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TEACHING COURSES IN MACROECONOMICS AND MONETARY POLICY WITH BLOOMBERG ANALYTICS

Short title for running header: Bloomberg for Macroeconomics

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Abstract: In this article, the authors illustrate the use of Bloomberg for analyzing topics in macroeconomics and monetary policy in economics and finance courses. The hands-on experience that students gain from such a course has many benefits, including deeper learning and clearer understanding of data. The authors describe goals and learning objectives, then compare Bloomberg with Federal Reserve Economic Data (FRED). In addition, they provide examples of how to use Bloomberg in the classroom, describe how to have students perform sector analysis, show how Bloomberg tools are useful for analyzing monetary policy, discuss how to use Bloomberg to analyze the financial sector, and illustrate the platform's use in a case study.

Keywords: experiential learning, macroeconomics, monetary policy

JEL codes: A22, E43, E44

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The Bloomberg terminal platform has been in existence since 1981 and has been used by traders in financial markets to provide them with information and trading. The platform, which we hereafter refer to as "Bloomberg," also provides a great learning environment for students interested in macroeconomics, monetary policy, and money and banking. This article is designed to help instructors take full advantage of Bloomberg's capabilities.

In this article, we first briefly discuss the literature on the benefits of experiential learning. Then, we discuss the goals that Bloomberg can fulfill, and how they compare with learning objectives in macroeconomics, money and banking, and monetary economics courses. We then compare Bloomberg to Federal Reserve Economic Data (FRED) and point out some of the advantages that Bloomberg has over FRED. In this section of the article, we provide numerous examples of hands-on work that students can perform. Next, we provide additional examples of how to use Bloomberg. In the following section, we show how students can use Bloomberg to perform sector analysis. In the next section, we show how to use Bloomberg for analyzing monetary policy. Then, we examine Bloomberg's extensive coverage of financial markets. We follow this with an illustrative case study. The article ends with concluding remarks.

ECONOMICS LITERATURE ON EXPERIENTIAL LEARNING

Our use of the Bloomberg terminal is motivated by the literature on experiential learning. Experiential learning improves student outcomes. It minimizes passive memorization of concepts and maximizes active learning. The Bloomberg terminal teaches students to learn real-world applications, retain new information, and to access their accumulated knowledge to create new knowledge, and is thus an invaluable experiential learning device.

Earlier works in the literature of education highlight the significance of experiential learning. One of the most highly cited works on this topic is by Kolb (1984) who defines

experiential learning. In Kolb's view, experiential learning comes from life experiences and is thus quite different from the type of learning that is common in universities, in which students learn from lectures in a classroom setting. Keeton and Tate (1978) suggest that students need to experience direct contact with the world, not just read about it or hear about it. The direct contact helps ensure that the student gains a deeper appreciation and understanding of the concept or data.

This idea of the benefits of experiential learning is supported by McGoldrick and Ziegert (2012), who emphasize the importance of experiential learning for students after they graduate. This is the case, as Hawtrey (2007) has noted the application of material to real-life experience leads to deeper learning and promotes ownership of learning, and Hoyt (2003) notes that it promotes student empowerment. Ultimately, experiential learning is active learning. Salemi (2002) finds that such active learning allows students the ability to work at a higher cognitive level.

Kazemi (2015) favors complementing the traditional teaching methods in economics and finance to make students' learning more experiential. Accordingly, he extolls the virtues of the Bloomberg terminal in giving students direct contact with data. Combining economic and finance theories with data helps to reinforce and deepen students' knowledge base. This will help students focus more, think harder and try to apply what they are learning, and get a better grasp of the intuition behind the topical issues presented to them. Once they understand a topic intuitively, the instructor has achieved the goal of making students' learning long-lasting.

We build our article on this through a series of examples describing how to use Bloomberg in the classroom to bridge the gap between the theory and practice, with a clear focus on the learning goals and objectives in teaching macroeconomics and monetary policy.

BLOOMBERG GOALS AND LEARNING OBJECTIVES

The use of Bloomberg in the classroom creates a clear sense of comfort for students to use some of this powerful portal's functionality in their research and presentations to produce substantially more analytical and comprehensive charts, tables, and graphs. Our goals in using Bloomberg in teaching macroeconomics, money and banking, and monetary policy courses are summarized as follows.

Teaching students skills in numeracy, trends and data analysis, and knowledge of the Bloomberg platform is a significant component of our teaching of these courses. We need to connect the dots between the theory and practice by making sure they are properly equipped with the right set of skills. Thereby, we desire to use Bloomberg in the classroom as a means to bridge the gap between economic theory and practice to fully prepare students for careers in the industry.

We additionally try to blend topical issues into core economic theory as it is very important for students to be able to read, watch, and listen to the news and be able to apply it to what they have learned in economics. Examples of this presented in the article are the direction of the Fed's tightening and the movements of the federal funds rate, flattening of the yield curve, unemployment compensation numbers, and financial markets indexes and their fluctuations.

Another one of our goals is to familiarize students with this powerful tool and make them fluent with the research and analytical functionality of Bloomberg and to give them the independent ability to dig deeply into the Bloomberg platform to produce charts, tables, and graphs as a foundation for their research. Through this, we further show students how to connect the dots between the theory and practice by showing them how to access the right data on Bloomberg and how to properly utilize its analytical tools.

In our final goal, we intend to prepare students for a deeper and a more comprehensive understanding of complex economic theories by showing them the reaction of the financial markets to economic data and news and the likely Fed policy action in response to it. Through this pedagogy, we hope that we make students better graduate students by providing them with a deep, comprehensive and intuitive knowledge of economics. Additionally, for students who pursue careers in investments and the financial services industry immediately following college, their in-depth theoretical and practical knowledge of the discipline, combined with their fluency in Bloomberg, makes them very desirable job candidates in the industry.

In terms of specific learning objectives in the subject area, Bloomberg can aid students with the following learning objectives, which we address throughout the article:

1. Understand financial markets at a deeper level
    a. Understand how financial markets react to economic news
    b. Understand how financial variables move in response to economic shocks
    c. Interpret financial data and how it relates to monetary policy
    d. Explore financial concepts in data

2. Understand macroeconomic theory more completely
    a. Relate economic theory to data
    b. Understand that there may be alternative methods to measure the same theoretical concept
    c. Test a theory with data

3. Understand the international economy and differences across countries

4. Understand macroeconomic data and what they mean
    a. Examine movements of data over time and how such changes affect the economy
    b. Understand the time-series history of major macroeconomic variables

5. Understand monetary policy and its influences
    a. Understand how monetary policy depends on data
    b. Examine how monetary policy influences financial markets

BLOOMBERG VERSUS FRED

Another great tool other than Bloomberg for instructors of macroeconomics is the FRED database provided on the Web site of the Federal Reserve Bank of St. Louis.[1] In this section, we describe ways in which the use of Bloomberg provides access to data not available in FRED. We do not show how to teach with FRED because that has been done well by others.[2] There are several major advantages to using Bloomberg over FRED, however, including: (1) ease of access to detailed analytical charts, (2) more data available in Bloomberg than FRED, especially real-time and proprietary data; and (3) instantaneous economic and financial data releases, compared with consensus forecasts, along with any revision of prior period data.

First, Bloomberg allows students and instructors to do things that cannot be done in FRED at all. For example, the Taylor rule function of Bloomberg and the analytics of it are not possible to perform on FRED. In a classroom discussion of rules versus discretion in the conduct of monetary policy, we ask students to calculate Taylor rule estimates for the federal funds rate under different assumptions pertaining to inflation, inflationary expectations, the natural rate of unemployment, and the unemployment rate. By comparing their results with the Fed's target for the federal funds rate, as well as estimates of this measure by other economists and major investment firms, students learn how tweaking different assumptions or variables in the equation results in varying estimates for the Taylor rule. Other very useful Bloomberg teaching tools that FRED does not offer include bond pricing, yield calculations, bond duration, world inflation rates, global interest rates, and international data.

Even when the data are available in FRED, for a student or instructor to replicate some of Bloomberg's detailed analytical charts using FRED requires a highly specialized set of

programming and code-writing skills in addition to time, whereas Bloomberg does it all simply with a click.

Second, although FRED is a great resource, it can only provide publicly available data, all of which are available through other sources. The advantage of Bloomberg in this respect is that it contains data not available on FRED or any other source without paying for them, and the data are updated in real time as they are released. Proprietary data that are available in Bloomberg and not in FRED include the Conference Board's index of leading indicators and measures of consumer confidence, the S&P 500 index,[3] and yield curve data.[4] In addition, FRED does not contain all the detailed series from the Bureau of Economic Analysis and Bureau of Labor Statistics, whereas Bloomberg contains more of these, such as measures of the capital stock. Using data series that are available in Bloomberg and not in FRED allows an instructor to answer a number of macroeconomic questions in class, or assign them to students to do. Here are some examples of what we do in our classes that other instructors might find helpful to replicate in theirs, with the specific learning objective that is accomplished in each example:

Real Interest Rates

We have students calculate real interest rates of various types based on nominal interest rates and inflation expectations over differing periods. Note that Bloomberg offers more inflation expectations series than are available in FRED. Then, having created the series, we can ask questions such as "How has the real interest rate changed over time?" and "In which periods were the returns to saving high? In which periods was it better to be a borrower?" *Learning objective covered: 4a.*

Inflation Expectations

We ask students to show break-even inflation rates, comparing nominal interest rates on government bonds to the real interest rates on comparable TIPS bonds. The student can compare a series on break-even inflation rates to inflation expectations from the University of Michigan series and from the Survey of Professional Forecasters. We ask the class to compare the volatility of the different series and ask why the volatility might be so much higher for the break-even inflation rate rather than for the inflation expectations series from the surveys. This would allow the instructor to discuss issues such as time-varying liquidity premiums in financial markets. *Learning objective covered: 2b.*

