



Central Bank Exit Strategies

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50 years of
experience

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Outline of the Presentation

- Motivation
- Main trade-offs—policy rates vs. balance sheet tightening
- Key issues to consider on how to reduce balance sheets
 - Size and composition of central bank balance sheets
 - Financial market functioning
- Conclusions

Motivation

- How should central banks with large balance sheets tighten?
 - Hike interest rates or reduce the balance sheet first?
 - Combine both interest rate hikes and balance sheet reductions?
 - Use the tools in opposite directions?

Pre-COVID-19 Playbook Prioritized Rate Hikes

- Normalization: First, stop increasing the balance sheet
- Policy rate hikes would precede reduction of the balance sheet
- Policy rate hikes viewed as more appropriate instrument:
 1. Transmission from interest rates better understood
 2. Easier to communicate
 3. Less likely to generate market turbulence
- In addition, maintaining a large balance sheet for some time would allow policy rates to rise faster, providing more “policy space”

Model Closed Economy

- Standard, log-linearized NK model à la Woodford (2003)
- Monetary policy subject to a zero lower bound constraint
- Discounting to ensure realistic effects of forward guidance
- LSAPs effective despite absence of financial intermediation channel

- Key model components

- Aggregate demand equation

$$x_t = \kappa x_{t-1} - \tilde{\sigma}(r_t^{long} - r_t^{long,pot})$$

- Blends insights from standard NK and segmented bond market models
- Whole path of interest rates matters (NK) as do premia affecting long rates (via segmentation à la Andres et al. 2004 and Chen et al. 2012)
- Phillips curve:

$$\pi_t - \iota_p \pi_{t-1} = \beta \delta (\pi_{t+1|t} - \iota_p \pi_t) + \kappa_p (x_t - \kappa x_{t-1}) + \varepsilon_{\pi,t}$$

Model Closed Economy: Monetary Transmission

- The long-term real rate can be decomposed as:

$$r_t^{long} \equiv r_t^{long,pol} + r_t^{long,tp}$$

- Policy component defined as

$$r_t^{long,pol} \equiv \delta r_{t+1|t}^{long,pol} + (1 - \delta)r_t$$

- Term-premium equals (Chung, Laforte, Reifschneider, Williams, 2011, 2012)

