Jackson Hole Economic Policy Symposium
August 22-24, 2019

Session: "What Does It Mean to be a Data-Dependent Central Banker?"
Paper: Athanasios Orphanides "Monetary Policy Strategy and its Communication"

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1. Introduction

Athanasios Orphanides' paper is a valuable contribution to central banking. It lays out clearly the challenges to monetary policy communication, it summarizes the recent history of efforts to improve communication, it highlights remaining challenges, and, most importantly, offers promising practical ways to overcome those challenges. Particularly outstanding is the Section 6 "proof of concept" part of the paper. In this section, Athanasios shows how simple policy rules based on real-time near-term projections of inflation and economic activity imply interest rate paths that are very close to the actual federal funds target from 2006 through the present. This similarity between the predicted and actual paths means that these easy-to-understand inputs and rules could have been used as a useful tool to communicate the Fed's strategy. I hope that other researchers will expand on Athanasios' "proof of concept" to study in more detail whether the simple rules would have worked well in other periods in the U.S. as well as in other countries.

To an outsider, the title of Athanasios' paper would seem to have little to do with the title of this session. In fact, they are intimately related. In the rest of my discussion, I will discuss how "data-dependence" and communication are linked.

I will begin by discussing the origin of the term "data-dependent" and my interpretation of the intended meaning. In fact, the term originated as a suggestion for an improvement in the communication of monetary policy strategy. Unfortunately, the term has often been misinterpreted. I will suggest that a better description of what is meant by the term is "*conditions*-dependent" policy. Athanasios' paper offers a practical way to communicate this type of policy effectively.

2. What does "data-dependent" mean?

I am an academic economist so I do not follow every new phrase of "Fed-speak" as closely as market participants do. I admit that my first encounter with the statement that "policy should be data-dependent" left me puzzled – it had as much meaning to me as someone saying that "cooking should be ingredient-dependent." I traced the history of the use of data dependence to a speech given by then-Philadelphia Fed President Charles Plosser in November 2012. In that speech, he criticized the "calendar-date" forward guidance that the FOMC had been using in its statements since August 2011. He noted that the Fed had progressively extended the horizon during which it would keep interest rates exceptionally low. He argued: "*Date*-based forward guidance is problematic. Instead, a systematic approach provides *data*-based forward guidance." (Plosser (2012), p. 7)

I interpret this statement as then-President Plosser trying to introduce in public-friendly words some key distinctions that academic economists have used for years: in particular, "time-dependent" rules versus "state-dependent" rules. Let me explain those terms with an example. A company that routinely changes its prices by two percent on January 1st of each year is following a *time*-dependent, or equivalently, a *calendar*-dependent, rule. In contrast, a company that changes its prices based on its inventory-sales ratio and other summaries of the state of supply and demand for its products is following a "*state*-dependent" rule. These indicators of market conditions summarize the relevant "state of the world" that the company needs to know to make a good decision on when and by how much it should change its prices. In the monetary policy context, current data about economic conditions and forecasts of the future path of the economy are elements of the relevant "state" of the economy.

The standard prescription from optimal control theory is that a rule should be state-dependent, not time-dependent. Then-President Plosser's further statement that (quote) "policy decisions should be made and explained in terms of economic conditions, not the calendar" makes this link between terms particularly clear. (Plosser (2012), p. 7) Similarly, in a 2013 talk at the UCSD Economics Roundtable, President John Williams stated "It's important for the public to recognize that monetary policy is not set on some fixed schedule, but rather is data-dependent." For reasons I will elaborate in a moment, I think the FOMC should have used the term "*conditions*-dependent" rather than "*data*-dependent" when substituting for the more technical term "state-dependent."

When the FOMC minutes in summer 2014 began to describe the timing of interest rate increases as "data dependent," some observers interpreted these statements as indicating that the Fed's decisions would be much more sensitive to the latest incoming data. Some observers set up two false extremes: an old "calendar-dependent" rule that supposedly ignored all incoming data and a "data-dependent" rule that was extremely sensitive to the latest data. Neither is correct. In fact, I interpret the "calendar-dependent" communications not as a time-dependent rule, but rather as an optimal state- or conditions-dependent rule *communicated to the public using Fed forecasts of the calendar time when conditions would be such that the conditions-dependent rule might suggest a rise in interest rates was warranted.* There was a great deal of uncertainty in the aftermath of the crisis, so forward guidance communication in the form of the usual conditions-dependent language might have been promptly met with the question: "but when will conditions merit a rise in interest rates?" The FOMC reduced this uncertainty by using its own forecasts of the first possible date that conditions might first dictate a lift-off from the zero lower bound.