International Trade

In this exercise, using Bloomberg's data from many countries around the world, we have students calculate the "openness index" in multiple countries— the sum of imports as a share of GDP and exports as a share of GDP. Then students can see the importance of international trade in many countries and not just the United States. We follow by asking students why trade has increased so much over time around the world and to ponder the benefits and costs of increased trade. *Learning objective covered: 3.*

Total Factor Productivity

We illustrate how to determine total factor productivity (TFP) using capital stock data from the Fixed Assets part of the National Income and Product Accounts, with more recent data available in Bloomberg than in FRED. This can be done by assuming a Cobb-Douglas production function, combined with data on employment and the capital stock. Then the contributions of each factor affecting GDP growth can be calculated. Students can see how much of GDP growth is driven by the growth of total factor productivity versus the capital stock versus employment. We use this

exercise to discuss the productivity slowdown in the 1970s and the tech boom in the 1990s. In a related exercise, we ask students also to determine whether they think the TFP data support certain classical or Keynesian theories. Real business cycle theory suggests that business cycles are driven by TFP shocks. We ask students if they think the data support that view. Do negative TFP shocks coincide with the start of recessions? Are TFP shocks usually positive in economic expansions? Now combine the TFP data with data on energy price shocks (such as using the producer price index for fuels and related products and power). Comparing the timing of TFP shocks to energy price shocks, do the data support a classical theory driven by TFP shocks or a Keynesian theory that price stickiness prevented a return to general equilibrium in the aftermath of a shock to energy prices? *Learning objective covered: 2a.*

Economic Growth

In this exercise, we examine the Solow growth model using capital stock data from the Fixed Assets part of the National Income and Product Accounts available in Bloomberg, but not in FRED.[5] This can be done by assuming a Cobb-Douglas production function, combined with data on employment and the capital stock to calculate the capital-labor ratio. Students are asked to also calculate the output-labor ratio and consumption-labor ratio and determine whether there is any evidence that the U.S. capital-labor ratio is reaching a steady state. If the capital-labor ratio is flattening out and perhaps reaching a steady state but the consumption-labor ratio and output-labor ratio continue to rise, what does that imply about the growth of total factor productivity? *Learning objective covered: 2a.*

Yield Curves

In Bloomberg, it is easy to generate yield curves on Treasuries and compare the shape of those yield curves over time. This is quite difficult to do with FRED. You can illustrate how the yield

curve tends to be much flatter or downward-sloping at the start of recessions and gets much steeper early in expansions, and then becomes less steep as expansions continue. This leads to a discussion of theories about the term structure of interest rates, including the expectations theory and preferred habitat theories, along with the term premium. We ask our students how well the data confirm the theories. Or, ask them to perform more of a current events analysis, comparing today's yield curve with that from one year ago, and asking what happened in the past year to cause the yield curve to shift.

Figure 1 provides an example that shows the narrowing of yield spreads between the short-term and long-term bonds recently. This is a chart that an instructor can put together in a matter of seconds to help students see this in a very dynamic way. It is one thing for students to read or hear on the news about the narrowing of spreads and flattening of the yield curve but it is a great deal more gratifying for them to be able to put it together themselves using Bloomberg.

[Insert figure 1 about here]

In figure 2, we show how the Fed's increase in the target for the federal funds rate since December 2015 has shifted short-term interest rates higher, moving the short-term end of the yield curve to higher levels. This shift of the yield curve has not necessarily been a parallel one. For example, the yield curve of January 17, 2018, shows the yield on the 30-year Treasury bond below what it was when the Fed started raising rates in 2015, while short-term interest rates are higher. This is another example of how Bloomberg can effectively pull together yield curves for any point in time and present them side-by-side for a very useful dynamic analysis while shedding light on an often-confusing perception among students and even some practitioners in banking and finance. This misperception is associated with the faulty concept that as the Fed raises the federal funds rate, all rates with different maturities along the yield curve will rise. Students quickly learn that

the yield curve's slope can change significantly, and that long-term rates can decline even as short-term rates increase. *Learning objective covered: 1b.*

[Insert figure 2 about here]

Cross-Country Growth Rates

Students can learn about GDP growth in different countries by plotting them in Bloomberg. They can then compare the growth rates across countries and see if GDP growth moves simultaneously in different countries during recessions. Ask students whether they observe an international business cycle. To what extent are countries interdependent? Is GDP in some countries more closely correlated to GDP in certain countries than others? What economic theories are consistent with these observations? *Learning objective covered: 3.*

Forecast Rationality

In this case, we ask students to use the data on forecasts available on Bloomberg to test the rationality of forecasts. This can be done most easily for inflation forecasts from various sources (University of Michigan or Bloomberg). Have students compare the forecasts with the actual outcome, creating a scatter plot of forecast versus actual and asking if the points lie on a 45-degree line. We do this for different subperiods and ask students if they thought that inflation expectations were rational in the 1970s and early 1980s. Then we ask them to contrast those results with inflation forecasts in the 1990s and 2000s. *Learning objective covered: 2c.*

Monetary Policy

Bloomberg calculates the implied probability of an interest-rate hike by the Fed for each of the upcoming FOMC meetings for the year. We ask students to examine how the data dependency of the Fed's decision could change the forecast of the federal funds rate for each of the upcoming meetings of the FOMC. This exercise requires students to be mindful of economic releases as well as the major developments in the global economy and the financial market's reaction to these

developments. See, for example, Figure 3, which shows the data as of June 2018 on the probability of a hike in the Fed's target for the federal funds rate at FOMC meetings from June 2018 to June 2019. *Learning objective covered: 1c.*

[Insert figure 3 about here]

International Interest Rates

Comparing interest rates in countries around the world allows students to investigate theories about capital flows and their relation to interest rates.[6] Students can examine differences in short-term rates and long-term rates across countries and develop a deeper understanding of the term structure of interest rates. *Learning objective covered: 3.*

OTHER EXAMPLES OF HOW TO USE BLOOMBERG

One of the challenges of teaching macroeconomics and monetary policy as an experiential learning course is bridging the gap between knowledge of theory and real-world practice. Typical internships in the industry do not always focus on connecting the two. We have been able to close this gap by building a very strong bridge through use of the Bloomberg platform. The life experience that students gain through working in the relevant and appropriate environment connected to the field can be intertwined into one where students learn both the theory and practice together.

One of the best ways to use Bloomberg is to analyze current economic events. In this section, we supply examples that we use in our classes either as part of the discussion of each topic and/or as an assignment for students to use the theoretical framework discussed in class in combination with Bloomberg data analytics to come up with an assessment of the environment studied and sometimes a policy recommendation as well. Here are three such examples: (1) the

effects of quantitative easing on financial markets, (2) the response of financial markets to the Fed's tapering plans, and (3) an analysis of the market's reaction to a meeting of the FOMC.[7]

Effects of Quantitative Easing on Financial Markets

In discussing the Federal Reserve's quantitative easing (QE) programs, as well as the program known as Operation Twist, we often find that students' understanding of these tools is incomplete and shallow at best. We start with an explanation of what QE entails, followed with an explanation of each phase of QE by covering the timing, the amount, and the reasoning behind the Fed's engaging in such an exercise. We further discuss the differences between QE programs and conventional open market operations (OMO).

When we analyze QE1, the Fed's first quantitative easing program, we use Bloomberg and pull up a chart of the Dow Jones Industrial Average from November 25, 2008, to March 31, 2010 (the period in which the Fed engaged in its first round of quantitative easing), as shown in figure 4. They learn that the horizontal lines show the level of the Dow at the beginning and end of the period, and the numbers in the upper left show that the Dow went up 28.03 percent over the period, which is an annualized increase of 20.17 percent per year. At this point, we pause and explain that while you cannot attribute the rise in the Dow to the Fed's quantitative easing program, you can note the rise in the stock market during the QE1 period. We ask students to consider how and why such an expansionary monetary program might have contributed to the growth of stock prices in this period. We ask them to think about what might have happened to the economy and the stock market if the Federal Reserve had not engaged in such a policy.

[Insert figure 4 about here]

We proceed by explaining how the Fed tried to reduce long-term interest rates by selling short-term Treasury securities and buying long-term Treasury securities from September 2011 to

December 2012. The program was known inside the Fed as the Maturity Extension Program, and outside the Fed as Operation Twist. Students find it quite intriguing to learn that the Fed first used that policy in 1964 and named it "Operation Twist" because it was a twist away from the normal open-market operations and it coincided with the popular hit song by Chubby Checker, "The Twist."[8] Now students understand clearly what Operation Twist is and have fun doing it. In fact, they end up talking about it even as they exit the room at the end of class. We proceed by asking the class: How did such programs affect financial markets? Rather than just stating the impact of such policies in summary, we ask students to do a case study, examining the short-run and long-run impacts of the policy changes.

We show the impact of Operation Twist by looking at yield curves on different dates, as shown in figure 5. The dashed line shows the yield curve as of September 2011, when Operation Twist began. By March 2012 (dotted line), the entire yield curve had risen very slightly. We then ask students to explain the reasons behind this. But by December 2012 (solid line), the twist is observable, as short-term interest rates are slightly higher and long-term interest rates are lower than they were earlier. Of course, we point out to students that economic events other than Operation Twist may have also affected the yield curve over this period. But the Bloomberg graphs can be effective ways of demonstrating how well the Fed's desire to flatten the yield curve worked in practice. *Learning objective covered: 1a.*

[Insert figure 5 about here]

Response of Financial Markets to Fed Tapering Plans

In 2013, when the Fed began to consider tapering its quantitative easing program, the effects on financial markets were substantial and clear to see using charts from Bloomberg. We ask students to show, both verbally and graphically, the effect of Fed tapering from May to August 2013 on the

price of the 30- year Treasury bond, interest rates, and stock market. In this exercise, using Bloomberg, they might show how the price of the 30-year Treasury bond fell by 13 percent, as investors expected the Fed to reduce its demand for the bond, driving the interest rate up. Figure 6 shows the steady decline in the bond price over this period—a great moment for the instructor to capitalize on the correlation between bond prices and interest rates. This gives students the sense that by tuning into the markets and watching the direction of monetary policy, they can predict the future path of interest rates.

