

Quantitative Tightening Around the Globe: What Have We Learned?

Wenxin Du (Columbia Business School, NBER and CEPR)
Kristin Forbes (MIT-Sloan School of Management, NBER and CEPR)
Matthew Luzzetti (Deutsche Bank)*

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Four Key Questions

1. What are central bank strategies for QT to date?
- 2. What are the effects of QT announcements?**
- 3. What are the effects of QT implementation?**
- 4. Who steps in when central banks unwind holdings?**

2. What are the Effects of QT Announcements?

Data and Methodology

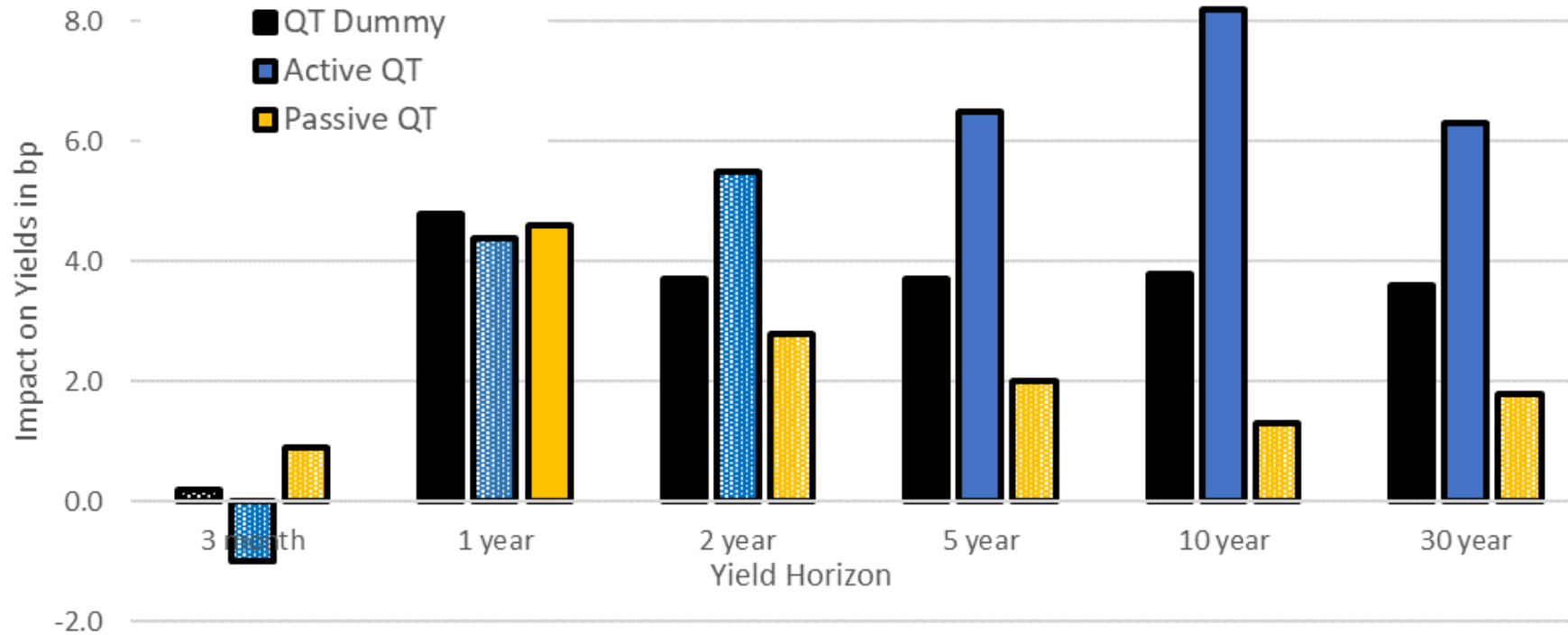
- Impact of 38 QT announcements on government bond yields & other financial variables (y) for country i over 2-day windows

$$\Delta y_{it} = \alpha_i + \sum_C \beta^C QT_{it}^C + \gamma News_{it} + \varepsilon_{it}$$

- Assess impact of different QT characteristics (C)
- $News_{it}$ controls for surprises in the policy interest rate and economic data news (Citi Surprise Index)
- Controls for country fixed effects (α_i), robust Newey-West standard errors
- Daily data, 01/01/14 – 10/31/23, excluding windows of market turmoil (2020, LDI crisis in 2022, SVB/Credit Suisse turmoil in 2023)

Impact by Transaction

Impact of QT Announcements on Government Bond Yields



Note: Solid bars indicate estimates are statistically significant (at the 10% level).

