Forward Guidance and the Zero Lower Bound on Inflation Expectations

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Motivation

- The Zero Lower Bound on Inflation Expectations
  - Consumer inflation expectations are rarely negative
  - Expected inflation rates did not fall below zero, even though headline inflation rates did
  - Gorodnichenko and Sergeyev (2021) model this empirical finding by a ZLB on inflation expectations
  - This has important implications for the efficacy of monetary and fiscal policy
  - One short-coming is that imposing a ZLB on inflation expectations is subject to the Lucas' critique.

⇒ Explore what an alternative explanation of this empirical finding could be:

> The forward guidance policy of central banks may be a reason why inflation expectations have not fallen below zero

Model Set-Up

Standard New Keynesian model

Modeling the ZLB on Inflation Expectations

$$\tilde{E}_t \hat{\Pi}_{t+1} = max(-\pi, E_t \hat{\Pi}_{t+1})$$

Phillips Curve with ZLB on Inflation Expectations

$$\hat{\Pi}_t = \beta \, max(-\pi, E_t \hat{\Pi}_{t+1}) + \kappa \, \hat{mc}_t$$

Euler Equation

$$0 = \hat{R}_t - E_t \hat{\Pi}_{t+1} - \frac{\hat{c}_t - \breve{\nu}_t}{\sigma\,(1-\nu)} + - \frac{E_t \hat{c}_{t+1} - E_t \breve{\nu}_{t+1}}{\sigma\,(1-\nu)}$$

Taylor Rule

$$\hat{R}_t = max(\tfrac{1-R}{R}, \gamma_\pi \, \hat{\Pi}_t + \gamma_x \, (\hat{y}_t - \hat{y}_t^{pot}))$$

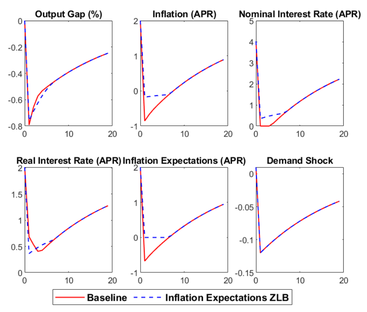
Demand Shock

$$\breve{\nu}_t = \rho_\nu \, \breve{\nu}_{t-1} + \varepsilon_{\nu_t}$$

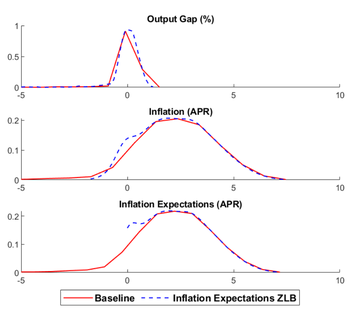
Baseline Results

Comparison between standard model and model with ZLB on inflation expectations

- IRFs following a negative demand shock
  - Following a negative demand shock, output drops, inflation drops and the central bank decreases the nominal interest rate
  - With a ZLB on inflation expectations inflation expectations do not drop that much, therefore inflation drops less and the nominal interest rate is decreased less
- Long-simulation
  - The ZLB on inflation expectations only affects the economy when inflation expectations fall below 0%
  - The ZLB on inflation expectations acts as a lower bound on inflation as well



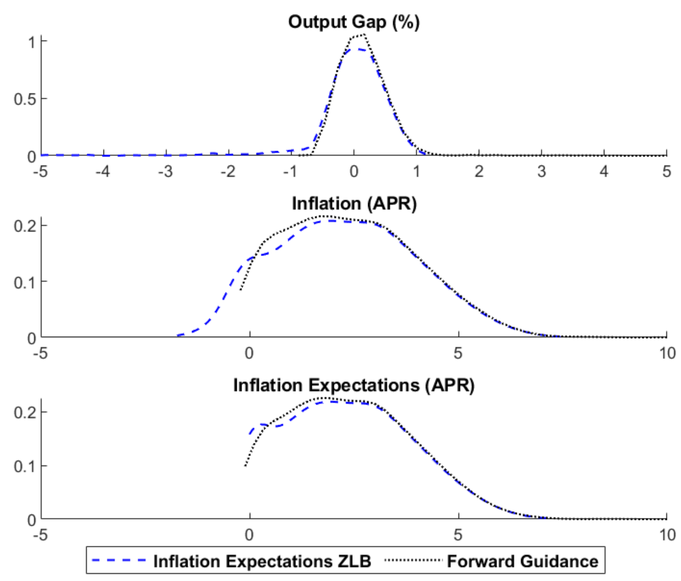
Impulse response functions



Density functions

Unconventional Monetary Policy

- Introduce threshold-based forward guidance
  - At the ZLB the central bank uses forward guidance to increase inflation expectations and inflation
  - Central bank commits to keeping the nominal interest rate at zero as long as inflation expectations are below zero
  - Otherwise the central bank uses a Taylor rule
- How does threshold-based forward guidance work?
  - If the economy is hit by a shock, bringing the nominal interest rate to the ZLB, the central bank announces to keep interest rates low for longer
  - This announcement is reviewed every period



Density functions of long simulation

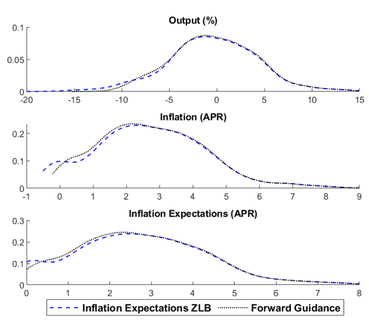
	Percentile	5^{th}	25^{th}	50^{th}	75^{th}	95^{th}
Inflation Expectations (APR)	Infl. Exp. ZLB	0	1.1	2.2	3.4	5.0
	Forward Guidance	0.1	1.2	2.3	3.4	5.0
Inflation (APR)	Infl. Exp. ZLB	-0.2	1.1	2.2	3.5	5.1
	Forward Guidance	0.1	1.2	2.3	3.5	5.2
Output Gap (%)	Infl. Exp. ZLB	-0.8	-0.2	0.1	0.3	0.7
	Forward Guidance	-0.4	-0.1	0.1	0.3	0.8

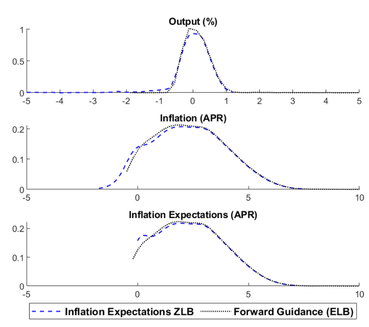
⇒ With threshold-based forward guidance inflation expectations do not drop below zero

⇒ The ZLB on inflation expectations is a model result

Robustness Checks

- Smets and Wouters model
  - Equivalence results robust to Smets and Wouters model
- Alternative decision threshold
  - Changing the central banks decision threshold to the effective lower bound
- Non-linear macro model
  - Nonlinear macro model to account for large shocks to economy
  - Forward guidance is still powerful enough to raise inflation expectations above zero





Conclusion

- ZLB on inflation expectations mitigates the reaction of the economy following a negative demand shock
- Results of threshold-based forward guidance strategy are observationally equivalent to a ZLB on inflation expectations
- Forward guidance is a potential explanation for the empirical findings by Gorodnichenko and Sergeyev (2021)
- Results are robust to several different model specifications

References

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