[Insert figure 6 about here]

By looking at data on the stock market, students can also see that when the Fed confirmed that it would begin tapering soon at its June 2013 meeting, the Dow fell 4.3 percent in five days, as shown in figure 7.

[Insert figure 7 about here]

We further discuss how the financial environment can change rapidly when the course of the Fed's action changes. For example, the Fed surprised investors in September 2013 by deciding not to taper its asset purchases because of the threat of a government shutdown and slightly weaker economic activity. We illustrate to students that as a result of this, the price of the 30-year Treasury bond increased sharply.[9] The announcement also led to a sharp rise in the Dow.[10] We discuss these issues with students in the context of a macroeconomic model to analyze why these changes occurred in financial markets. *Learning objective covered: 5b.*

An Analysis of the Market's Reaction to an FOMC Meeting

On the day of an FOMC meeting, we look at the NW3 chart on Bloomberg as shown in figure 8, highlighting the Dow, S&P500, NASDAQ, and VIX. We mark where the markets are prior to the announcement of the Fed on each chart and carefully examine their response and direction

following the Fed's announcement. The live and real-time reaction of these market indexes to the decision of the Fed creates an exciting learning experience for students. While they recognize how a great deal of the Fed announcement was already priced into the markets due to market expectations and predictions of the move as shown in the figure, there is also a potentially sizable reaction that is often made in response to the Fed's decision that might have been unexpected. The next move for us in this experience is to try to decipher why the reaction was the way it was and what are some of the contributing factors. For example, at the May 2, 2018, meeting of the FOMC, while the Fed did exactly what the markets were expecting by not changing the target for the federal funds rate, the market reacted negatively when the Fed announcement was made, with the Volatility Index (VIX) rising sharply at 2:00 p.m. with the Dow, S&P500 and NASDAQ (as denoted by INDU, SPX and CCMP) all falling. We then examine the Fed's statement, released at 2:00 p.m., and go over what was on the Fed's radar screen, including the various plus and minus signs they saw in the economy. We focus on the following words from FOMC: "The Committee expects that economic conditions will evolve in a manner that will warrant further gradual increases in the federal funds rate."[11] We follow by highlighting for students how the markets interpreted the Fed's language as more hawkish, suggesting a high probability of rate hikes in both June and September. *Learning objective covered: 5b.*

[Insert figure 8 about here]

SECTOR ANALYSIS

In teaching a macroeconomics course, a useful assignment is to have each student study a sector of the economy over the course of a semester.[12] The students can use Bloomberg to view the recent movements of variables in each sector. We will illustrate the use of Bloomberg by showing some variables from the household sector and labor markets. Of course, Bloomberg contains variables

on many other sectors of the economy, including the business sector, the government sector, and the international sector, as well as key indicators of the economy, such as the inflation rate. As we cover these topics in class, we not only graph the appropriate variable with its latest real-time release, we further discuss how the variation of these variables against their norm and consensus forecasts could change the market's expectations. We discuss expectations regarding the potential reaction of the Fed to the news and how any likely action of the Fed might result in a reaction by financial markets, including bonds, equities, and exchange rates. *Learning objective covered: 4a.*

Household Sector

Bloomberg contains data on numerous household variables, including personal consumption expenditures, consumer confidence, housing prices, and home sales. Students learn that the most useful general variable for the household sector is personal consumption expenditures, which represents about 70 percent of GDP. We show them that consumption growth tends to be fairly stable over the business cycle, except in a major downturn, as was the case in 2008 and 2009.[13] From this, they see how the loss of wealth in the financial crisis also led to a lower rate of growth of consumer spending in the recovery following the recession.

One of the main driving forces of consumer spending is the confidence that consumers have about the economy, so measures of consumer sentiment are followed very closely by economic policymakers. The Conference Board's measure of consumer confidence provides students with insight into consumer's feelings about spending, as figure 9 suggests. In this graph, students can see the very steep decline in consumer confidence in the recession and its very slow rise in the recovery. The rise in confidence from 2009 to 2018 was marked by a number of periods in which it declined sharply. These declines occurred when there were weak economic news,

increases in oil prices, threats to the economy from a potential government shutdown, and other negative events for the economy.

[Insert figure 9 about here]

The last recession was initiated by a decline in home prices. Bloomberg contains a number of measures of housing prices that we use in our classes to make the connection between the discussion and the reality of the bust of the housing boom more visual and hence compelling.[14] Using such a graph, we show students that the home price index rose substantially from 2003 to 2006, then declined very sharply in 2007 and 2008. After the recession ended, home prices moved erratically until 2012, when they finally began to increase. As of 2017, the index had increased nearly 50 percent from its low in 2012, though it remained below its high of 206.52 set back in July 2006.

We further discuss how the decline in home prices led to a very sharp decline in the number of homes sold, as figure 10 illustrates. Sales of existing homes peaked in 2005, dropped slightly in early 2006, and then began plummeting in late 2006 and 2007, leading to the financial crisis. Government policy (a home-buyer tax credit) boosted home sales in 2009 and early 2010, but the end of the program caused sales to hit a low point later in 2010. Sales climbed steadily from 2010 to 2013 and gradually increased through May 2017 but remain far below their levels in 2005. *Learning objective covered: 4b.*

[Insert figure 10 about here]

Labor Markets

Students studying the labor market might be interested in using data on nonfarm payroll employment, the unemployment rate, initial claims for unemployment insurance, and the labor-force participation rate.

Macroeconomists generally regard the monthly change in nonfarm payroll employment as providing the most useful monthly data on the overall state of the economy, so the monthly employment report is the most watched variable on Wall Street. In a typical month in an economic expansion, the monthly change in payrolls will range from 100,000 to 300,000 net new jobs per month. But in a recession, the economy might lose several hundred thousand jobs per month, as it did in the most recent recession.[15]

While the monthly change in nonfarm payrolls may be the most useful measure of labor market conditions, the most well-known variable is the civilian unemployment rate.[16] We show students that after rising dramatically from 2007 to 2009, the unemployment rate began a steady, but slow, decline that continues into the present. They could see that the sharp rise in the recession occurred quickly and the slow decline meant that millions of Americans remained unemployed long after the recession ended.

A useful guide to the strength of the economy in the short run is initial claims for unemployment insurance, which is released on a weekly basis, providing timely insight into the strength of labor markets. As figure 11 shows, labor markets deteriorated very rapidly in 2008, with initial claims peaking in early 2009 at 665,000 claims. We show students as the recovery occurred, many workers were still being laid off, so initial claims continued at a high level from 2009 to 2012, before finally returning to more normal levels in 2013. This measure was 221,000 for the week ending May 25, 2018.

[Insert figure 11 about here]

One of the major surprises in the recession and its aftermath was the decline in the labor-force participation rate. Figure 12 shows the steady decline in the participation rate in the recession and recovery. Depressed economic conditions led large numbers of workers to drop out of the

labor force entirely, especially younger workers. Beginning in September 2015, the participation rate began to increase and was at 62.7 percent as of May 2018. *Learning objective covered: 4b.*

[Insert figure 12 about here]

ANALYZING MONETARY POLICY

Bloomberg provides numerous tools for analyzing monetary policy. One of the main tools that analysts use is the Taylor rule, originally proposed by Taylor (1993), which has been the focus of a large amount of research over the past 25 years. The rule provides a useful benchmark for setting monetary policy and has been widely used to understand the behavior of central banks around the world. The Taylor Rule function in Bloomberg provides a nice facility for looking at alternative versions of the Taylor rule.

The basic equation of the Taylor rule is:

$$i_t = r_t^* + \pi_t + w_1 ygap_t + w_2(\pi_t - \pi^T), \quad (1)$$

where i_t is the central bank's nominal interest rate instrument (the federal funds rate in the United States) at time *t*, r_t^* is the equilibrium real interest rate at time *t*, π_t is an inflation measure at time *t*, $ygap_t$ is a measure of the output gap (or unemployment gap) at time *t*, and π^T is the inflation target. We explain how the rule can be backward-looking, if the inflation measure and output-gap measure are based on recent history, or forward-looking, if the inflation measure and output-gap measure are forecasts of the future. We discuss how a number of different variables can be used to measure inflation, including the GDP price index, the PCE price index, or the CPI. We then present to students how an alternative version of the model allows for inertia in changing the interest rate by including a lagged interest rate term on the right-hand side of the equation. The result is:

$$i_t = \rho i_{t-1} + (1-\rho)[r_t^* + \pi_t + w_1 ygap_t + w_2(\pi_t - \pi^T)], \quad (2)$$

In this equation, ρ determines the degree of inertia in setting monetary policy. In equation (1), ρ is implicitly equal to zero, so there is no inertia.

Using Bloomberg, students can set most of the parameters of the Taylor rule for the United States and then compare the implied rate to the actual federal funds rate over time. Figure 13 shows the Taylor rule setup in Bloomberg. Students can set ρ, r_t^*, w_1, w_2, π^T, and the variables used to measure inflation and the output gap. Bloomberg then plots the actual federal funds rate against the rate that would have been set using the rule. At this point, we ask students to discuss and explain the choice of particular parameters of the Taylor rule. For example, what should the inflation target be? How much weight should be given to the output gap versus inflation in the rule? Should a lagged interest rate be included and how does that affect the degree to which policy changes in response to a shock? What are the arguments for having a lower equilibrium real federal funds rate in the rule in recent years compared to the past? What is the most desirable inflation rate to use in the model? How much faith do you have in measures of potential output used in calculating the output gap? Asking these questions will get students to think critically about the Taylor rule and the practical difficulties of monetary policy—another example of how we can close the gap between the theory and practice. *Learning objective covered: 5c.*

[Insert figure 13 about here]

FINANCIAL MARKETS

A unique advantage of Bloomberg is in its coverage of financial markets, which is especially helpful in covering the short-run responses of financial markets to shocks. Bloomberg has a very complete set of coverage of financial instruments, allowing a student to dig much deeper into financial market outcomes than when using alternative data platforms.

