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Robustly optimal monetary policy in a behavioral environment

Lahcen Bounader[1], Guido Traficante[2]

[1]*International Monetary Fund,* [2] *European University of Rome*

This brief discusses a robustly optimal monetary policy in a behavioral New Keynesian model, where the private sector has myopia, while the central bank has Knightian uncertainty about the degree of myopia of the private sector and the degree of price stickiness. As shown in Bounader and Traficante (2022), in such a setup the central bank solves an optimal robust monetary policy problem. Under uncertainty about myopia the Brainard's attenuation principle holds, while under uncertainty on price stickiness, alone or in addition to myopia, the attenuation principle is violated and monetary policy becomes more aggressive.

There is a wide consensus that uncertainty affects the conduct of monetary policy (Levin et al., 2005), but there is less agreement on its impact on interest rate decisions. The current pandemic emergency can be seen as an example of Knightian uncertainty that makes policy responses highly difficult, as recently highlighted by the former Bank of Canada's governor, Stephen Poloz (2020), who declared "The pandemic is an example of Knightian uncertainty that will also force us to reconsider many fundamental ideas about how our economy can and should function". Therefore, one of the key challenges in central banking is how to conduct monetary policy in the presence of uncertainty. According to the Brainard's attenuation principle (1967), the presence of uncertainty implies an attenuated policy response compared to settings where uncertainty is not taken into account. A more

recent literature contested this result showing that uncertainty may lead to aggressive policy actions (Onatski and Stock, 2002; Giannoni, 2002; Pellegrino et al., 2020). This brief, based on Bounader and Traficante (2022), discusses a robustly optimal monetary policy in a behavioral New Keynesian (NK) model entailing cognitive discounting. We assess the robustly optimal policy considering uncertainty around the degree of cognitive discounting and the degree of price stickiness. Introducing uncertainty in the behavioral parameter seems natural, as we lack solid empirical evidence on its estimate. Further, as this parameter pertains to psychological underpinnings of individual decision-making, it could be subject to the Lucas (1976) critique as the policy action itself could alter the way households discount the future.

Academic research and empirical evidence suggest that there can be different dimensions of uncertainty, ranging from unobservable variables in real time, as in Orphanides (2001), Orphanides (2003a) and Orphanides (2003b), to the perceptions of key relationships describing the economy as in Hansen and Sargent (2015). In this paper, we follow robust control techniques to model the imperfect knowledge about a specific economic structure. The central bank does not know the true economic structure and cannot formulate the probability for the misspecification terms: This uncertainty is called Knightian uncertainty. In such a case, the central bank can only design a monetary policy supposing the worst-case outcome for the unknown parameters. This policy is called a robust policy and deviates from the policy chosen without Knightian uncertainty, when the central bank is assumed to know the reference model. Therefore, for monetary policy to be robust, the appropriate interest rate setting must take into account the risk that the policymaker does not know the structure of the economy accurately. Besides of being related to optimal robust monetary policy, our paper is related to the behavioral New Keynesian models. Recently, the baseline new Keynesian model has been enriched with behavioral elements to take into account deviations from the rational expectations hypothesis. A notable example is "cognitive discounting", or myopia, as in Gabaix (2014, 2020). When agents are myopic, they form expectations with perceived laws of motion. Compared to the rational expectations setup, behavioral agents have a lower discount factor due to the fact that they pay limited attention to events that are more distant into the future. The introduction of myopia allows to overcome some puzzles that usually emerge in standard models with rational expectations. With myopic agents monetary policy decision-making becomes highly difficult, and stabilization outcomes could deviate substantially from expectations in a context where the central bank has incomplete information over the degree of this myopia.

In such a setup, we assess optimal robust monetary policy under discretion and commitment. Under discretion, robustness implies that the policy maker should set the policy rate considering a higher value of the cognitive discounting and an attenuated interest rate reaction to a cost-push shock. The same result proves to be valid also when assessing robust optimal monetary policy under commitment. Since the robustly optimal policy is based on higher value of cognitive discounting, the transmission from the shock to inflation and output is much stronger compared to the optimal baseline equilibrium-i.e., the equilibrium where the central bank conducts optimal policy knowing the value of myopia. The same mechanism applies to the feedback from interest rate to macro variables, which is much stronger under the robustly optimal policy equilibrium. As a result, interest rate reaction under this equilibrium is attenuated. In case of uncertainty with respect to price rigidity, policy is set more aggressively both under discretion and under commitment. We also show that Knightian uncertainty on myopia and price rigidity increases the area of equilibrium determinacy with respect to the rational expectations case. Our interpretation is that, under Knightian uncertainty on myopia and price rigidity, the output gap is less reactive to inflation. Therefore, it is not only bounded rationality, as in Gabaix (2020), that guarantees equilibrium uniqueness without the Taylor principle, but also uncertainty around key model parameters.

Policy Implications

In cases of high uncertainty, such as in the aftermath of the pandemic, monetary policy decisions in real time are extremely difficult. We show that less or more aggressive policy response, compared to the full information setup, depends on the source of uncertainty: in response to cost-push shocks, the central bank should set the policy rate less aggressively in case of uncertainty surrounding the degree of myopia across agents. On the other hand, uncertainty over price rigidity implies a more aggressive policy stance. This analysis could shed light on the current debate on how central banks could approach cost-push shocks after the pandemic.

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