Quantitative forward guidance through interest rate projections

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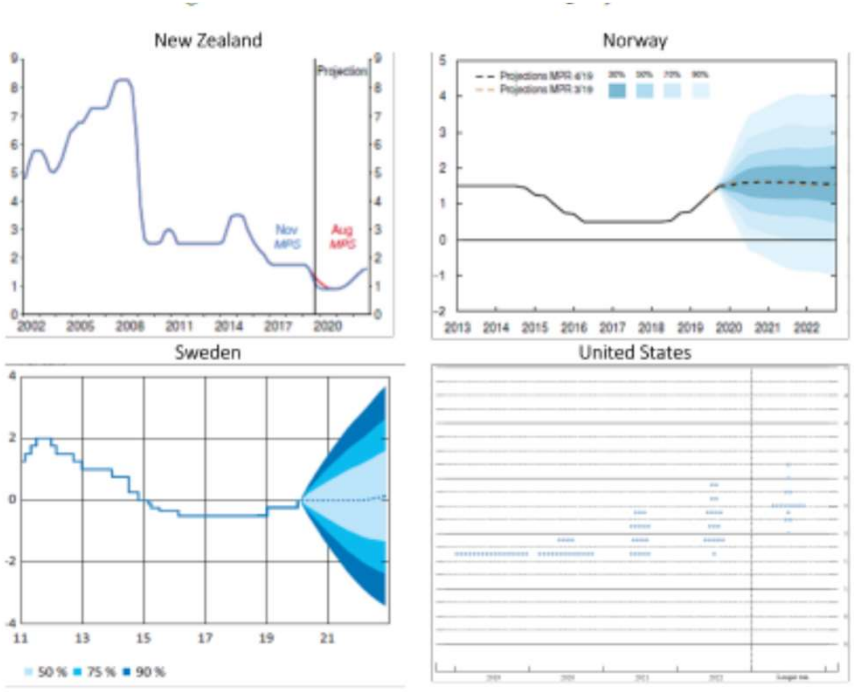
ASSA 2022, Poster session

Motivation

- Forward guidance on the future path of policy rates has become a key policy tool for central banks over the past decade
- Widespread consensus amongst central bankers and academics that forward guidance should continue being part of CBs toolkit going forward (Blinder et al (2017))
- But less agreement on how it should be implemented, in particular if it should be qualitative or quantitative in nature (Ehrmann et al (2019))
- This paper contributes to the debate by assessing quantitative forward guidance through interest rate projections

Quantitative forward guidance through interest rate projections

RBNZ	Norges Bank	Sveriges Riksbank	Federal Reserve
1997	2005	2007	2012
90 day bank bill rate (quarterly average)	overnight deposits rate at Norges Bank (quarterly average)	7 day repo rate with the Riksbank (quarterly average)	fed funds rate (year-end)
current quarter to 12 quarter ahead	current quarter to 12 quarter ahead	current quarter to 12 quarter ahead	current year to three years ahead



Outline

- Assess quantitative forward guidance through interest rate projections along four main dimensions
  - Predictability – do markets anticipate central bank paths?
  - Credibility – do unexpected changes to the path move markets?
  - Consistency – are CB interest rate paths consistent with macro projections?
  - Redundancy- do CB interest rate paths provide information on top of macro projections?

Data

- Irregular frequency
  - Number of path releases by each central bank

- Notations:
  - $i^{c}_{t,\tau}$: central bank projection at time t for interest rate at τ
  - $i^{m}_{t,\tau}$: market (risk-neutral) expectation

RBNZ	Norges Bank	Sveriges Riksbank	Federal Reserve
90 day bank bill futures	3 month NIBOR FRA	3 month STIBOR FRA	fed funds futures

  - Timing
    - t_i: central bank projection release date
    - t_i-1: day prior to projection release
    - t_{i-1}: previous projection release date

Predictability and credibility: Estimation

- Predictability

$$i^c_{t_i,\tau} = \alpha_0 + \alpha i^m_{t_i-1,\tau} + (1-\alpha) i^c_{t_{i-1},\tau} + e_{t_i,\tau}$$

