

# NBER Reporter

NATIONAL BUREAU OF ECONOMIC RESEARCH

Reporter OnLine at: [www.nber.org/reporter](http://www.nber.org/reporter)

2009 Number 3

## The Martin Feldstein Lecture\*



John B. Taylor

### Empirically Evaluating Economic Policy in Real Time

John B. Taylor

To honor Martin Feldstein's distinguished leadership and extraordinary contributions to the National Bureau of Economic Research, the Feldstein Lecture addresses an important question in applied economics, with an application to economic policy. In this inaugural lecture I consider macroeconomic policy during the financial crisis.

It is useful to divide the financial crisis into four phases: 1) the "root cause" period from 2003 to 2006; 2) the period from the flare-up in August 2007 to the panic in September 2008; 3) the panic period in September-October 2008; and 4) the post-panic period. Here I look at the fourth phase and focus on monetary policy.<sup>1</sup>

I emphasize *real time* policy evaluation because the crisis is ongoing and because the research is quite different from many existing monetary policy evaluations that examine policy over decades.<sup>2</sup> The financial crisis has made real time evaluation essential because of the rapid changes in events and policy. In addition to loads of new data and policies, real time evaluation must address new methodological questions about the use of high frequency data and simulation techniques.<sup>3</sup> Because of blogs, the 24-hour news cycle, and the rapid spread of ideas, the need for real time policy evaluation is here to stay.

To evaluate monetary policy during this period I develop a specific quantitative framework in which I compare actual policy with certain counterfactual policies. It is not enough to say that policy is good or

\* This is a written and abbreviated version with a few selected charts from the Martin Feldstein Lecture given on July 10, 2009. Additional charts and a video of the full lecture can be accessed at [http://www.nber.org/feldstein\\_lecture/feldsteinlecture\\_2009.html](http://www.nber.org/feldstein_lecture/feldsteinlecture_2009.html)

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#### IN THIS ISSUE

The Martin Feldstein Lecture	1
Research Summaries	
Search Technologies & Retail Competition	5
Measuring Tariff Evasion and Smuggling	8
How Labor Institutions Influence... Markets	11
Dynamic Measures of Inflation	13
NBER Profiles	16
Conferences	18
NBER News	22
Program and Working Group Meetings	23
Bureau Books	26

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bad in the abstract; you need to say “compared to what” and be able to measure the differences. Such a framework requires that one characterize actual policy and then choose an appropriate counterfactual policy. Both are difficult tasks and there are alternative ways to go about them. What is most important, in my view, is the quantitative framework that different researchers can use in different ways.

## Actual Monetary Policy since the Panic of 2008

First consider actual policy. In early September 2008, the Fed's target for the federal funds rate target was 2 percent. Starting during the week of September 17, 2008, bank reserves and the monetary base rose sharply, as shown in Figure 1, above levels required to keep the federal funds rate on target.

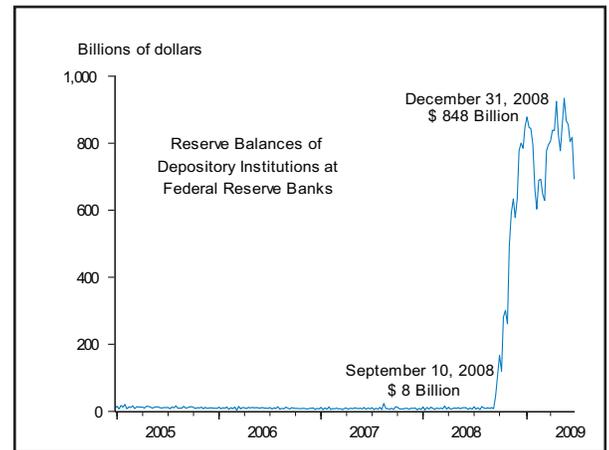


Figure 1. The Sharp Increase in Reserves under Actual Monetary Policy

Why did reserves increase so much? The Fed created them to finance loans and purchase securities. Some have argued that they were increased to accommodate a shift in money demand, or a decline in velocity, but the drop in interest rates suggests otherwise. Reserves continued to increase through the end of 2008 and have remained elevated since then as the Fed has financed its purchase of mortgage backed securities (MBS) and long-term Treasury securities, made loans to banks through the Term Auction Facility (TAF), and to foreign central banks, to AIG, and so on. The large level of reserves has raised questions about how and when the Fed will exit from it.

