Forward Guidance with Aggregate Uncertainty of Disaster Risk

Smriti Verma

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Extended Abstract

"Forward guidance" in monetary policy is communication by the Federal Open Market Committee (FOMC) about the future course of monetary policy, intended to steer expectations and achieve desirable macroeconomic outcomes in the present by committing credibly to keep interest rates low in the future, even when future circumstances would warrant a deviant policy action that could improve household welfare then as well as achieve better overall macroeconomic outcomes. The Federal Reserve in the United States has communicated its intentions regarding the likely duration of accommodative policy from the onset of the financial crisis, and all through the Great Recession, and the recovery therefrom, as a means to influence inflation expectations.

The literature on forward guidance has been driven by the "forward guidance puzzle" (Del Negro, Giannoni, and Patterson 2012) – estimated DSGE models, while successfully explained the effects of contemporaneous monetary policy actions on key macroeconomic variables, grossly exaggerated the effects of future policy announcements. The central bank's announcement of lower interest rates, eight quarters in the future, implied a massive stimulus, with the impact on both output and inflation several times larger than that implied by a same-sized contemporaneous drop in the policy rate (Del Negro et al 2013). Gurkaynak, Sack, Swanson (2005) measure the effects of a "future path of policy", closely associated with FOMC statements, on bond yields and stock prices, and find that both, monetary policy actions and statements have important but differing effects on asset prices, with FOMC statements having a much larger impact on longer-term Treasury yields. In a similar flavor, Campbell, Fisher, and Justiniano (2012), and Milani and Treadwell (2012) studied the impact of forward guidance shocks on the economy using small- or medium-scale DSGE models estimated on a pre-Great Recession sample, and both papers find that forward guidance shocks play a large role in explaining movements in the policy rate, and these contribute significantly to business cycle fluctuations.

Forward guidance can typically be classified as either Delphic or Odyssean using the terminology introduced by Campbell et al (2012), where Delphic forward guidance is an announcement regarding the FOMC's macroeconomic out-

look for the economy. On the other hand, forward guidance is Odyssean if the FOMC's announcements or statements reflect the future course of monetary policy, and intentions thereof, and bind them to the announced future courses of action.

Forward guidance, in its less evolved and more primitive form, can be traced back to as early as the FOMC's February meeting in 1994, when the FOMC began making terse policy announcements of anticipated accommodation or tightening of monetary markets in post-meeting statements, which by May 1999 transformed into more forward-looking statements indicating the committee's tilt toward one or another of its dual mandate of output and inflation performance. (Campbell et al 2017).

In order to achieve greater transparency in the conduct of monetary policy and to improve its predictability, the forward-looking scope of such statements kept increasing. During the Great Recession in 2008, the FOMC had cut federal funds rate to its effective lower bound in December 2008, and so forward guidance became the only tool available to provide monetary accommodations and hence transformed into more explicit communications of policy intentions, wherein the FOMC gave calendar-based indications of the likely course of future monetary policy and the federal funds rate.

However, such communication can be of value only when these are interpreted by the public as intended by the FOMC, and how the public forms inflation expectations or even the FOMC's outlook of the state of the macroeconomy, are factors that critically alter the efficacy of forward guidance as a tool of monetary policy. The FOMC introduced calendar-based forward guidance in August 2011, when it indicated its intentions to keep the exceptionally low federal funds rate in place, "at least through mid-2013" (Campbell et al 2017). The efficacy of forward guidance in bringing about the desired contemporaneous outcomes rests critically on the credibility of the monetary authority.

For forward guidance to have any effect on current aggregate demand, the public must believe that the central bank will remain is committed to maintaining low interest rates in the future, as promised now, and that it will not give in to the temptation of reneging on such commitment in responding to the then circumstances to achieve higher household welfare than would result from the promised path of interest rates. With the FOMC's introduction of calendar-based forward guidance in August 2011, while the commitment of the central bank was pronounced more clearly than before, it was fraught with the danger of misleading long term inflation expectations. The communication of the FOMC to keep rates low up to a certain indicated calendar-based time in the future could be interpreted by the public as the FOMC's outlook for the economy key macroeconomic aggregates and could destabilize long run inflation expectations which would have effects contradictory to the desired motive of communicating intentions for accommodative monetary policy. Campbell et al. (2012) assessed the impact of exogenous changes in monetary policy on private expectations and found the sign to be opposite to the predictions in theory so that accommodative monetary policy was associated with lower projections for inflation and activity. In view of these considerations, the FOMC replaced the

calendar-based language in the December 2012 statement and switched to announcing policy intentions that were tied to economic performance on inflation and real activity, and the state of the economy more generally.

Campbell et al. (2017) use a full information, rational expectations framework and find that FOMC forward guidance has mixed effects. The main goal of their study is to assess whether FOMC improved economic performance since the financial crisis using Odyssean forward guidance, and to quantify the impact of Odyssean FOMC forward guidance on macroeconomic outcomes since the financial crisis that unwound from 2007 to 2009. They find that puzzling responses of private-sector forecasts to FOMC announcements can be attributed entirely to Delphic forward guidance, even though a large fraction of the variability in Federal Funds Futures rates on days with FOMC announcement remained unexplained by their measure of FOMC private information. Interestingly, while their findings suggest that purely rule-based policy would have ameliorated the recession and kept inflation closer to target in the years immediately following the crisis, than FOMC forward guidance did in practice, the Fed's introduction of calendar-based Odyssean forward guidance starting toward the end of 2011 appeared to have boosted real activity and moved inflation closer to target.