On Bloomberg, it is easy to see what exchange rates are of one currency against others, in real time, with a simple command.[17] A student also can find forward exchange rates as well as the exchange rates of countries whose currencies trade less frequently than the USD, Euro, Yen, etc.

Bloomberg also provides very deep coverage of government and corporate bonds, showing prices and yields of all tradable securities. The main Treasury securities screen of Bloomberg can be found by typing the command PX1, which shows the details (coupon, term, bid and ask price, and yield to maturity) of the most active Treasury securities from 1-month to 30-year instruments, all in real time, including Treasury Inflation Indexed Securities. We utilize this very useful function of Bloomberg to teach students about the bond market, pricing, and calculations of a bond's yield to maturity and other measures, such as duration and convexity. Through this exercise and thanks to the real-time nature of the data, students can look at the same numbers that professional market participants use to make their trading decisions. This is yet another example of how we make their learning experiential without having to bring them to the floor of one of the exchanges.

One of the best applications of this screen is illustrated in an example in which we ask students to work together using the Treasury "most active" data (the PX1 page on Bloomberg, shown in figure 14). We ask them to derive the yield curve and show how the yield curve has changed over time. For example, figure 15 shows the yield curve on four different dates from May to October 2013, which illustrates how the yields on bonds with different times to maturity changed over time as the Fed began to discuss tapering of its asset purchases. As the market began to realize that tapering was more and more likely, yields on longer-term bonds increased substantially. *Learning objective covered: 1d.*

[Insert figures 14 and 15 about here]

CASE STUDY: GOVERNMENT SHUTDOWN IN OCTOBER 2013

An informative case study using Bloomberg comes from analyzing the partial U.S. government shutdown in early October 2013. Political wrangling over the government budget reached an impasse and the government could not legally spend any additional funds on a large number of its operations. The shutdown had a strong impact on financial markets, which can be seen in a number of data series available on Bloomberg.

When the shutdown began, the likelihood that the government might default on its debt payments, though still remote, became larger. As a result, interest rates on Treasury securities rose.[18] Interest rates hit a peak on October 16, when it appeared unlikely that a political solution was possible. The surprise political agreement that was proposed later that day caused the interest rate to return to its more normal level by October 18.

During the week of October 14, when the government shutdown finally ended, the movements of various markets illustrate the impact of news on financial markets. On October 15 and 16, as the shutdown seemed to be continuing, interest rates on 10-year and 30-year Treasury bonds rose. But on October 16, when Congress finally reached an agreement, interest rates declined sharply and continued to decline for the next few days, as details about the plan were disseminated, suggesting a greatly reduced probability that the U.S. government would default on its debt. Volatility in financial markets is measured by an index commonly known as VIX (Volatility Index), which shows the amount of volatility implied by the prices of option contracts on the S&P 500 index. A higher measure of volatility suggests that investors are less certain about the future value of stock prices than normal. Bloomberg allows us to view the VIX over the period of the government shutdown to see how the shutdown affected investors' expectations about future stock prices.[19] The shutdown led to a substantial increase in uncertainty, reaching a peak on

October 9 when the political rhetoric made a long shutdown seem likely. But as the probability of an agreement increased, the VIX declined, dropping sharply on October 16 when the government ended the shutdown. On the days that the shutdown was finally ended, volatility dropped very sharply.[20] Again, when students observe this on their own, it puts them in the driver's seat, giving them a similar experience to that of the traders on the floor of different exchanges. *Learning objective covered: 1b.*

SUMMARY AND CONCLUSIONS

In addition to the issues we have discussed in this article, there are a number of additional advantages to using Bloomberg.

1. Bloomberg's ECST function gives the instructor access to the most recent, as well as historical, Bloomberg data and analytics for countries around the world, including Africa, Asia Pacific, Eastern Europe, Latin America and the Caribbean, and the Middle East.
2. Through Bloomberg's "Track" feature, one can easily pick points of significance in any chart.
3. Using Bloomberg's "News" feature, one can move the cursor to any point of interest in a chart and click on it to get news at that point in time.
4. Any part of a chart can be expanded to show more incremental changes. This option is really useful when looking at long-range data.
5. Clickable points in tables and graphs give the user many additional layers of functionality and analytics, making the data more dynamic and interactive.

Our goal in this article is to introduce instructors to the use of Bloomberg for courses in macroeconomics and monetary policy. Bloomberg can be used for many purposes, some of which

we have illustrated here. We find Bloomberg particularly useful for analyzing the impact of monetary policy on financial markets, studying particular sectors of the economy, examining the Taylor rule and its implications, looking at the details of numerous financial variables, and doing case studies of economic events. In addition, having read over 30 years of more academically and practically coherent students' essays, papers and research projects, we can attest that using Bloomberg has been successful for us to bridge the gap between theory and practice for our students. Furthermore, through our own collective observations and experience, we believe that students gain a deeper understanding of economic concepts and those who become fluent in using Bloomberg may find more doors open to them when they seek employment. Consequently, even if the start-up costs to instructors are not trivial, the benefits to their students may be substantial. Of course, it would be ideal if we could provide an empirical analysis of our claim, which is the subject of a later project that we are currently working on. However, our goal in this article was not to show the empirical significance of our approach, but rather to share with our colleagues how we have been able to bridge the gap between theory and practice in our classrooms.

NOTES

[1] The FRED database is available at https://fred.stlouisfed.org/.

[2] See links on the St. Louis Fed Web site pages https://www.stlouisfed.org/education/tools-for-teaching-with-fred and links to the Web pages of Starting Point at https://www.stlouisfed.org/education/starting-point-teaching-and-learning-economics-teaching-with-fred.

[3] S&P 500 and other market indexes are available in real-time and on a tick-by-tick basis and in different formats.

[4] Of course, the number of data series in both Bloomberg and FRED is constantly changing over time. Our descriptions in this article are based on the data that were available at the time the article was finalized in August 2018.

[5] The fixed assets data do actually exist in FRED but with a much (years) longer time lag than in Bloomberg.

[6] See Appendix Figure A.1 for yield curves in October 2017 for the U.S., Germany, U.K., France, and Italy at digitallab.stonehill.edu/digitalcommons/croushore-kazemi-teachingmacroandmonetarypolicy.pdf.

[7] See Kazemi (2015, 79).

[8] Incidentally, we must confess that one of us has an embedded video clip of Chubby Checker's "The Twist" that we play in class! You can guess what happens from there on for the next few minutes in class as almost all of them recognize the tune.

[9] See Appendix Figure A.2 for a graph of this at digitallab.stonehill.edu/digitalcommons/croushore-kazemi-teachingmacroandmonetarypolicy.pdf.

[10] See Appendix Figure A.3 for a graph of this at digitallab.stonehill.edu/digitalcommons/croushore-kazemi-teachingmacroandmonetarypolicy.pdf.

[11] Federal Open Market Committee press release, Board of Governors of the Federal Reserve System, May 2, 2018, https://www.federalreserve.gov/monetarypolicy/files/monetary20180502a1.pdf

[12] For an example of how to use such assignments in an economics capstone course, see Croushore (2015).

[13] See Appendix Figure A.4 for an example at digitallab.stonehill.edu/digitalcommons/croushore-kazemi-teachingmacroandmonetarypolicy.pdf.

[14] It should be noted that an instructor could show this by typing one simple command (SPCS20) in Bloomberg. Appendix figure A.5 shows one such measure, the S&P/Case- Shiller 20-city home price index. You can easily change the date range of the graph by replacing the beginning and ending dates of the chart on the top left of it with the desired range. See Appendix Figure A.5 at digitallab.stonehill.edu/digitalcommons/croushore-kazemi-teachingmacroandmonetarypolicy.pdf.

[15] See Appendix Figure A.6 for the data on this variable from 2003 to 2018 at digitallab.stonehill.edu/digitalcommons/croushore-kazemi-teachingmacroandmonetarypolicy.pdf. In the depths of the recession, the economy lost as many as 800,000 jobs per month for six consecutive months. In the recovery, payrolls increased by 100,000 to 200,000 net new jobs per month in most months from 2011 to 2018.

[16] See Appendix Figure A.7 at digitallab.stonehill.edu/digitalcommons/croushore-kazemi-teachingmacroandmonetarypolicy.pdf.

[17] See Appendix Figure A.8 at digitallab.stonehill.edu/digitalcommons/croushore-kazemi-teachingmacroandmonetarypolicy.pdf.

[18] See Appendix Figure A.9 at digitallab.stonehill.edu/digitalcommons/croushore-kazemi-teachingmacroandmonetarypolicy.pdf.

[19] See Appendix Figure A.10 for the VIX from September 9, 2013, to October 18, 2013, at digitallab.stonehill.edu/digitalcommons/croushore-kazemi-teachingmacroandmonetarypolicy.pdf.

[20] See Appendix Figure A.11 at digitallab.stonehill.edu/digitalcommons/croushore-kazemi-teachingmacroandmonetarypolicy.pdf.

