite: Econ 410 or equivalent
- Course information is on website
 - <http://www.ssc.wisc.edu/~bhansen/460/>
- Office Hours
 - Thursdays 10:00-12:00
 - or by appointment

Textbooks

- *Forecasting in Economics, Business, Finance, and Beyond*
 - Francis X. Diebold
 - Online
- *The Signal and the Noise*
 - Nate Silver
 - Supplemental

Computer Software

- STATA
 - Continuity with Econ 410
 - Available for UW students from Campus Software Library
 - Or in Social Science Computer Labs
 - Or via SSCC Winstat server
- STATA can be purchased directly
 - A permanent license, for the student price
- Eviews described in textbook, not available here
- Excel useful for graphics
- For advanced users:
 - MATLAB, R

Assessment

- Problem Sets (weekly): 15%
- Reading Reflections: 15%
- Project: 25%
- Midterm exam: 20%
- Final exam: 20%

Problem Sets

- Weekly
 - First due next Tuesday (1/24)
 - Posted on course website
- Conceptual, algebraic, theoretical, and numerical
- Computer analysis
- You can work together, but also attempt everything yourself

Reading Reflections

- Weekly
 - First due next Thursday (1/26)
- Read one chapter from Silver's book
 - For example, Chapter 1 "A Catastrophic Failure of Prediction" is about the 2008 financial crisis
- Write a few sentences
 - Something you learned, something you found different than in the primary textbook, something you agree with, or something you disagree with.

Exams

- Midterm: Tuesday March 7
- Final Exam: Wednesday May 10
- Exams will have mix of conceptual, theoretical, and interpretive questions

Forecasting Project

- Goal is to everyone to design an individual project, make decisions, and have some fun
- You will choose a specific time series, make a set of forecasts, and evaluate your success
- You will work on this project throughout the semester.
- The Forecasting Project will require 3 reports
- Details posted on course website

Timing

- You will select a time-series to forecast
- It must have at least one new realization between when you turn in your (second) forecast report and when you turn in your evaluation report.
- For example, if you want to forecast the U.S. GDP for 2017 Q1, the number is announced by the BEA on April 28. You can turn in your forecast up until April 27.

First Project Report

- Due Tuesday March 28
- Describe the variable
 - Source
 - When future observations will be available
 - This constrains the timing for your second report
 - Where you will find the data
 - Present a time-series of the historical series

Second Project Report

- Forecast Report
- Due one full day before your forecast date, latest by Tuesday May 2
- Must include:
 - Description of the data, including plots and time-series properties
 - Description of your forecasting method
 - Description of your forecasting model and parameter estimates

Second Project Report (continued)

- Extrapolation Forecasts
 - A full year of extrapolation forecasts
 - For monthly data, this means a set of 12 forecasts
 - For quarterly data, a set of 4 forecasts
- Point and Interval Forecasts
 - Point forecasts are the expected future values
 - Interval forecasts are possible ranges
 - You will learn these concepts over the semester

Third Project Report

- Due Thursday May 4
- Brief forecast evaluation
- Compare your one-step-ahead forecast with the actual realization
 - Was the actual value close to your forecast?
 - Did the actual value fall in your forecast interval?
 - Would a decision-maker have been wise to listen to you?

Data for Project

- You select your economic series to forecast
- As this is an economics course, it should be an *economic* series.
- Feel free to ask me about possibilities.
- You can pick a standard economic series, or can be creative.
- I advise against financial series. There is little to forecast, and the project will turn out to be uninteresting.