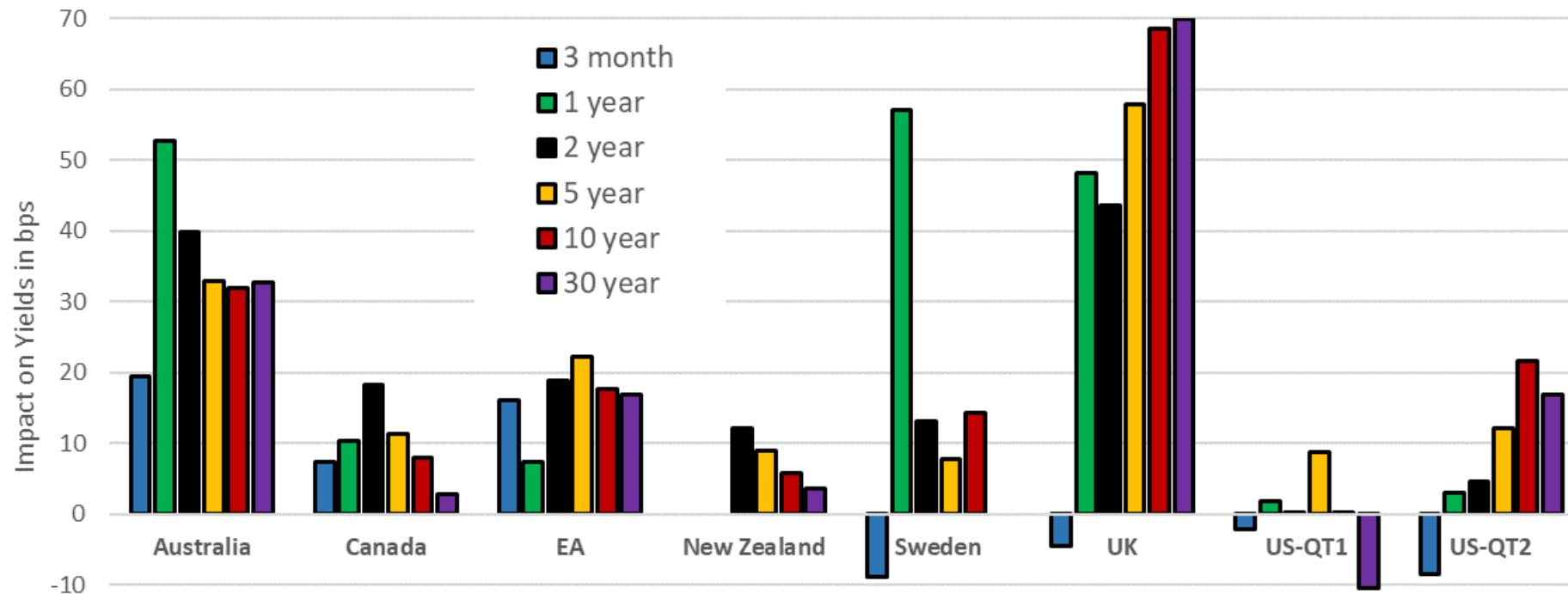
CHANNELS:

Passive QT: may signal stronger central bank commitment to tighter policy

Active QT: steepens yield curve

“Cumulative” Impact by Country

Figure 3.4
Cumulative Effect of all QT Announcements on Government Bond Yields



Notes: Calculated as the sum of the estimated effects of each individual QT announcement by country, based on estimates in Appendix Table A3.3. These aggregate effects only includes QT events that are new or additional QT (i.e., not *WindDown* events) and only include post-pandemic QT announcements, except for the US announcements from 2014-2017, which are included as US-QT-1.