$$r_t^{long,tp} = \delta r_{t+1|t}^{long,tp} - (1 - \delta)\vartheta b_t$$

- b_t denotes central bank bond holdings

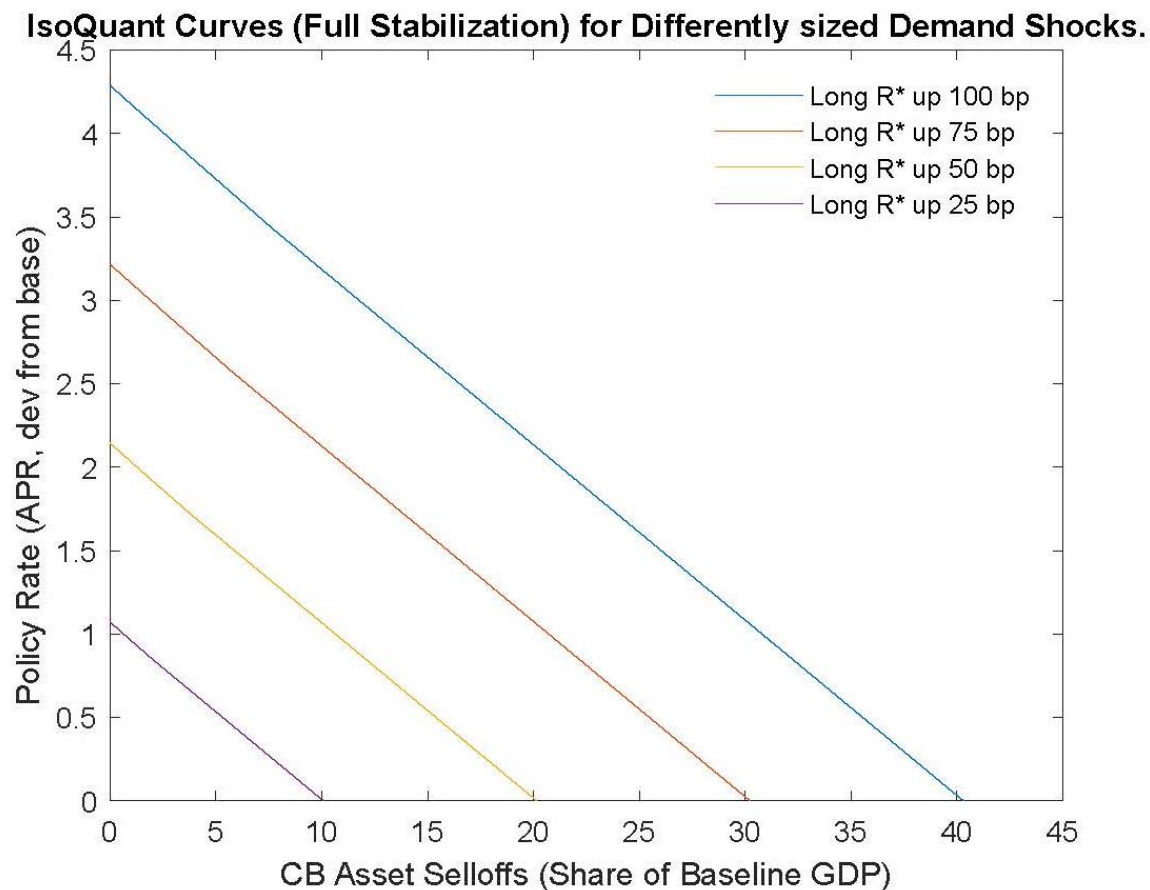
- Monetary policy is assumed to follow a standard Taylor-type rule

$$i_t^{pol} = \max[i_t^{shadow}, 0]$$