Data Frequency

- Pick an economic series which is available monthly or quarterly
- Annual series are difficult to fit in our evaluation window
- Weekly is possible, but have extra challenges.
- Daily series have special difficulties which we will not cover

Sample Size

- When you select a time-series, check that there is a sufficient historical record for you to fit a forecasting model
- If the sample length is too short, you will not be able to fit an meaningful model, and the project will not be interesting
- I suggest a minimum of 20 years of monthly or quarterly data

Questions

- In the First Project report, you will describe your selected time-series and data availability
- The purpose is so that you will have assessed feasibility, before you get too far along
- It also gives me a chance to review your project to assess feasibility

Finding Data

- Many economic data series are on the web
- Be careful to check for historical availability. Many only post a few years of observations
- Official government sites are very good sources, and have full historical series
- One excellent starting point is the Federal Reserve Economic Data (FRED) website
- Another is the data page at Resources for Economists: rfe.org
- Links on the course webpage

Example

- Wisconsin Unemployment Rate
- Recent History
 - 4.2% in August
 - 4.2% in September
 - 4.1% in October
 - 4.1% in November
- December 2016 is pre-announced by the Wisconsin Department of Workforce Development on Jan 19, and officially by the BLS Jan 24
- Future Releases by Bureau of Labor Statistics (BLS)
 - January 2017: March 13
 - February 2017: March 24
 - March 2017: April 21
 - April 2017: May 19

Extrapolative Forecasts

	Point Forecast	50% Interval Forecast	80% Interval Forecast
2016:12	4.0%	(4.0%, 4.0%)	(3.95%, 4.05%)
2017: 1	4.0%	(4.0%, 4.1%)	(3.9%, 4.1%)
2017: 2	4.0%	(3.9%, 4.1%)	(3.8%, 4.2%)
2017: 3	4.0%	(3.9%, 4.1%)	(3.7%, 4.2%)
2017: 4	4.0%	(3.9%, 4.2%)	(3.7%, 4.3%)
2017: 5	4.0%	(3.8%, 4.2%)	(3.6%, 4.4%)
2017: 6	4.0%	(3.8%, 4.3%)	(3.6%, 4.5%)
2017: 7	4.1%	(3.8%, 4.3%)	(3.5%, 4.6%)
2017: 8	4.1%	(3.8%, 4.4%)	(3.4%, 4.8%)
2017: 9	4.2%	(3.8%, 4.5%)	(3.5%, 5.0%)
2017:10	4.2%	(3.8%, 4.6%)	(3.4%, 5.3%)
2017:11	4.3%	(3.8%, 4.8%)	(3.4%, 5.5%)

Forecast for December 2016

- Point Forecast: 4.0%
 - Decline of 0.1% from November
- 50% Forecast Interval
 - [4.0% to 4.0%]
- 80% Forecast Interval
 - [3.95% to 4.05%]