3. Why It's Not Just a Matter of "Data"

In the monetary context, by "data" we typically mean the latest publicly available data on the economy, such as real GDP growth, inflation, job growth, and the unemployment rate. I will now argue that the connection between the publicly observable data on the one hand and policies on the other consists of a chain with many links, many of which are not directly observable to the public and the workings of some of which are nearly impossible to communicate clearly to the public.

Figure 1A shows the simple idealized path between data and monetary policy interest rates. If the path were that simple, communication would be simple. The truth, however, is much more complicated. Consider just one real world complication, shown in Figure 1B. The latest data release provides an imperfect glimpse even into the *current* state of the economy, much less the future path of the economy. Why? Because most government statistics must be revised as new data comes in. Those revisions can be sizeable. Consider what government data indicated about the drop in real GDP in the quarter after the fall Lehman brothers, 2008Q4. The first estimate, released in the first quarter of 2009, indicated a 3.8% drop real GDP at an annualized rate. The

second quarter estimate revised 2008Q4 drop to 6.3%. Several years later, the estimate of the actual drop finally stabilized around 8.4%, more than twice the original estimate.

Thus, policymakers are faced with uncertainty not only about the current state of the economy but also where it has been in the recent past and what the growth rate has been. To translate "data" into predicted actions, the public needs to know how much of the central bank's assessment of the current state of the economy and its near-term forecast is determined by new data on the first estimates of recent GDP, etc. and how much is determined by new revisions of past estimates of GDP.

But data revision is only one of many complications. Figure 2 shows a more realistic diagram of the filters through which data flows on its path to influencing policy. In the top row of circles, I have divided data into three categories: new data (e.g. the first estimate of last quarter's GDP), revised data (revised estimates of past GDP), and historical data (time series on GDP). None of these categories flows directly into monetary policy interest rates. Instead they flow through two key filters, econometric models, such as FRB US, and "Judgment." I have put econometric models in a clear rectangular box to indicate that this is something that is at least in principle easier to communicate to the public. In fact, the Fed posts the FRB US model's programs and data for the public to simulate. I have put the second filter, "Judgment," in a cloud shape to indicate that this important filter is nebulous and hence much harder to communicate to the public.

As the third row of elements in Figure 2 shows, the econometric model and judgment filters are used to convert the three data categories into assessments of the current state of the economy, forecasts of the future path of the economy, estimates of the "stars"- the natural real rate of interest, the natural rate of unemployment and potential GDP-, and estimates of the effects of monetary policy rates on the economy, all of which are key intermediate inputs into the policy rule. I have also used a cloud shape for the star variables, since these are unobservable concepts based on economic theory (though subjective estimates can be communicated to the public). These four elements feed into the policy rule, which then determines the monetary policy interest rate.

One cannot emphasize enough how much uncertainty there is in many links in this diagram. For example, my recent study of the effects of monetary policy on the GDP, unemployment, and prices suggests a wide range of estimates of not only the magnitude of the effect of a change in the federal funds rate but also the timing of the effect. Moreover, fundamental puzzles arise far too often and

the academic literature has not come up with fully satisfying answers. In fact, the reason why the "Judgment" cloud is so important is that the econometric model filter is "light years" away from churning out precise relationships such as $E = MC^2$. For example, Okun's Law is not a precise law at all, but a rule-of-thumb relationship based on unobservable inputs.

In sum, it is no wonder that the release of new data as well as statements by the FOMC can lead to erratic responses by financial markets. We live in an economic world where both policymakers and market participants must make do with rough approximations of how an ever-changing economy operates.

What is so exciting and promising about Athanasios' paper is that, despite the inherent uncertainty about models and estimates and all the sorts of things that worry academics, he has managed to find simple, but robust, rules that capture actual policy behavior very well. Incorporating these elements into communication can lead to significant improvements in the conduct of monetary policy.