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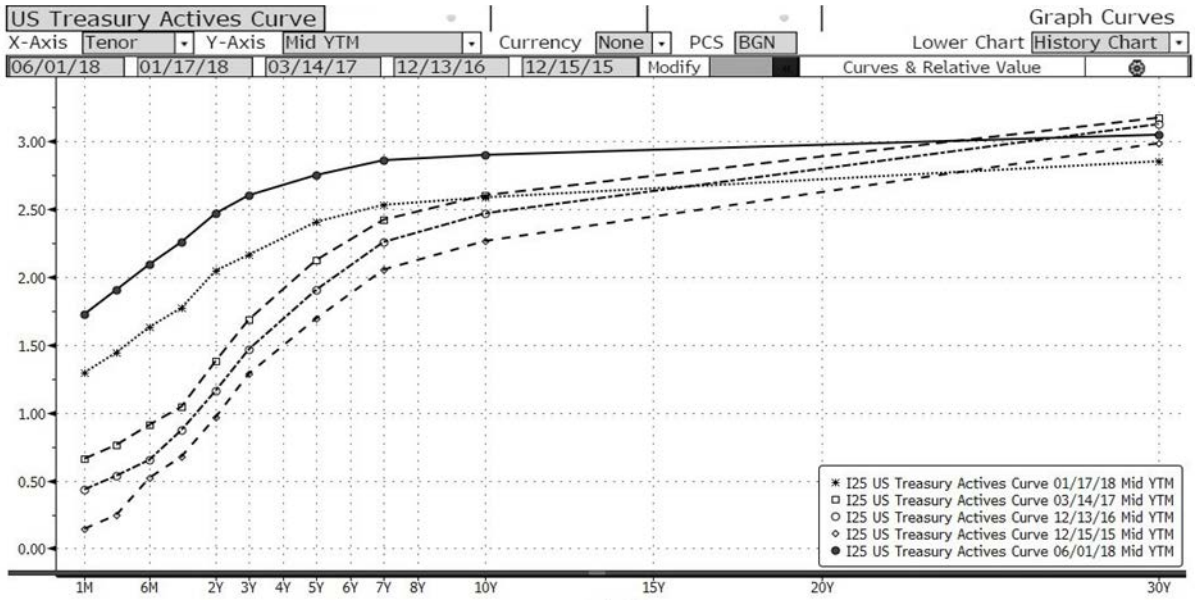
Note: The graph shows the spreads between interest rates on U.S. government Treasury bonds of different maturities on October 24, 2017.

FIGURE 1: Yield Spreads Narrow Past 10 Year Lows (as of 10/24/2017)

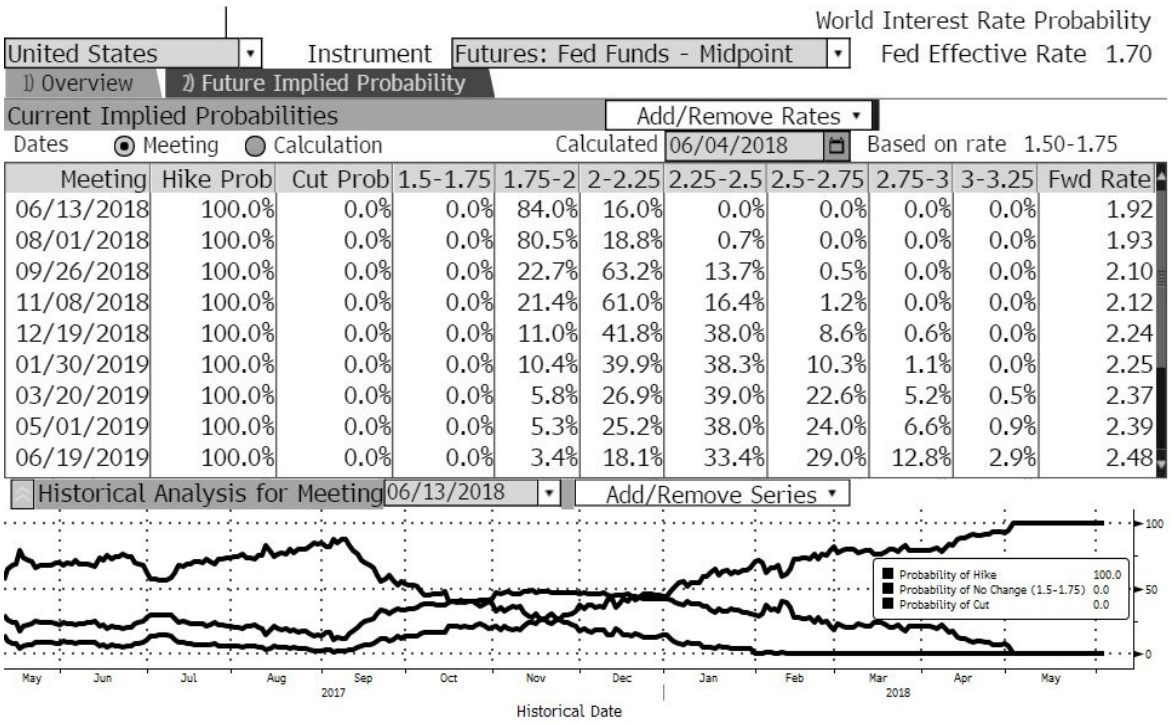
To get this chart on Bloomberg: type USYC2Y3Y, then press the function key <F10> on your Bloomberg keyboard. Type COMP and then hit the <GO> key on Bloomberg, which is the same as the "Return key," and then select the desired currency that you would like to base your calculations in—here the U.S. dollar (USD). These steps will get you the spread between the 2-year and 3-year Treasury notes. Then click on the next line and follow the same commands to get the spread between the 2-year and 5-year note all the way to 2-year and 30-year spread—all based in USD as follows: Type USYC2Y5Y <F10>, press tab and select USD in the next field. Type USYC2Y7Y <F10>, press tab and select USD in the next field. Type USYC2Y10Y <F10>, press tab and select USD in the next field. Type USYC2Y30Y <F10>, press tab and select USD in the next field.



Note: The graph shows the yield curve at different points in time from December 2015 to June 2018.

FIGURE 2: Yield Curve Flattening Since the Fed Began Raising Rates

To get this chart on Bloomberg: type GC and press the <GO> key. In the top left tab type in I25 (for US Treasury actives) and press <GO>. This will give you the yield curve for the U.S. in real-time. To compare this with the yield curve for the U.S. for any different dates, hit the tab "Modify" or simply use the date tabs and enter the desired dates in MM/DD/YY format.



Meeting	Hike Prob	Cut Prob	1.5-1.75	1.75-2	2-2.25	2.25-2.5	2.5-2.75	2.75-3	3-3.25	Fwd Rate
06/13/2018	100.0%	0.0%	0.0%	84.0%	16.0%	0.0%	0.0%	0.0%	0.0%	1.92
08/01/2018	100.0%	0.0%	0.0%	80.5%	18.8%	0.7%	0.0%	0.0%	0.0%	1.93
09/26/2018	100.0%	0.0%	0.0%	22.7%	63.2%	13.7%	0.5%	0.0%	0.0%	2.10
11/08/2018	100.0%	0.0%	0.0%	21.4%	61.0%	16.4%	1.2%	0.0%	0.0%	2.12
12/19/2018	100.0%	0.0%	0.0%	11.0%	41.8%	38.0%	8.6%	0.6%	0.0%	2.24
01/30/2019	100.0%	0.0%	0.0%	10.4%	39.9%	38.3%	10.3%	1.1%	0.0%	2.25
03/20/2019	100.0%	0.0%	0.0%	5.8%	26.9%	39.0%	22.6%	5.2%	0.5%	2.37
05/01/2019	100.0%	0.0%	0.0%	5.3%	25.2%	38.0%	24.0%	6.6%	0.9%	2.39
06/19/2019	100.0%	0.0%	0.0%	3.4%	18.1%	33.4%	29.0%	12.8%	2.9%	2.48

Note: The graph shows the probability that the Federal Reserve will increase interest rates at various times from June 2018 to June 2019, as measured by the federal funds futures market.

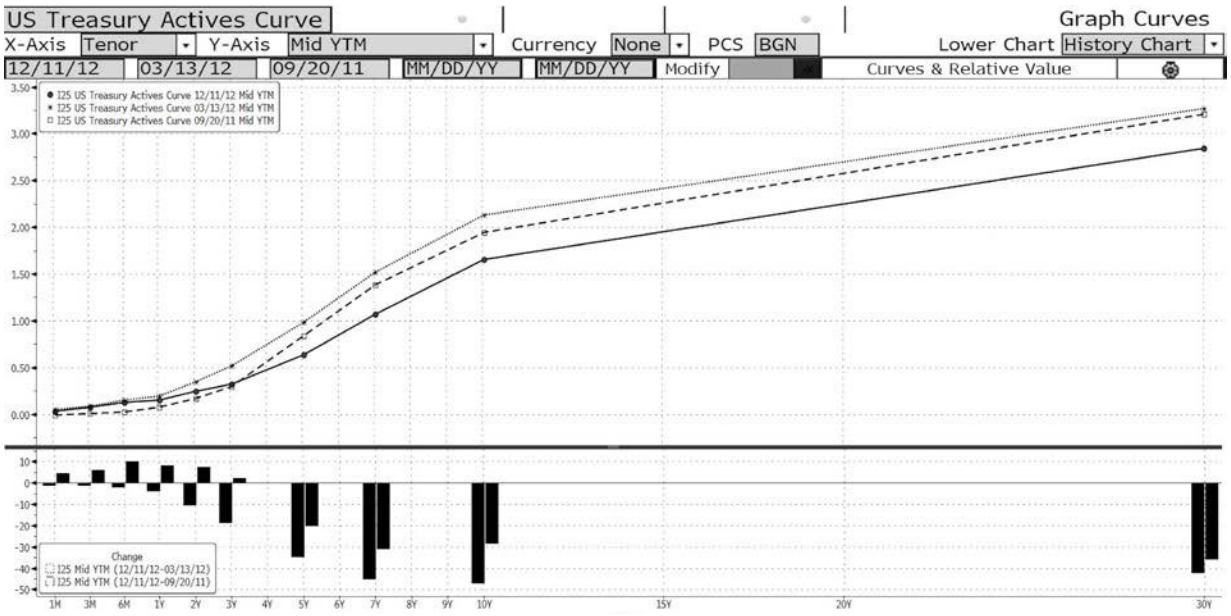
FIGURE 3: Probability of the Fed Interest Rate Hike in 2018 and 2019

To get this chart on Bloomberg: type WIRP and press <GO>.