- Where $i_t^{shadow} = \gamma_i i_{t-1}^{shadow} + (1 - \gamma_i)[\bar{i}^{pol} + \gamma_\pi \pi_t + \gamma_x x_t] + \varepsilon_t^{pol}$

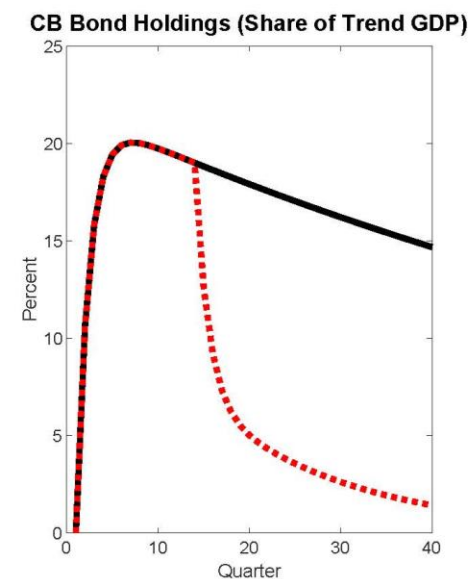
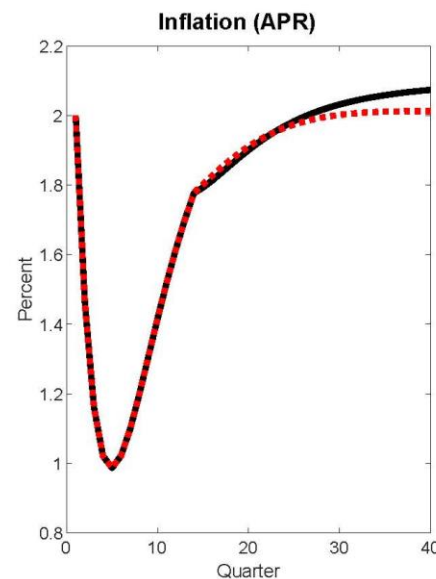
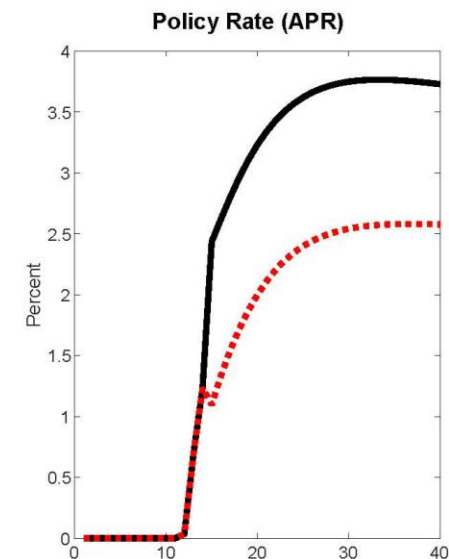
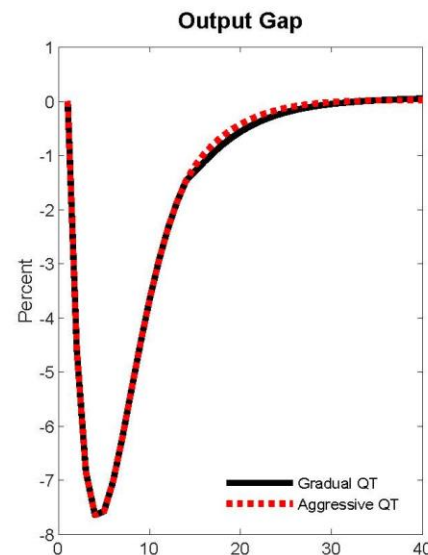
Why is There a Trade-off Between Rates and QT?