Note that this quantitative easing began *before* the funds rate hit zero. Indeed, the increase in

reserves eventually drove the interest rate to zero, which the Federal Open Market Committee (FOMC) then ratified. To see this, consider the timing of FOMC decisions. On October 8 the FOMC voted to cut the funds rate to 1.5 percent from 2 percent, but for the two weeks ending October 8, the funds rate was already well below 2 percent, averaging 1.45 percent. On October 29 the FOMC voted to cut the funds rate to 1 percent from 1.5 percent, but for the two weeks ending October 29, the funds rate was already well below 1.5 percent, averaging .76 percent. Then, on December 16, the FOMC voted to cut the funds rate to 0–.25 percent from 1 percent, but for the two weeks ending December 17, the rate was already in that range, averaging .14 percent. Thus, decisions to increase reserve balances, rather than the FOMC decisions about the target rate, drove down the funds rate.

### Choosing a Counterfactual Monetary Policy

What is a reasonable counterfactual monetary policy? Most simply it would be to continue setting interest rates without the increase in reserves. When the optimal interest rate (say through the Taylor rule) hit zero — or became slightly positive, in the range of 0 to .25 percent — the trading desk would keep reserve balances at a level consistent with that interest rate, the caveat being that the growth rate of the money supply must not fall. Such a counterfactual would avoid monetary policy episodes like the Great Depression in the United States or the Lost Decade in Japan, where money growth actually declined. Given the state of the economy, this counterfactual would have had an interest rate (according to the Taylor rule) that hit the lower bound (0 to .25 percent) and would not have been much different from the actual path of the federal funds rate.

Thus the counterfactual monetary policy would be different from the actual policy: the size of the expansion in reserves and the corresponding increase in loans and securities purchases by the central bank would be much smaller with the counterfactual. The path of the federal funds rate would be identical for both actual and counterfactual.

To make such a counterfactual operational, consider a specific policy in which three facilities — the MBS purchase program, the medium-term Treasury purchase program, and the TAF — had not gone into operation. That is, the counterfactual monetary policy consists of three sub-counterfactuals in which the Fed 1) would not have purchased up to \$500 billion MBS, 2) would not have purchased up to \$300 billion in longer-term Treasury securities, and 3) would not have made up to \$500 billion in TAF loans. The resulting path for reserves with this counterfactual is shown in Figure 2. Observe that the expansion of reserves is much smaller and more temporary compared to the actual policy shown in Figure 1. Indeed an exit strategy would already have been executed.

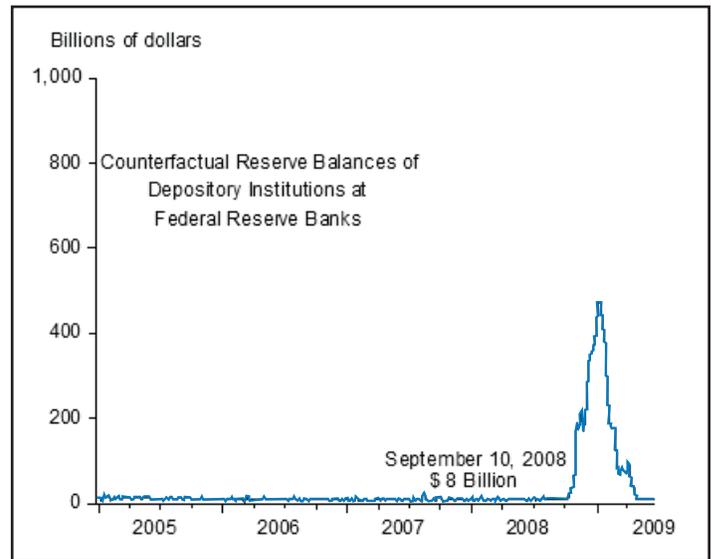


Figure 2. A Smaller, More Temporary Increase in Reserves under a Counterfactual Policy

Alternative counterfactuals could consider different facilities or different mixtures of facilities with larger or smaller impacts on reserves, including the case where reserves are held near their levels before the panic in September.

Because the path of the federal funds rate is identical in the actual and counterfactual policies, our evaluation can focus on the impact of the three sub-counterfactuals on other interest rates.

### The MBS Purchase Program

Many say that Fed purchases of MBS drove mortgage rates down, but what do the data show? Johannes Stroebel and I (2009) have been investigating the impact empirically. We regressed the spread between 30-year mortgages and 10-year Treasuries on purchases as a share of the total outstanding MBS plus a measure of risk in the MBS market.