A large chunk of the forward guidance literature has focused on resolving the forward guidance puzzle. The forward guidance puzzle - large contemporaneous effects as a result of a future policy announcement - arises from intertemporal substitution being the main channel of transmission of forward guidance into the real economy. As a result, departure from the complete markets, full-information rational expectations framework alleviates the forward guidance puzzle. The macroeconomic resolution of the puzzle comes from adding heterogeneity such as in Mckay, Nakamura, Steinsson (2016), Hagedorn et al. (2019), Acharya and Dogra (2020). McKay-Nakamura-Steinsson (2016) (MNS) show that forward guidance has substantially less power to stimulate the economy in the presence of uninsurable risk and borrowing constraints. It is not realistic to assume agents increase their consumption by the same amount in response to a future interest rate cut as they do to a current interest rate cut because of two reasons, borrowing constraints, and precautionary savings. People face some risk of hitting a borrowing limit which shortens their planning horizon, as interest rate changes that occur after they hit a borrowing constraint, are irrelevant to them. Presence of uninsurable income risks lead to precautionary savings, which temper households' responses to future interest rate shocks. As a result, power of forward guidance is substantially muted in the incomplete markets model compared to the standard complete-markets New Keynesian model.

Other departures from full information set ups and rational expectations include Chung, Herbst, and Kiley (2014), Carlstrom, Fuerst, and Paustian (2015), and Kiley (2016) which use sticky information models à la Mankiw and Reis (2002); Angeletos and Lian (2018) who relax the assumption of common knowledge; and other works that depart from rational expectations in the form of bounded rationality (Gabaix 2015), finite planning horizons (Woodford 2019), or by modeling the cognitive process of expectation formation and use the concept of reflective equilibrium (Garcia-Schmidt and Woodford 2019). Given how

critically the efficacy of forward guidance depends on the credibility of the central bank's commitment to announcements about future policy, several papers discuss imperfect credibility of the central bank to resolve the forward guidance puzzle (Bodenstein, Hebden, and Nunes 2012; Haberis, Harrison, and Waldron 2014; Campbell et al. 2019; Bernanke 2020).

Forward guidance has gained relevance as a means of conducting monetary policy, not only at the effective lower bound (ELB) as was the case during the Great Recession and recovery therefrom, when it was the only tool available to monetary authorities to lift the economy out of recession. In the increasing quest for increased transparency in monetary policy making, and greater predictability of the monetary authority's response to economic circumstances, forward guidance has become a standard and conventional tool of the Fed's regular conduct of monetary policy. In dealing with the challenges that face forward guidance, specifically perverse effects of calendar-based commitments on long-run inflation expectations, establishing the central bank's intent to commit to a future course of monetary policy, and the credibility of such commitment, have greatly impacted the evolution of the strategy that the central bank has used over the last two decades to communicate its intentions for future policy actions. The evolution in the Fed's communication strategy itself spurred academic interest in studying the effects of forward guidance on the real economy and assessing its role in manipulating inflation expectations formed by the public to achieve the desired outcomes regarding inflation targets and real activity in unfavorable times. Post the Great Recession of 2007-08, forward guidance has gained traction is policy discourse, beyond academic circles, and remains an area with many unexplored facets.

The literature on forward guidance has studied the effect of forward guidance "shocks" on contemporaneous aggregate demand and inflation, typically under the assumption of perfect foresight. Odyssean forward guidance by the Fed comprises indications on the duration for which the Fed intends to keep monetary policy accommodative, even if circumstances in the future would warrant and justify otherwise. However, the assumption of perfect foresight greatly simplifies the problem that the central bank faces before it makes such announcements because the likelihood of an aggregate shock or risk of such shock is assumed away with the assumption of perfect foresight. But forward guidance comes most in handy when the monetary authority finds its hands tied in the face of disaster risks, such as a lurking recession or upcoming periods of high inflation. The risk or presence of aggregate uncertainty, for example, the risk of a deep recession, or a deep recession itself, underscores the import of forward guidance. It is in such times when steering inflation expectations in a calculative manner can yield larger and more immediate outcomes than can actual changes in the federal funds rate. The point of forward guidance is to commit to a future path of policy and then stand by the policy avowed. But what should be the basis for such commitment, and what would guide the extent and duration of such policy indications, and how these commitments could vary when the economy faces the risk of a disaster, is what I am interested in studying in this paper.

To my knowledge, there is no body of work in the literature on forward

guidance that studies the basis for formulation of forward guidance and its effectiveness in the presence of aggregate risks and uncertainty. This would require doing away with perfect foresight, and formulating/studying state-contingent forward guidance, driven by the possibility of disaster risk in a future state of the world. This is the primary objective of this work – to study the formulation of state-contingent forward guidance and its effect on the real economy, in the presence of aggregate uncertainty in the form of risk of a disaster shock, such as a deep recession. As the literature has pointed out, monetary policy rules could place the central bank in better stead than Delphic forward guidance, but Odyssean forward guidance, particularly those tied to specific macroeconomic evidence and outcomes, could bring the economy closer to its target for inflation and keep up economic activity, better than simply sticking to policy rules could. What could be achieved by combining the idea of forward guidance with a more rule-based approach derived from the optimal response of monetary policy in the presence of aggregate shocks, is what this work aims to look at.