- Can achieve similar macro outcomes through QT (quantitative tightening of balance sheet) or hikes
- The choice to maintain a larger balance sheet provides more policy space
- Choice not important under modal outlook, but helpful if downside risks sizeable and ELB may bind



Trade-off Under Modal Outlook is Small

- The effects on output and inflation of aggressive (red) and gradual (black) QT are similar
- Highlights that the choice might not be consequential if modal outlook viewed as very likely
- But higher policy path under gradual QT may help if downside risks materialize



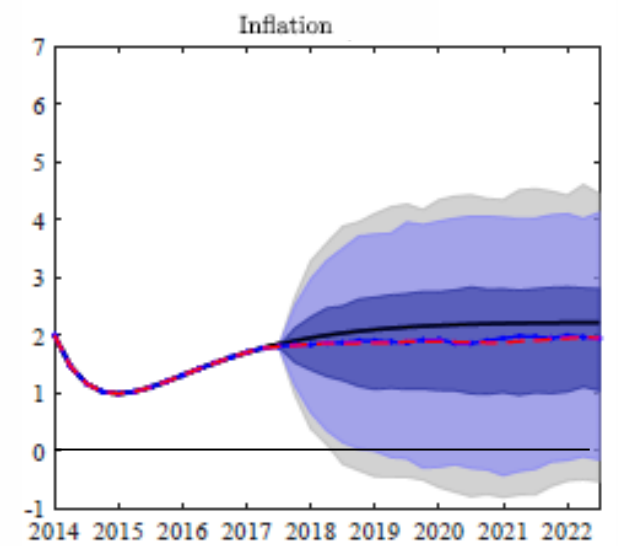
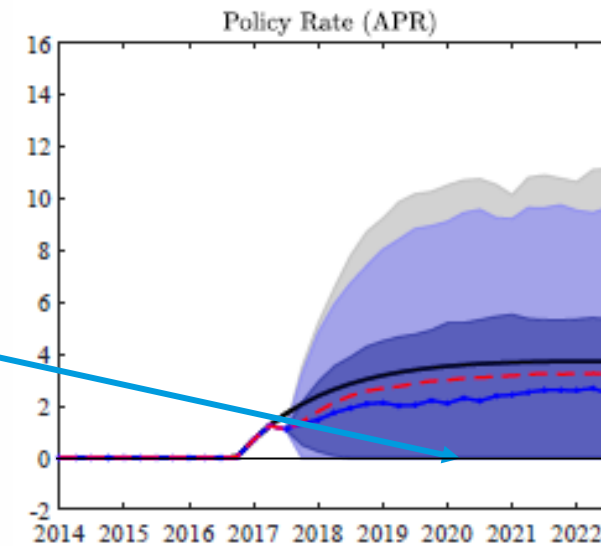
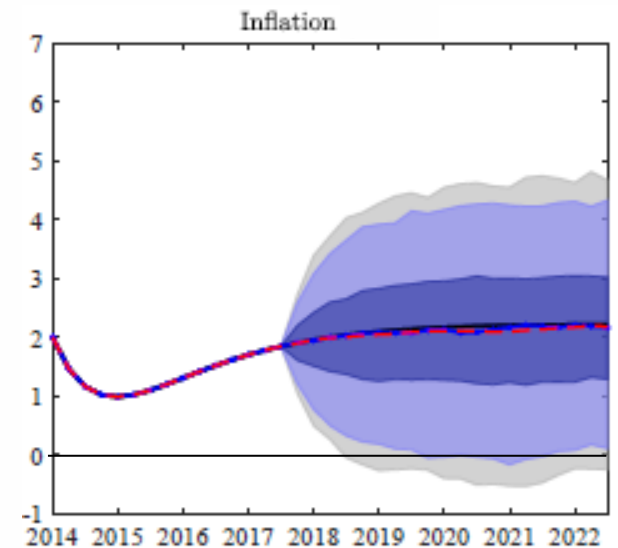
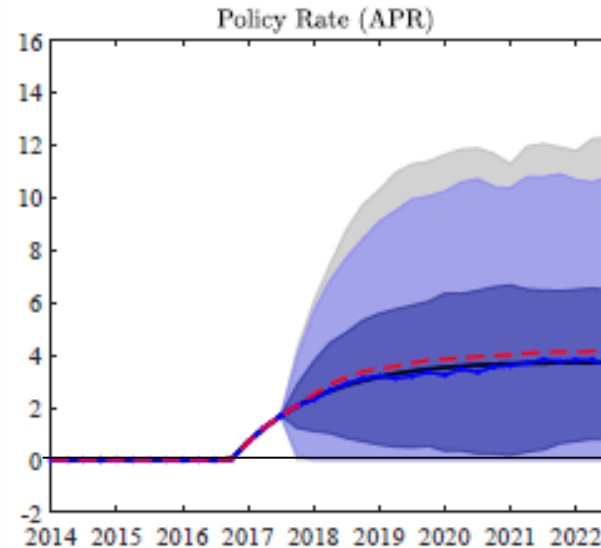
In 2015-7, Large Balance Sheets Insured Against Downside Risks to Output and Inflation

Gradual QT

- In 2015-7, maintaining a large balance sheet reduced risk of hitting ZLB (only 18 percent)

Aggressive QT

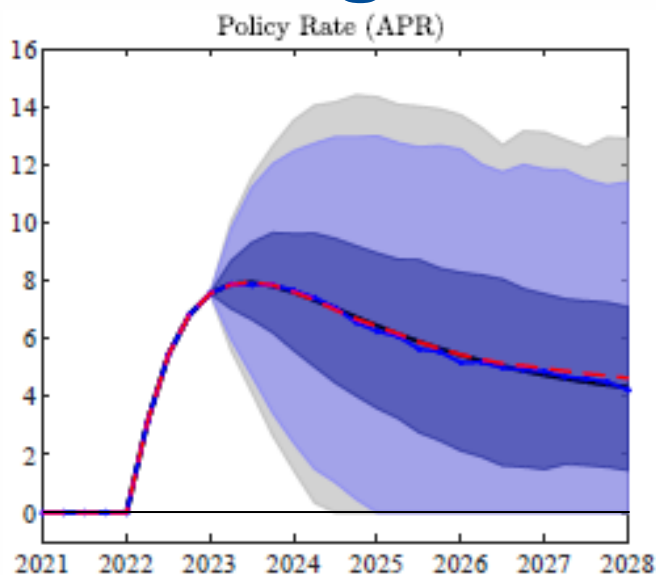
- Likelihood of hitting the ZLB would have been higher with a more aggressive pace of QT (i.e., 28 percent)