The Fed purchases are of Fannie Mae or Freddie Mac guaranteed MBS, so assessing their risk before and after their conservatorship is necessary. CDS rates on Fannie and Freddie debt were a good measure of risk, but they ended with the federal takeover. As an alternative risk measure, we used the spread between Fannie and Freddie debt and 5-year Treasuries, which was highly correlated with CDS rates while they existed. Our regressions show no significant role for Fed purchases on the MBS spread once the risk measure is taken into account.

Figure 3, on the following page, summarizes the results. It shows the actual mortgage rate spread that had been rising since 2007 and then declined in late 2008 and 2009. Using our estimated regression equation, we simulated the counterfactual that there were no MBS purchases — this counterfactual is also illustrated in Figure 3.

Mortgage rates only would have been a few basis points higher. The major reduction in the spread can be attributed to changed perceptions of risk.

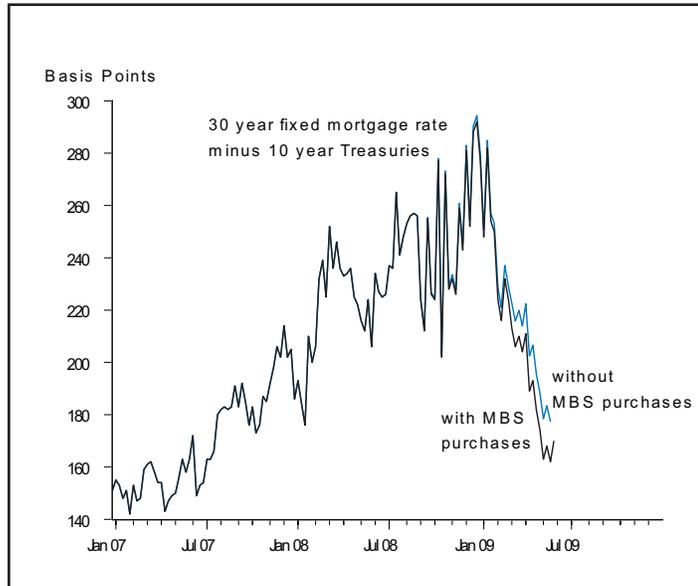


Figure 3. Mortgage Interest Rates: Actual and Counterfactual

### Purchases of Longer-Term Treasuries

Figure 4 next shows the interest rate on 10-year Treasuries along with purchases by the Fed.

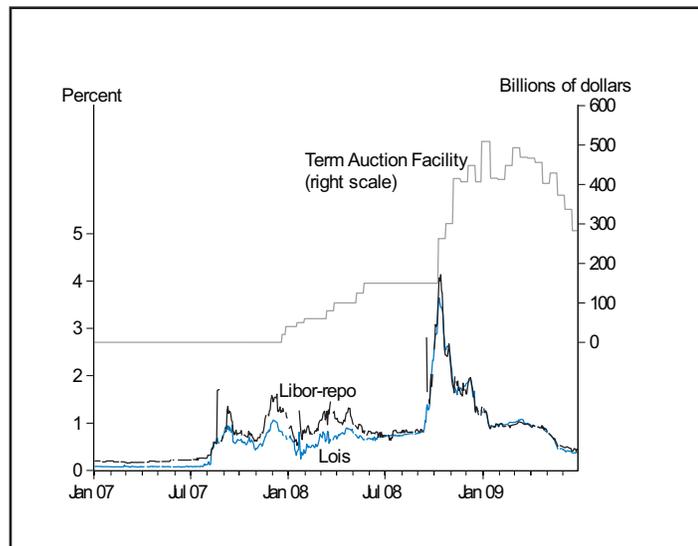


Figure 4. Libor-OIS (Lois) changes due counterparty risk (Libor-Repo) rather than TAF

Observe that the 10-year rate fell at the time of the announcement of the purchase program, but has mainly increased since then as the purchases have taken place. While other factors, such as an improved outlook for the economy or increased

concerns about inflation, may have driven up these rates, it is very difficult to find empirical evidence that the purchases lowered these longer term rates as intended.

### The Term Auction Facility

Evaluating the impact of TAF loans has been part of a research project that John Williams and I (2009) began early in the crisis. We looked at the impact of the TAF on the Libor-OIS<sup>4</sup> spread, a good measure of tension in the money markets and a focus of the facility. After controlling for counterparty risk using the spread between unsecured and secured interbank loans (Libor less the Repo rate), we found very little evidence that the TAF program has affected the spread.