Comparison to QE

- **Comparisons of impact of QE & QT on 10-yr govt. bond yields**
 - Very different economic environments between QE and QT

Country	Program	Study	Change in 10-year yield (in bps)	
			1-day	2-day
Survey of empirical studies of QE, pre-pandemic, multiple countries and QE episodes (aggregate effects)				
Multiple	Multiple	Borio and Zabai (2016)	-16 to -107	
US QE programs under different market environments (aggregate effects)				
US	QE1	Bauer and Neely (2014)	-123	
		<i>High stress</i> Gagnon, Raskin, Remache, and Sack (2011) Krishnamurthy and Vissing-Jorgensen (2011) Yellen (2011)	-91	-105 -107
	QE2	Bauer and Neely (2014)	-23	
		<i>Modest stress</i> Ehlers (2012) Krishnamurthy and Vissing-Jorgensen (2011) Krishnamurthy and Vissing-Jorgensen (2013) Yellen (2011)	-14	-40 -30
Bauer and Neely (2014)		-18		
US	QE3	Bauer and Neely (2014)	-14	
		<i>Minimal stress</i> Krishnamurthy and Vissing-Jorgensen (2013)	-3	

- *QT works in opposite direction of QE*
- *More muted effects than QE launched during stress periods; comparable to low stress periods*

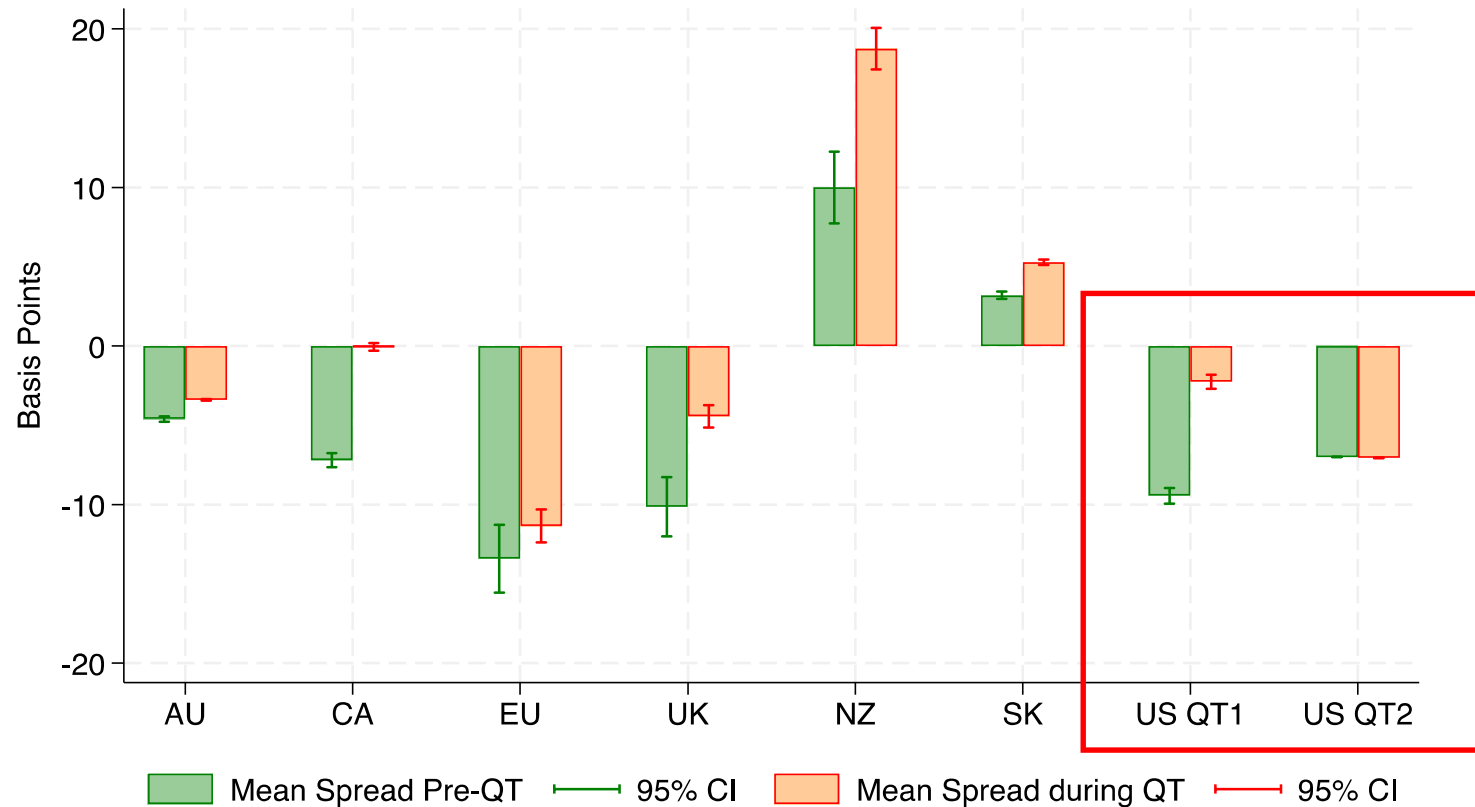
3. What are the Effects of QT Implementation?