Note: The graph shows the daily value of the Dow Jones Industrial Average during the period in which the Fed engaged in its first round of quantitative easing.

FIGURE 4: Dow and QE1: 11/25/2008 to 3/31/2010

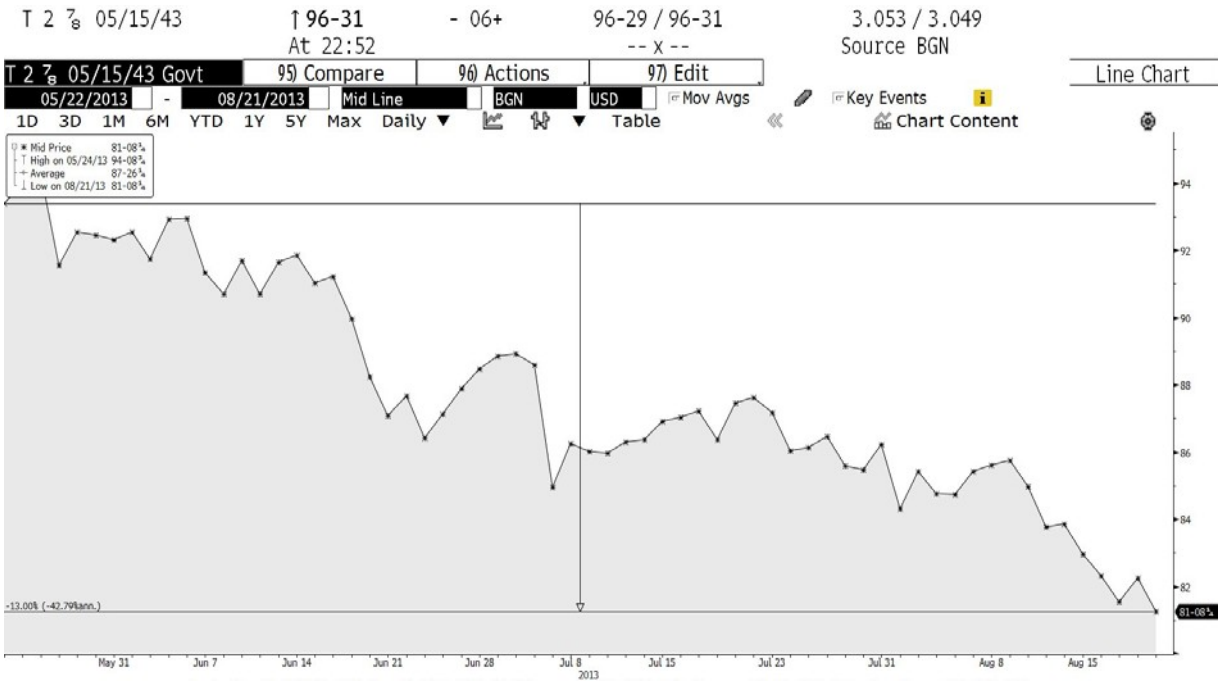
To get this chart on Bloomberg: type INDU and press the function key <F10>. Type GP and then hit the <GO> key. The default Bloomberg program will give you a six-month chart. You then could select the desired dates in the two tabs on the top left.



Note: The graph shows the yield curve on three different dates as the Fed engages in Operation Twist.

FIGURE 5: Yield Curve Changes as the Fed Engages in Operation Twist

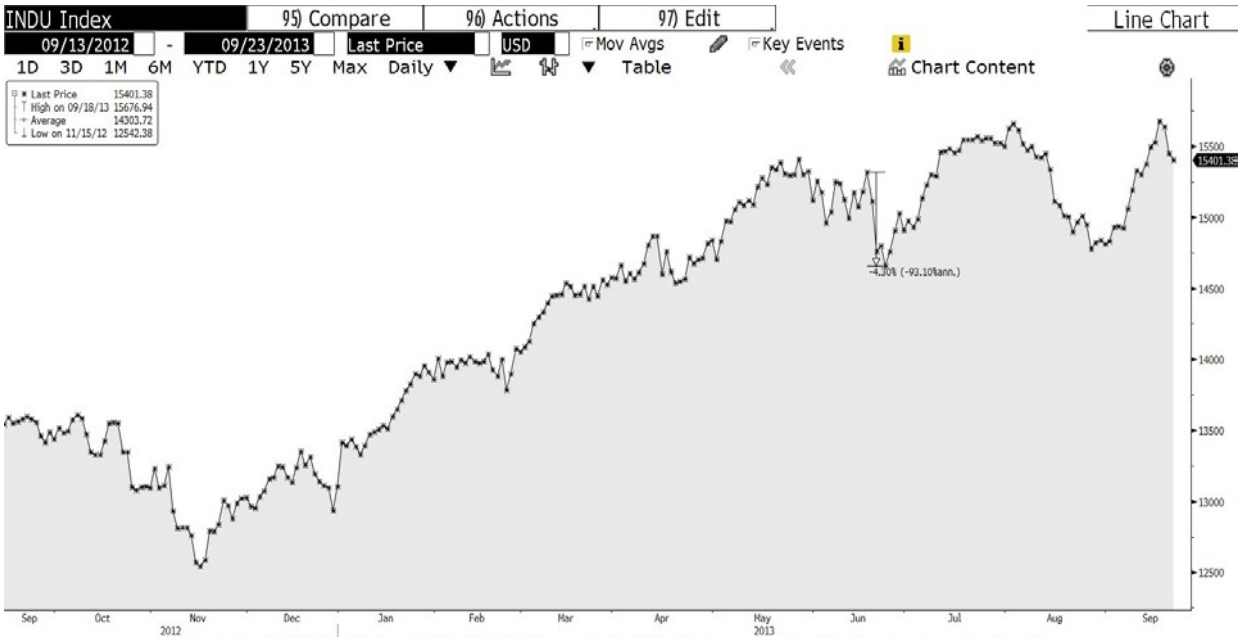
To get this chart on Bloomberg: type GC and press the <GO> key and follow the same steps as figure 2.



Note: From May 22, 2013, to August 21, 2013, the price of the 30-Year Treasury Bond that matures in May 15, 2043, and pays an interest rate of 2 7/8 percent, fell by 13 percent (an annualized rate of 43 percent), as investors expected that the Fed would soon begin to scale back its asset purchases, leading long-term interest rates to rise.

FIGURE 6: 30-Year Treasury Bond, 5/22/2013 to 8/21/2013

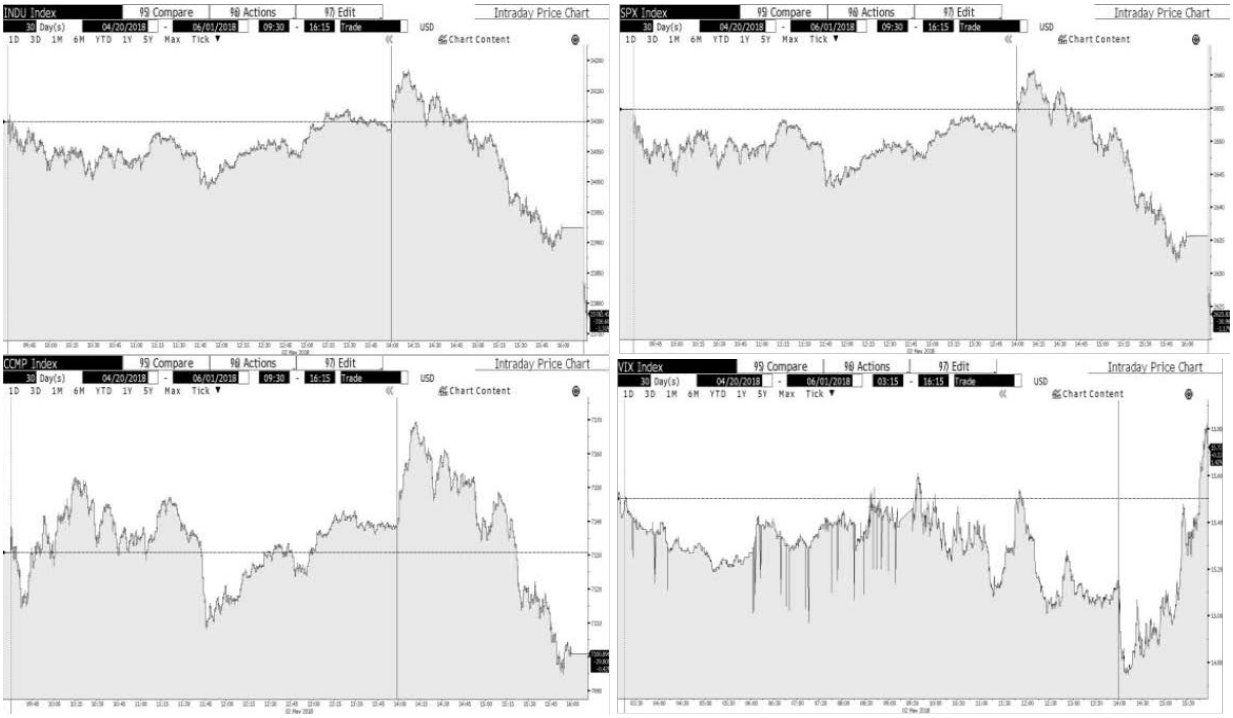
To get this chart on Bloomberg: type T 2 7/8 and 05/15/43. Then press function key <F2> and type GP and press <GO>. You then could enter the desired date range in the two tabs on the upper left side of the page.



Note: The Dow stock index fell after the Fed announced that it would begin to taper its asset purchases soon, following the June 2013 FOMC meeting.