4. Conclusion

In a world in which data are not subject to revisions and in which economic relationships are as stable and precise as physics relationships, central banker judgment might be replaced by artificial intelligence, in which case communication of monetary policy to the public would be easy. Until such a time (likely never), communication of monetary policy will remain challenging. Nonetheless, recent history teaches us that improvements can be made. Athanasios has offered a promising list of continued improvements.

References

Plosser, Charles (2012). "Good Intentions in the Short Term with Risky Consequences for the Long Term," Washington, DC, November 15.

Williams, John (2013). "Will Unconventional Policy be the New Normal*?" FRBSF Economic Letter*, 2013-29, October 7, 2013. Adapted from presentation to the UC San Diego Economics Roundtable on October 3, 2014.

Figure 1A. Idealized Path between Data and Policy

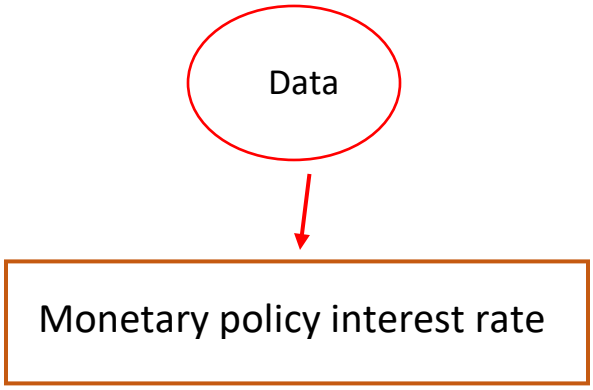

Figure 1B. Idealized Path between Data and Policy: One Complication

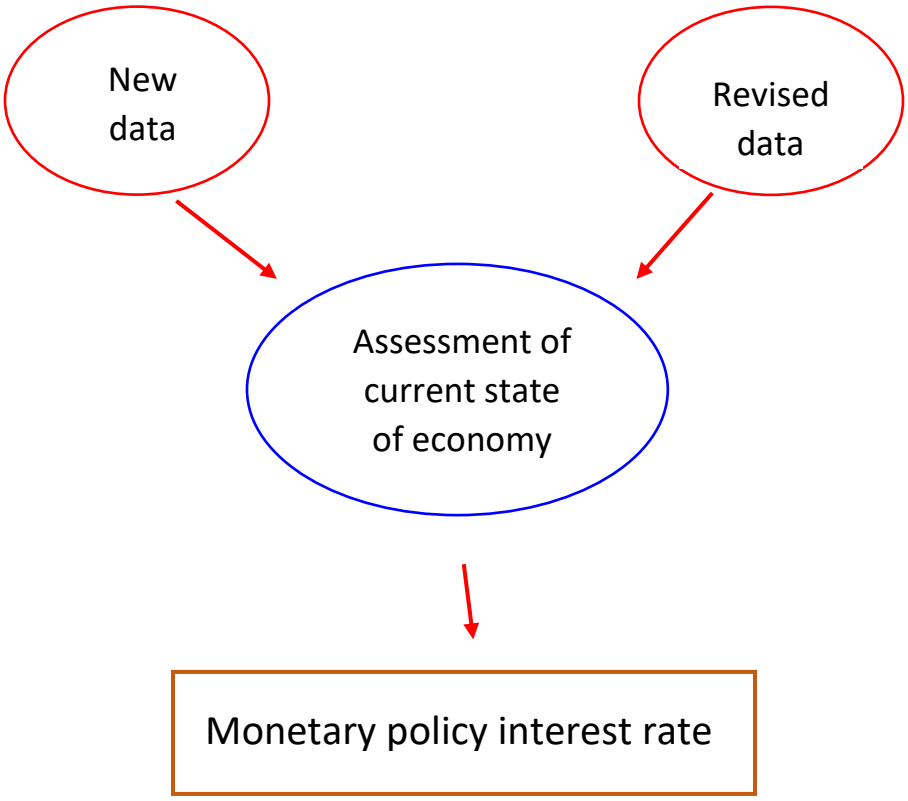

Figure 2. Actual Path between Data and Policy