Weight on the previous day's market path measures anticipation by markets

- Credibility

$$\begin{aligned} i^m_{t_i,\tau} - i^m_{t_i-1,\tau} &= \beta\left[i^c_{t_i,\tau} - \mathbb{E}_{t_i-1}(i^c_{t_i,\tau})\right] + e_{t_i,\tau} \\ &= \beta\left[i^c_{t_i,\tau} - \alpha_0 - \alpha i^m_{t_i-1,\tau} - (1-\alpha) i^c_{t_{i-1},\tau}\right] + e_{t_i,\tau} \end{aligned}$$

Impact of CB path surprise on market path measures credibility

Predictability and credibility: Results

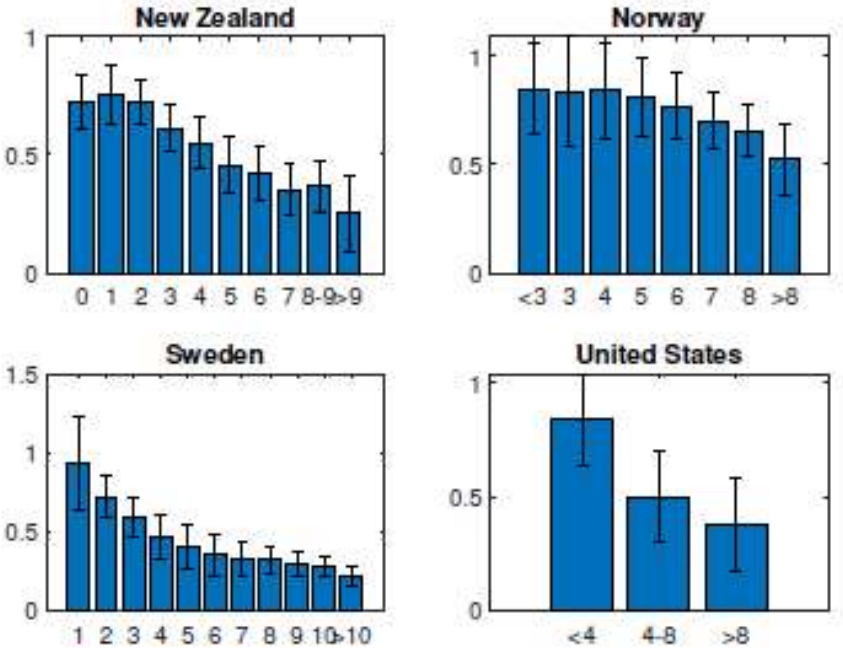
		New Zealand	Norway	Sweden	United States
Predictability	α	**0.499**	**0.750**	**0.323**	**0.383**
		(0.025)	(0.039)	(0.021)	(0.077)
	R^2	48%	74%	39%	39%
	N	841	438	850	107
Credibility	β	**0.123**	**0.153**	**0.189**	**0.199**
		(0.022)	(0.012)	(0.020)	(0.058)
	α	**0.310**	**0.768**	**0.288**	0.169
		(0.069)	(0.038)	(0.025)	0.(119)
	R^2	16%	31%	27%	18%
	N	817	438	844	107

- Predictability: CB projections anticipated by markets to significant extent
  - Revisions in projections are significantly related to repricing in market expectations (weight varies from 0.3 – 0.75)