FIGURE 7: Dow Responds to Tapering Announcement after June 2013 FOMC Meeting

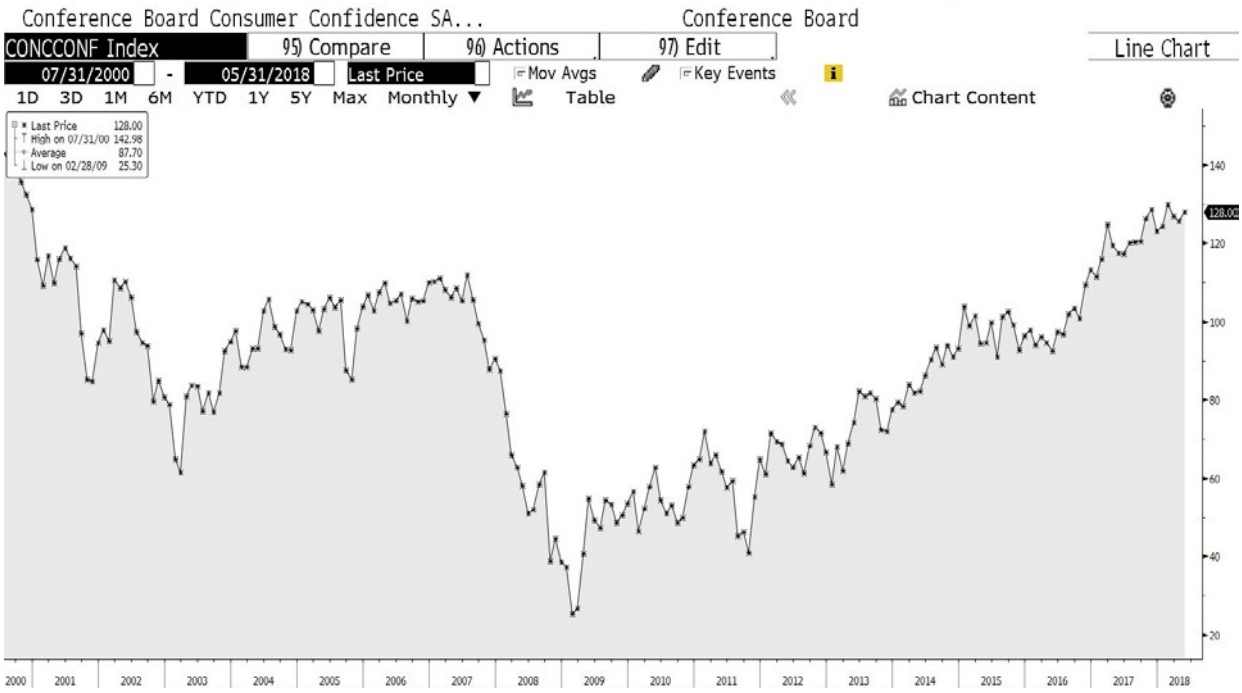
To get this chart on Bloomberg: type INDU then press the <GO> and enter the desired date range in the two tabs on the top left of the screen.



Note: This Bloomberg page can be viewed to see how the stock market reacts to an FOMC meeting. There is substantial market reaction, in this case, to the FOMC announcement at 2:00 pm after their meeting in May 2018. Stock prices declined in all three indexes (Dow, upper left; S&P500, upper right; NASDAQ, lower left) and the volatility index (VIX, lower right) increased.

FIGURE 8: FOMC Outcome on Major Market Indexes, May 2018

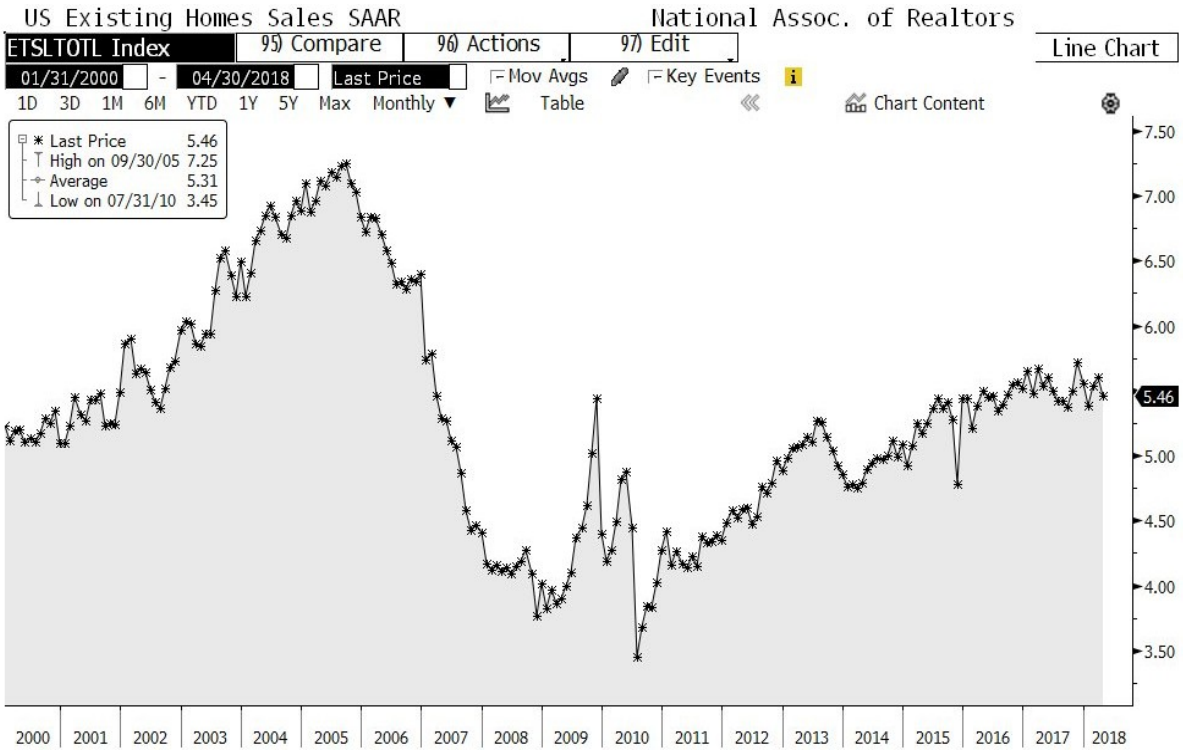
To get this chart on Bloomberg: You will need four separate sets of commands. From top left starting clock-wise type INDU then press <F10> function key followed with typing GIP then press <GO>. For S&P 500, the second chart on the top right, you will need to type SPX and press <F10> and type GIP and then <GO>. For the VIX, the 3rd chart on the bottom right, you will need to type VIX then press <F10> and then type GIP, and press <GO>. Finally, the NASDAQ market chart at the bottom left can be obtained by typing CCMP followed by <F10>. You will then need to type GIP and press <GO>.



Note: Consumer confidence plummeted during the financial crisis, then increased in fits and starts from 2009 to May 2018. It was at 128.00 in May 2018, which is lower than its high of 142.98 set in July 2000.

FIGURE 9: Consumer Confidence, Conference Board, 2000 to 2018

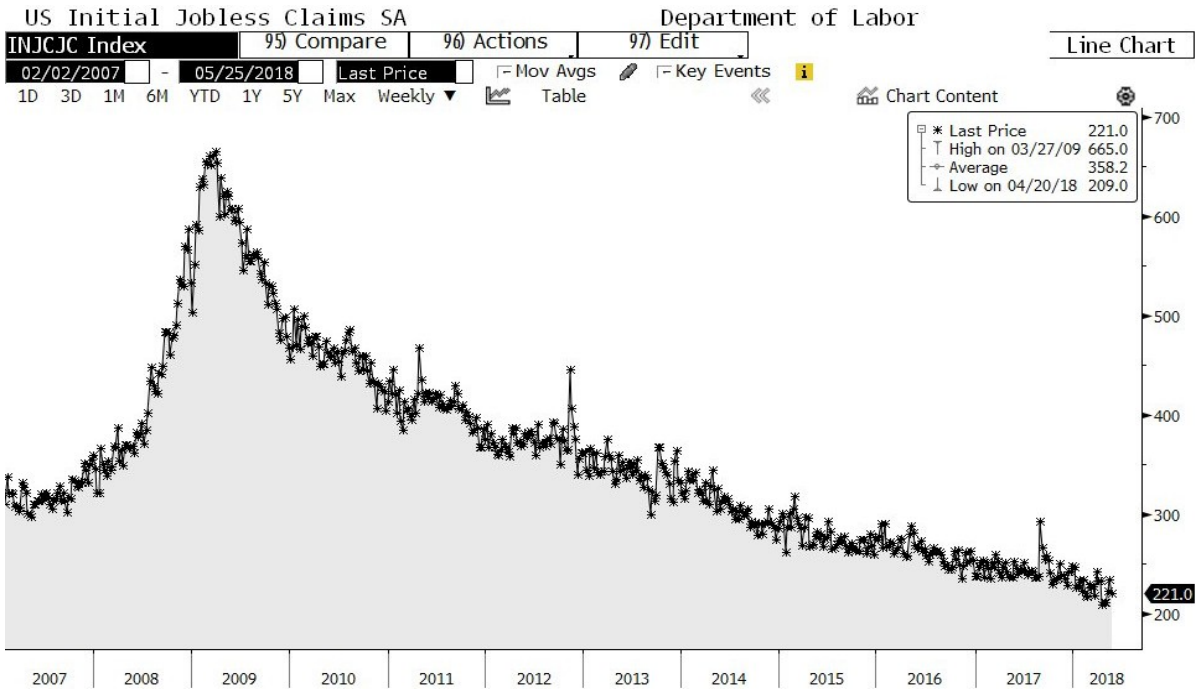
To get this chart on Bloomberg: type CONCCONF and press the function key <F10>. Then type GP and press <GO>. The Bloomberg default for this chart gives you the past six years. To look at a different period, just type in the desired beginning and ending of the period in MM/DD/YYYY format.