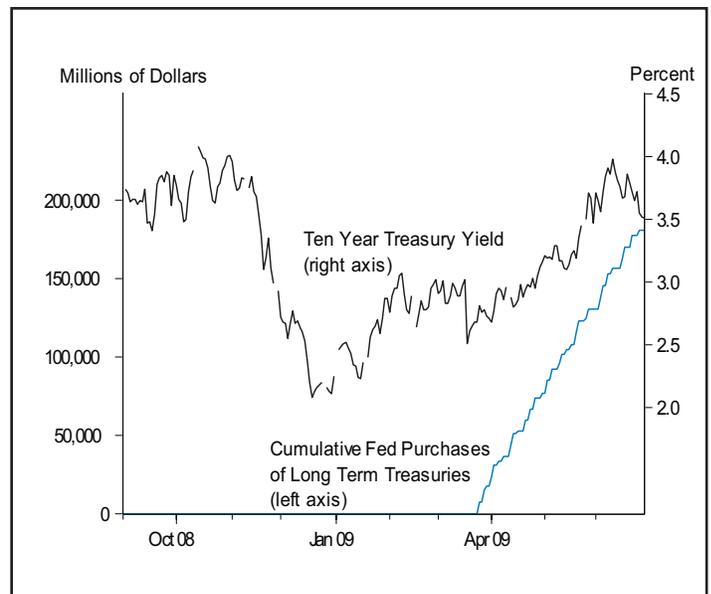


Figure 5. Treasury yields increased since start of purchase program

As shown in Figure 5, the Libor-OIS spread is highly correlated with the counterparty risk measure and there is very little impact of the TAF loans, also shown in Figure 5. According to this analysis, the path of Libor would have been essentially the same had the TAF not been activated. There may have been other benefits from the TAF, but in terms of this metric, which has long been mentioned as an appropriate one, there has been little impact.

### Conclusion

Milton Friedman and Anna Schwartz's classic NBER study empirically evaluating monetary policy during the Great Depression was not completed until thirty years after that contraction was over. An underlying theme of this lecture has been a call for NBER-style empirical research on economic policy during the current financial crisis, but now—in real time—not thirty years from now. While more difficult and inherently more preliminary than monetary research

done long after the fact, the findings can be both useful to policymakers and interesting to researchers.

I have tried to illustrate this theme by setting up a framework for evaluating monetary policy during the past few months. I found that three key interest rates—the interest rate on mortgages, the interest rate on medium-term Treasuries, and Libor—would essentially be no different had the counterfactual policy rather than the actual policy been followed. And with the counterfactual, the Fed would already have exited from its unprecedented actions. While the empirical results are preliminary, they are clear and consistent about the impact of policy on interest rates and the economy. Nevertheless, I would emphasize the particular empirical framework for monetary policy evaluation during this crisis as much as the empirical results.

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<sup>1</sup> See Taylor (2009) for an analysis of policy during of the first three phases and Cogan, Cwik, Taylor, and Wieland (2009) for an analysis of fiscal policy during the fourth phase.

<sup>2</sup> For example, Taylor (1979) evaluated monetary policy during 1953–75, Feldstein and Stock (1997) during 1959–92, and Bernanke (2004) during the pre- and post-1984 periods.

<sup>3</sup> See Svensson (2009) for a real time approach that adapts methodologies, such as the Taylor Curve, for use in the evaluation of Riksbank policy.

<sup>4</sup> OIS is the Overnight Index Swap which measures the market expectation of the average federal funds rate during the maturity of the corresponding Libor interbank loans.

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## Research Summaries

### Search Technologies and Retail Competition

Glenn Ellison\*

When the Internet first came into wide consumer use, one heard a lot about the promise of “frictionless commerce.” New search technologies would make it easy for consumers to find

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the exact product they wanted at the lowest possible price. Whether such a future comes to pass is obviously of great interest to consumers and online retailers. And, it may have dramatic effects on the traditional retail and media sectors. My recent research has included several projects that aim to improve our understanding of Internet search technologies and retail markets.

### Price Search and Obfuscation

The desire to better understand where search frictions come from and how they may evolve motivates my work with Sara Fisher Ellison on Pricewatch. Pricewatch is a specialty search engine serving consumers who want to buy computer parts (such as memory upgrades or video cards) at