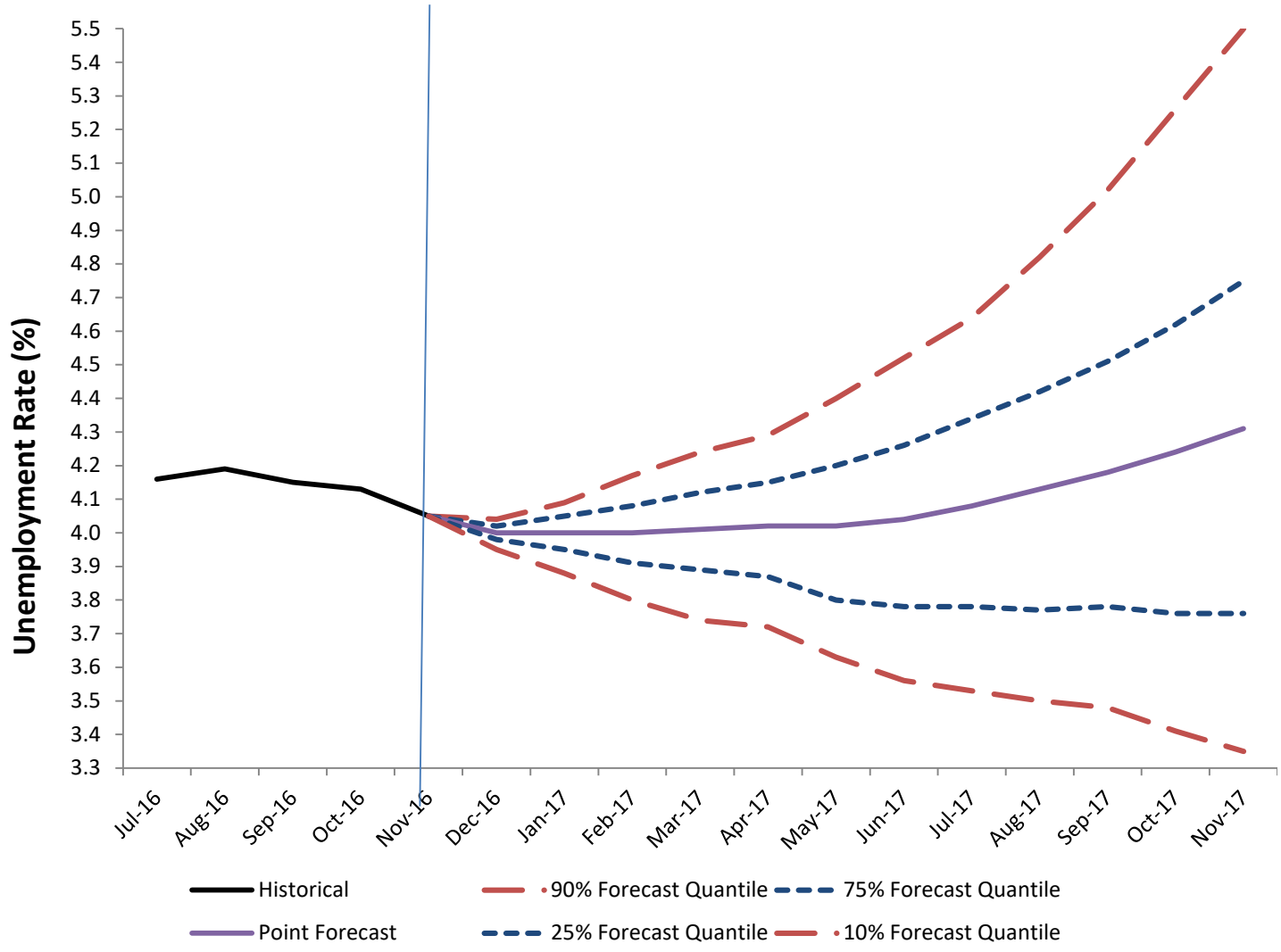
Forecast for March 2017

- Point Forecast: 4.0%
- 50% Forecast Interval
 - [3.9% to 4.1%]
- 80% Forecast Interval
 - [3.7% to 4.3%]

Forecast for November 2017

- Point Forecast: 4.3%
- 50% Forecast Interval
 - [3.8% to 4.8%]
- 80% Forecast Interval
 - [3.4% to 5.5%]