Limited Price Effects On QT Dates

- **No significant differences** between changes in government bond yields on **QT implementation dates** (either passive or active) vs. **non-QT implementation dates**.
- For countries conducting active QT, **no significant differences** between changes in government bond yields on securities sold by central banks (**QT-securities**) vs. securities not sold by central banks (**non-QT securities**).

Funding Spreads Moved Up

Average Short-Term Funding Spreads Before and During QT Across Countries



Note: The following funding spreads are used: Australia: Overnight cash rate - Cash rate target; Canada, CORRA - Policy rate; Euro area, ESTR - Deposit rate; New Zealand, 1M bank bill - Official Cash Rate; Sweden, T/N STIBOR - Deposit rate; UK, RONIA - Bank rate; US, Federal funds – IOR.

Convenience Yield and Liquidity of Government Bonds

- QT implementation is associated with a decline in the “convenience yield” of government bonds
 - Convenience yield measured as the difference in the 10-year interest rate swap rate and the government bond yield
- **No strong correlation** between central bank holdings of government bonds and the **liquidity index of government bonds**
- **Bid-to-cover ratios** of government bonds have stayed unchanged or moved higher during QT so far

4. Who Steps in When Central Banks Unwind Holdings?

Who Steps In?

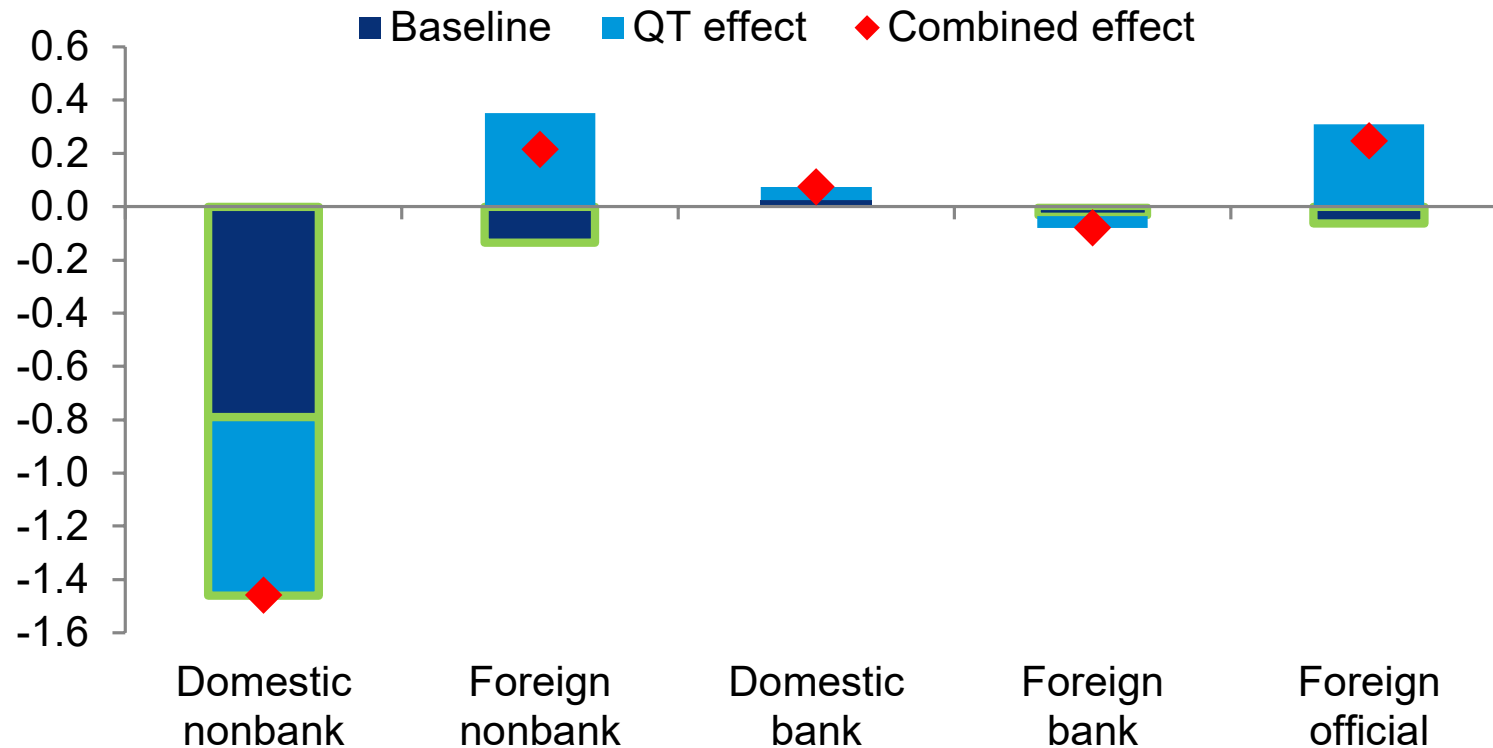
- Empirical assessment of which investor types increase their share of government debt securities holdings as the central bank steps back

$$D(\text{Inv_share}_t^{i,j}) = \beta_{i,j,0} + \beta_{i,j,1}D(\text{CB_share}_t^i) + \beta_{i,j,2}D(\text{CB_share}_t^i) * \mathbf{1}(\text{QT}_t^i) + \varepsilon_{i,j,t}$$

- Two types of regressions: (1) individual investor (j) and country (i), and (2) pooled panel regressions
- **Data sources:** IMF IFS (quarterly, Q1 2004-Q2 2023) and country data sources for deep dive into domestic nonbank sector (quarterly, availability varies by country)