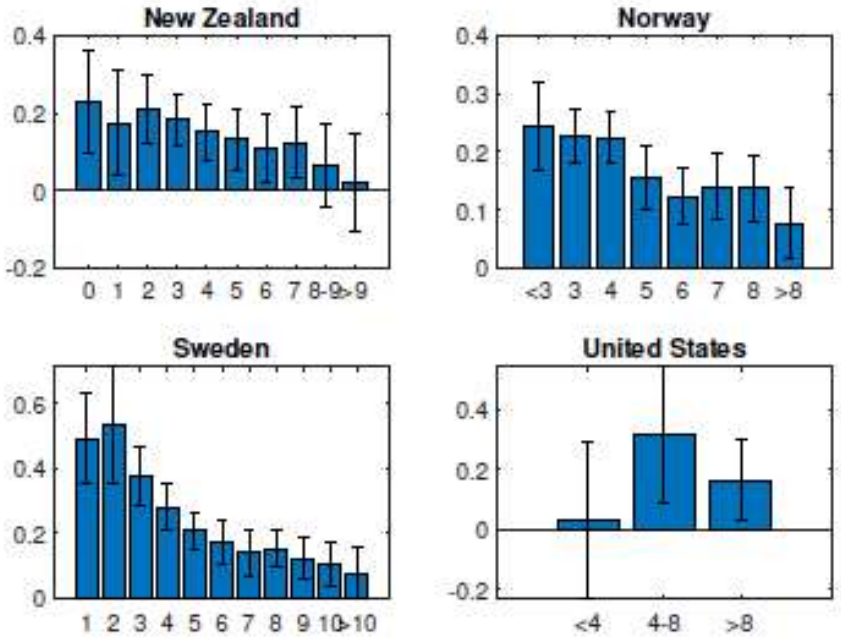
- Credibility: Surprise in CB projections affect market path in a significant way.
  - The pass-through is around 0.1-0.2 rather than 1, suggesting limited effectiveness as well as limited impairment of market function

Predictability and credibility over forecasting horizons

Predictability



Credibility



- Both predictability and credibility decrease with the forecasting horizon

Consistency and redundancy: Estimation

- Consistency

$$i^c_{t_i,\tau} = \gamma_0 + \gamma_g X^g_{t_i,\tau} + \gamma_\pi \pi_{t_i,\tau} + e_{t_i,\tau}.$$

  - Taylor-type reaction function for CB policy rate path
  - Estimation by OLS and by Tobit taking into account ELB constraint

- Redundancy

$$i^m_{t_i,\tau} - i^m_{t_i-1,\tau} = \beta_r \left[i^c_{t_i,\tau} - \alpha_0 - \alpha i^m_{t_i-1,\tau} - (1-\alpha) i^c_{t_{i-1},\tau} \right]$$
$$+ \beta_g (X^g_{t_i,\tau} - X^g_{t_{i-1},\tau}) + \beta_\pi (\pi_{t_i,\tau} - \pi_{t_{i-1},\tau}) + e_{t_i,\tau}.$$

  - Impact of CB path surprise on market path controlling for revision in macro projections

- Focus on Norway and U.S. where CB projections of output gap or unemployment rate gap are available

Consistency: Results

	Norway	United States
X^g	Output gap	Unemployment gap
π	CPI-ATE	PCE gap
	without ELB	
γ_g	**1.281**	**-0.660**
	(0.047)	(0.095)
γ_π	**1.710**	**1.162**
	(0.082)	(0.152)
R^2	68%	71%
N	726	118
	with ELB	
γ_g	**1.295**	**-1.165**
	(0.036)	(0.084)
γ_π	**1.694**	**1.409**
	(0.079)	(0.170)
N	726	118

- CB projections are consistent with a stabilising Taylor rule linking policy rate and macro projections.
- Taylor principle of a more than proportional response of policy rate to inflation projections fulfilled

Redundancy: Results

	Norway	United States
β_r	**0.161**	**0.292**
	(0.016)	(0.075)
β_g	-0.007	**0.079**
	(0.012)	(0.024)
β_π	-0.012	0.070
	(0.013)	(0.056)
R^2	31%	24%
N	438	107

- CB policy rate path surprise affects market path also controlling for macro projections

Conclusions

- Quantitative forward guidance through interest rate projections seems effective but with limitations
  - Predictable: well but not fully anticipated by markets
  - Credible: path surprises move markets but in a limited way
  - Consistent: projections linked to macro projections through a stabilising Taylor rule
  - Not redundant: Controlling for revisions in macro projections does not eliminate the effects of path surprises on market expectations