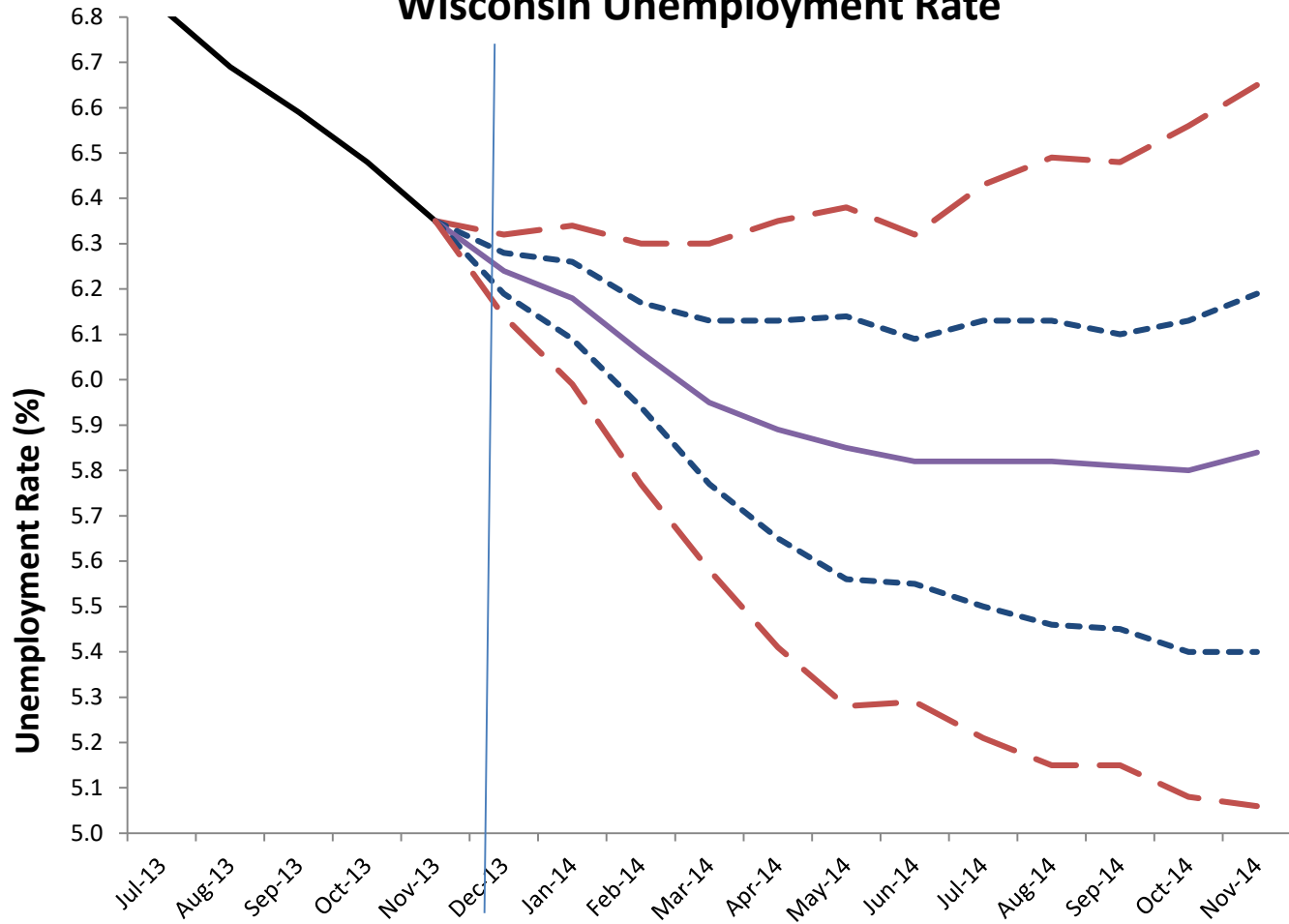
Wisconsin Unemployment Rate



Evaluation

- A few years ago for this class I made a similar 12-month extrapolative forecast
- The next slide is the forecast I made at the time