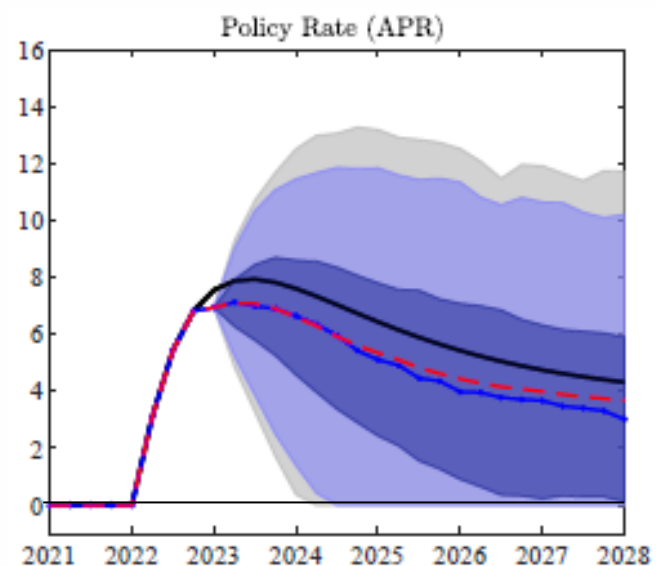
— Modal Outlook - - - Mean — Median ■ 50% Band ■ 90% Band ■ 95% Band

Current Higher Inflation Outlook Reduces “Insurance” Benefits of Large Balance Sheet

Gradual QT



Aggressive QT



- With a positive inflation shock, insurance argument for slower pace of quantitative tightening is less compelling
- The probability of hitting the ZLB is only slightly larger with aggressive QT (4 vs 6 percent)
- Insurance argument is even less important if rates are allowed to go negative
- There is stronger case for reducing the balance sheet quickly in current high inflation
- Especially if not returning to low-inflation, low- r^*

— Modal Outlook - - - Mean — Median ■ 50% Band ■ 90% Band ■ 95% Band

Stronger Rationale for Reducing Balance Sheet Quickly, but Still Reasons for Caution

- Market resilience and functioning issues need to be considered when deciding speed of balance sheet unwinding
- Past experience (e.g., Taper Tantrum, COVID-19) illustrates importance of managing risks to market functioning
- Cautious approach to QT warranted because of:
 - Strong transmission to broader financial conditions with rising debt and valuations
 - Risks of market fragmentation

Could Spillovers from Exit be Different?

- U.S. quantitative easing after the GFC has had substantial effects on EMDEs (Bowman, 2015; Caballero and Kamber, 2019)
- Unclear if quantitative tightening will be symmetrical
- Spillovers from hiking rates could be larger because short-term interest rates affect exchange rates more (Curcuru et al. 2018; IMF 2021)
- Sequencing of exit could matter for spillovers, but context is important:
 - Stronger demand in financial centers could mitigate negative impacts
 - Impact depends also on conditions in capital flow recipients