Domestic Nonbanks

Coefficients from pooled panel regressions



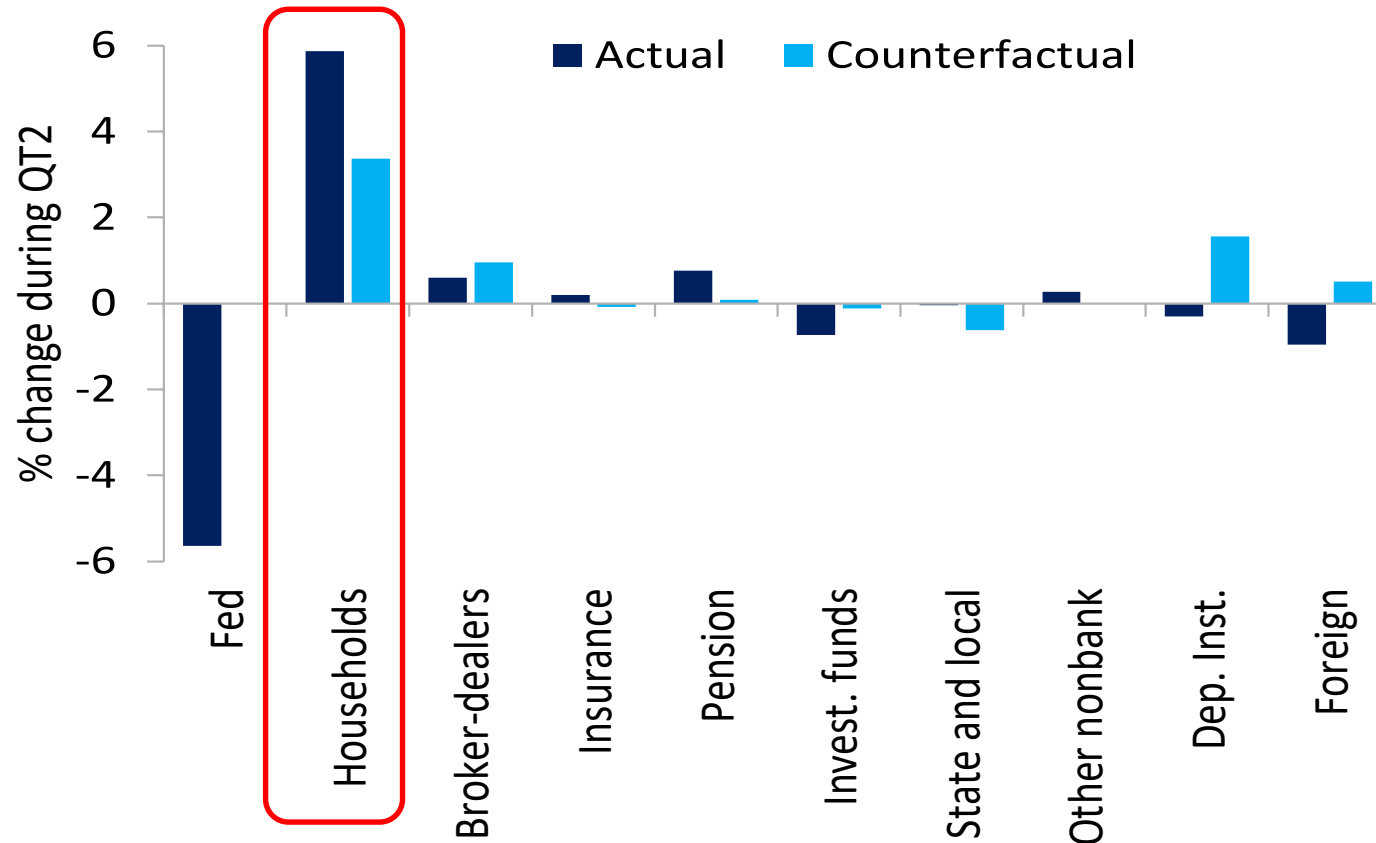
Findings:

1. Domestic nonbanks absorb CB balance sheet reductions, especially during QT (~150%)
2. No evidence other broad investor types change behavior during QT
3. Heterogeneity across economies

Notes: Panel regressions weight each economy by relative GDP in USD terms, include country fixed effects, and cluster robust standard errors at the country level. Green highlights denote coefficients significant at 5% level.

US Deep Dive

QT2: Actual vs. counterfactual change in share of Treasury holdings



Findings:

1. US “households” (**inc. hedge funds**) absorb drawdown, esp. during QT2
2. Banks, foreign investors reduced shares vs. predicted increase
3. Caveat: Results may not generalize as QT2 occurred against unique macro backdrop

Notes: Counterfactual constructed using regressions based on investor behavior prior to QT1.

Four Sets of Answers

1. What are central bank strategies for QT to date?

- Accelerated start of QT & meaningful progress
- Different strategies adopted for communication & unwind

2. What are the effects of QT announcements?

- Modest increase in government bond yields
- Otherwise minimal effects, but point in direction of tightening financial conditions
- Different channels for passive & active QT