Wisconsin Unemployment Rate



— Actual

— Point Forecast

— 90% Forecast Quantile

— 25% Forecast Quantile

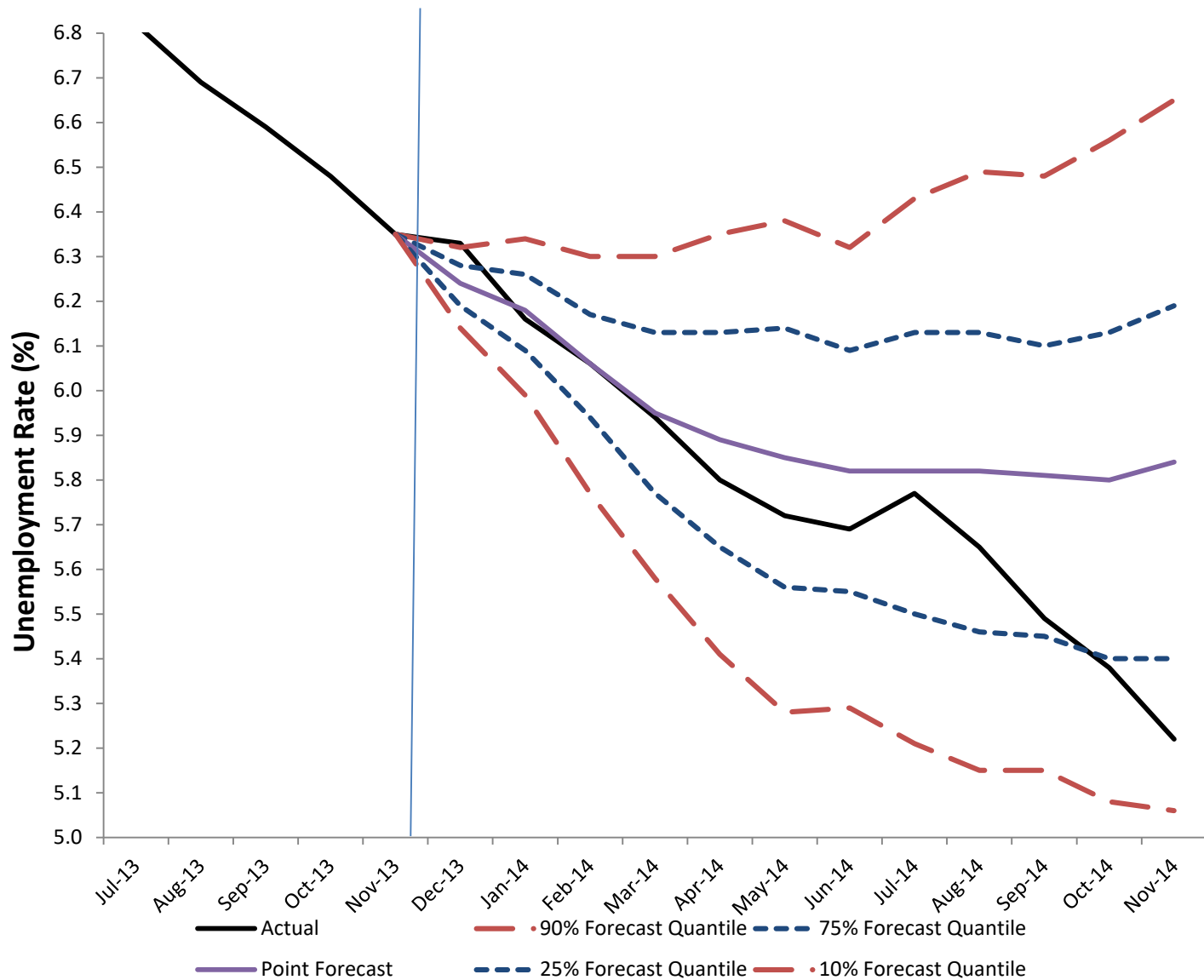
— 75% Forecast Quantile

— 10% Forecast Quantile

What Actually Happened

- The next slide is the forecast, plus the actual realizations

Wisconsin Unemployment Rate



Evaluation

- Many of the 12 realizations were very close to the point forecasts
- At the end of 2014, the unemployment rate fell more than forecasted
- All of the 12 realizations were within the 80% forecast intervals
- 11 of the 12 realizations were within the 50% forecast intervals

Upcoming Announcements

- Jan 18 (Wed)
 - Consumer Price Index (BLS)
 - Real Earnings (BLS)
- Jan 24 (Tues)
 - Regional and State Employment and Unemployment (BLS)
 - Usual Weekly Earnings (BLS)
- Jan 25 (Wed)
 - Quarterly Data Series on Business Employment Dynamics (BLS)
- Jan 27 (Friday)
 - Gross Domestic Product, 4th quarter, first estimate (BEA)
- Jan 30 (Monday)
 - Personal Income (BEA)
- Jan 31 (Tuesday)
 - Employment Cost Index (BLS)
- Feb 3 (Friday)
 - Employment Situation (BLS)
- Feb 10 (Friday)
 - Import and Export Price Indexes (BLS)
- Feb 14 (Tuesday)
 - Producer Price Index (BLS)
- Feb 28 (Tuesday)
 - Gross Domestic Product, 4th quarter, second estimate (BEA)

Assignments for the week

- Read Chapters 1-2 from Diebold
- Problem Set # 1
 - Due Tuesday (1/24)
- Read Chapter 1 from *The Signal and the Noise*
 - Reading Reflection
 - Due Thursday (1/26)