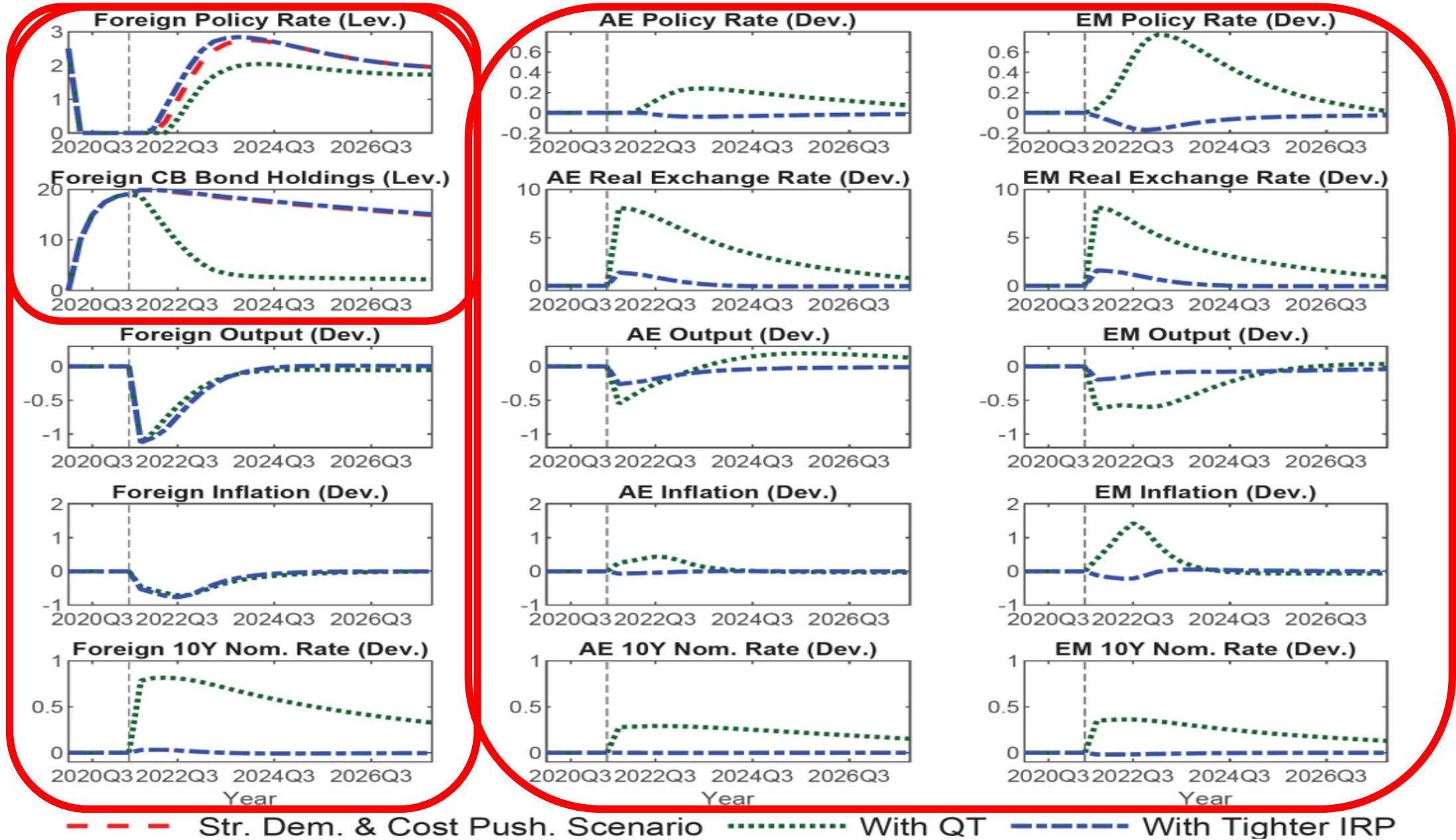
A Two-Country Model to Assess Spillovers

- We assess spillover effects of alternative QE exit strategies using a version of the two-country NK model in Kolasa and Wesolowski (2020)
- Distinguishing aspect: segmented asset markets a la Chen et al. (2012)
 - Short- and long-term bonds are imperfect substitutes because of the presence of portfolio transaction costs
 - Costs affect the term premium and depend on endogenous positions
 - CB can affect premium dynamics by determining bond supply
- Forward guidance is still effective, but potency greatly reduced due to
 - Strategic complementarities in price setting a' la Kimball (1995)
 - Bounded rationality / discounting in the spirit of Gabaix (2020)