Note: Sales of existing homes peaked in 2005, dropped slightly in early 2006, then began plummeting in late 2006 and 2007, leading to the financial crisis. As of May 2018, it has recouped only about half of its loss since that time.

FIGURE 10: Existing Home Sales, 2000 to 2018

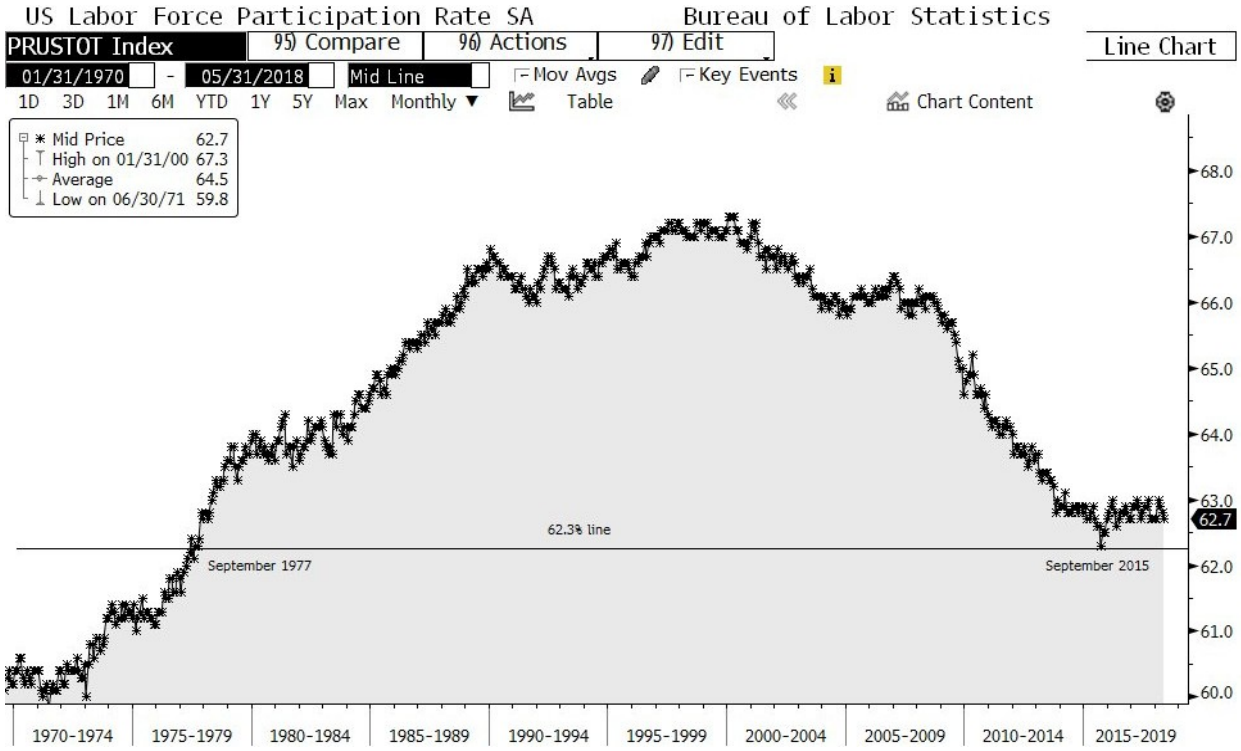
To get this chart on Bloomberg: type ETSLTOTL and press function key <F10> and type GP and press <GO>. At that point, you could type in the desired date range in the two upper left-hand tabs in the chart.



Note: The graph shows the number of initial jobless claims for unemployment insurance benefits from 2007 to 2018, showing the sharp run-up in claims in the recession and the slow decline in the recovery.

FIGURE 11: Initial Claims for Unemployment Benefits, 2007 to 2018

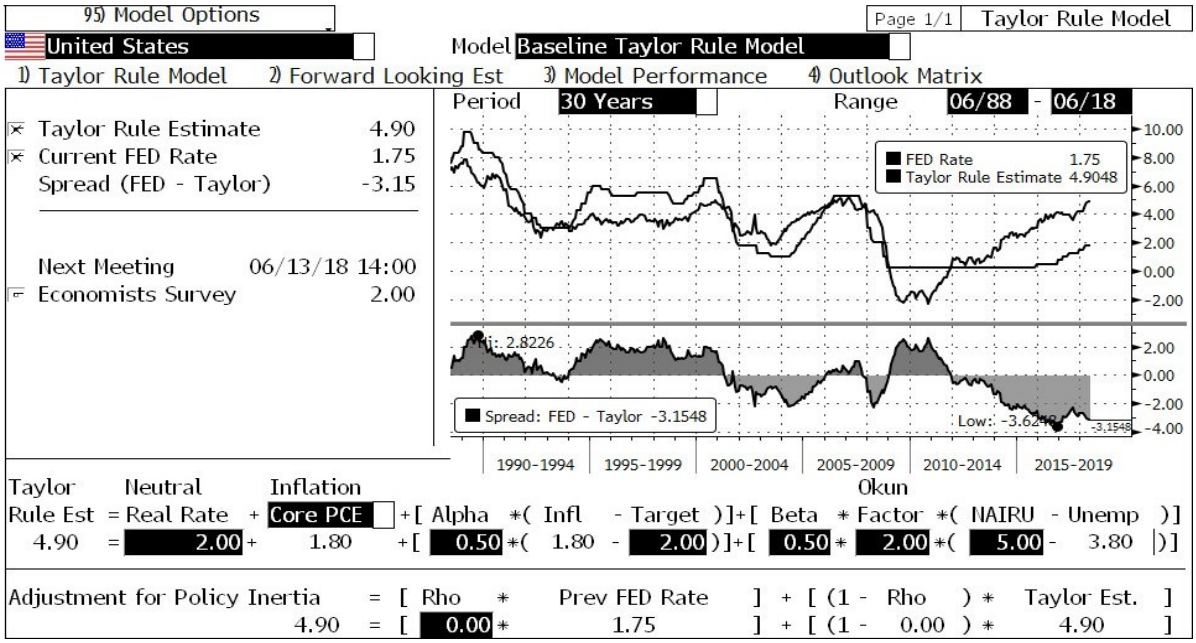
To get this chart on Bloomberg: type INJCJC and press <F10> function key. Type GP and press the <GO> key. The default Bloomberg chart for this series is one year. You could type in the desired range of dates in the two upper left-hand tabs in the screen.



Note: The graph shows the sharp decline in the participation rate that began in 2008, and shows that it bottomed out in September 2015.

FIGURE 12: Labor Force Participation Rate, 1970 to 2018

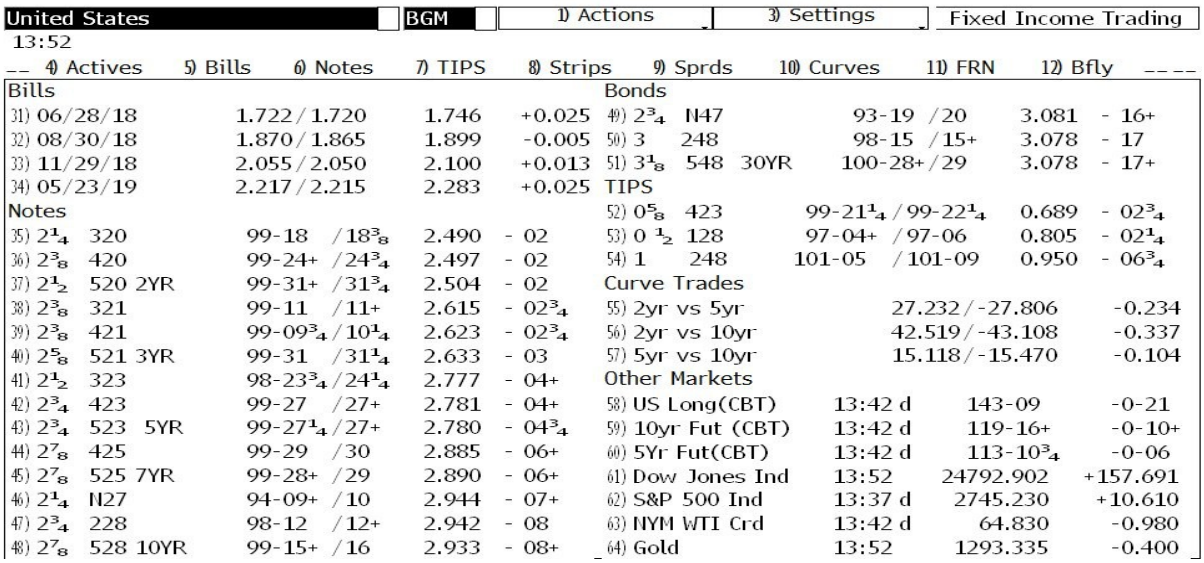
To get this chart on Bloomberg: type PRUSTOT and press <F10> function key. Follow by typing GP and press <GO>. Enter the desired range of dates in the two top left-hand tabs.



Note: The graph shows the baseline Taylor Rule from June 1988 to June 2018 with the actual components used to calculate the rate in the formula in the lower portion of the figure.

FIGURE 13: Taylor Rule, June 1988 to June 2018

To get this chart on Bloomberg: type TAYL and press <GO>. To estimate the Taylor Rule under different scenarios, just enter the values in the desired field/s.



Note: The table shows a list of actively traded securities on the market, their prices, and their yields.

FIGURE 14: Treasury Securities Screen

To get this chart on Bloomberg: type PX1 and press <GO>.

Note: The graph shows the yield curve on four different dates as the Fed began to consider tapering asset purchases.

FIGURE 15: Yield Curve Changes as the Fed Discusses Tapering

To get this chart on Bloomberg: type GC and press the <GO> key and follow the same steps as Figure 2.