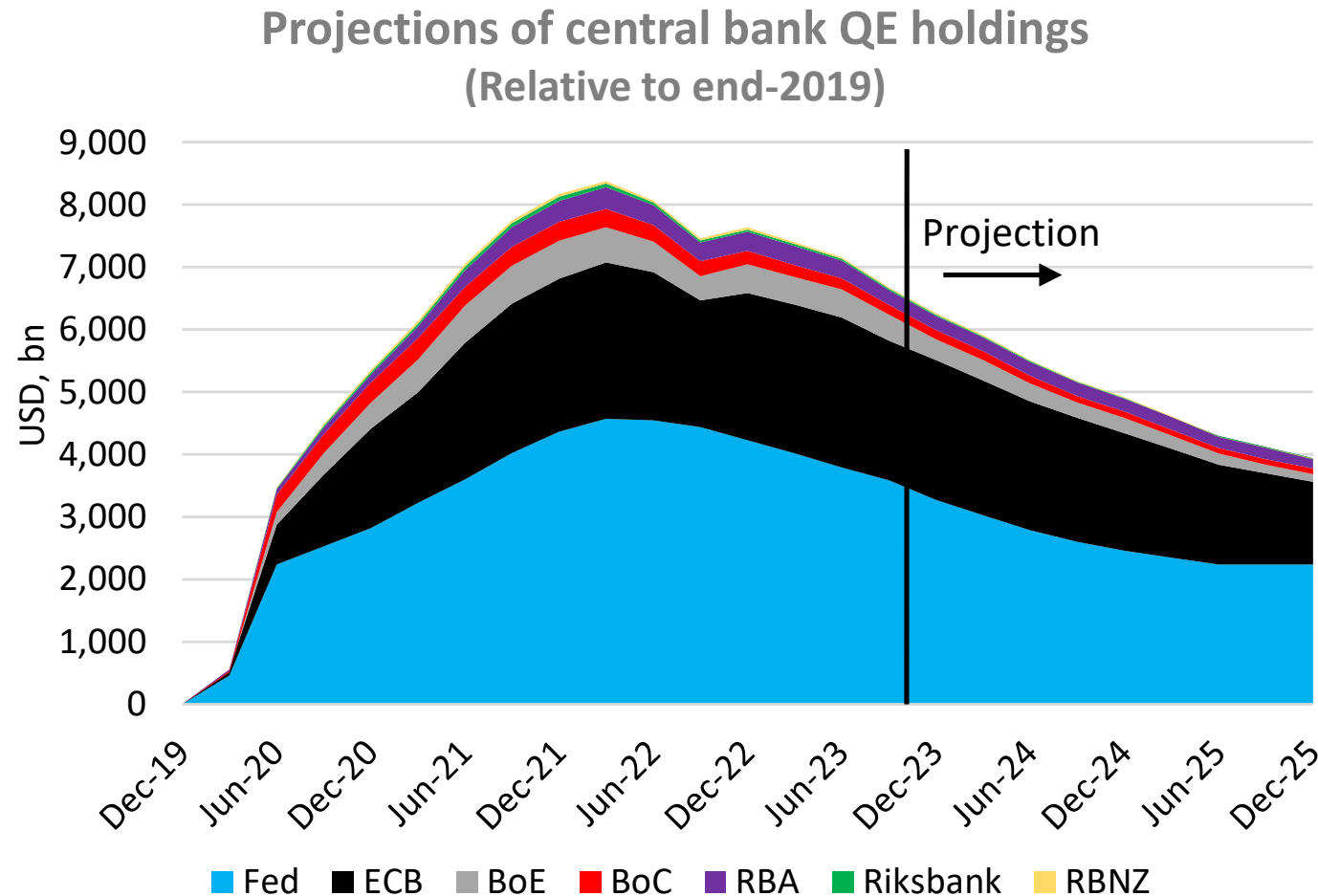
3. What are the effects of QT implementation?

- Minimal effects on pricing & liquidity of govt debt securities
- Modest rise overnight funding spreads & fall in govt bond convenience yield

4. Who steps in when central banks unwind holdings?

- Domestic nonbanks
- In US, key role for “households” —including leveraged institutions

What's Next?



Projections:

- **Assumptions:** QT continues along existing parameters & current guidance
- **Conclusions:**
 1. Central banks to reduce balance sheets by another ~\$2tn through end-2025
 2. Still well above pre-pandemic levels
 3. Will QT continue to be smooth?

Notes: Central bank asset holdings are converted to USD using average exchange rates from November 2023.