Two-Country Model: Monetary Transmission

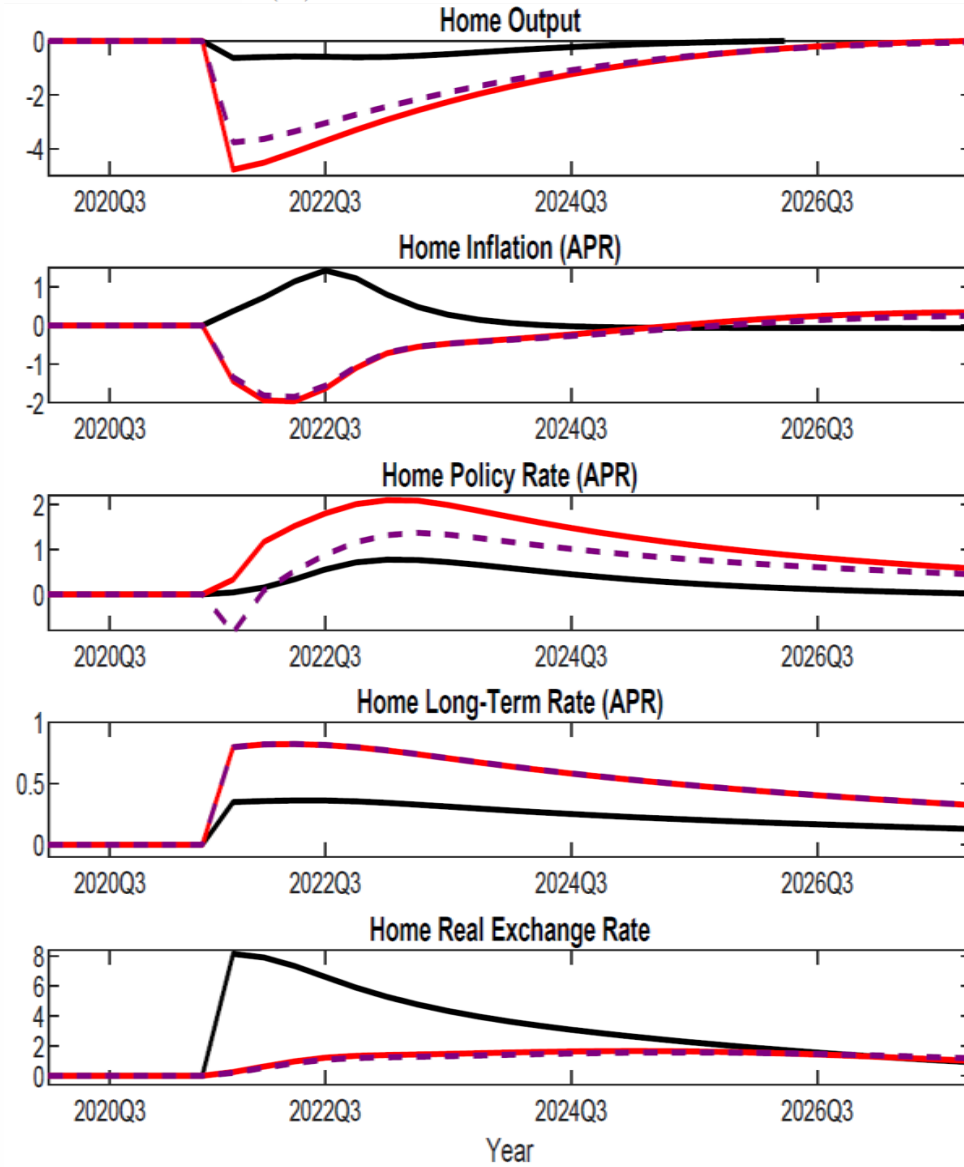
- A policy rate hike lowers output by about 1%, and inflation by 0.35%
 - Effects broadly consistent with VAR and DSGE evidence for EA and USA
- QT calibrated so that a 1.75 percent sell-off of CB bond holdings affects output by an order of magnitude less, although the long-term nominal rate falls more persistently
 - Effects on inflation also smaller, but in line with US QT estimates of Chung et al. (2011, 2012) and slightly below median estimates in Fabo et al. (2020)
- Larger output effects of conventional policy compared to QT reflect large majority of consumers being financially unconstrained and more responsive to changes in the short-term rate relative to the term premium
 - Real exchange rate does respond relatively more strongly to QT

Results Spillovers

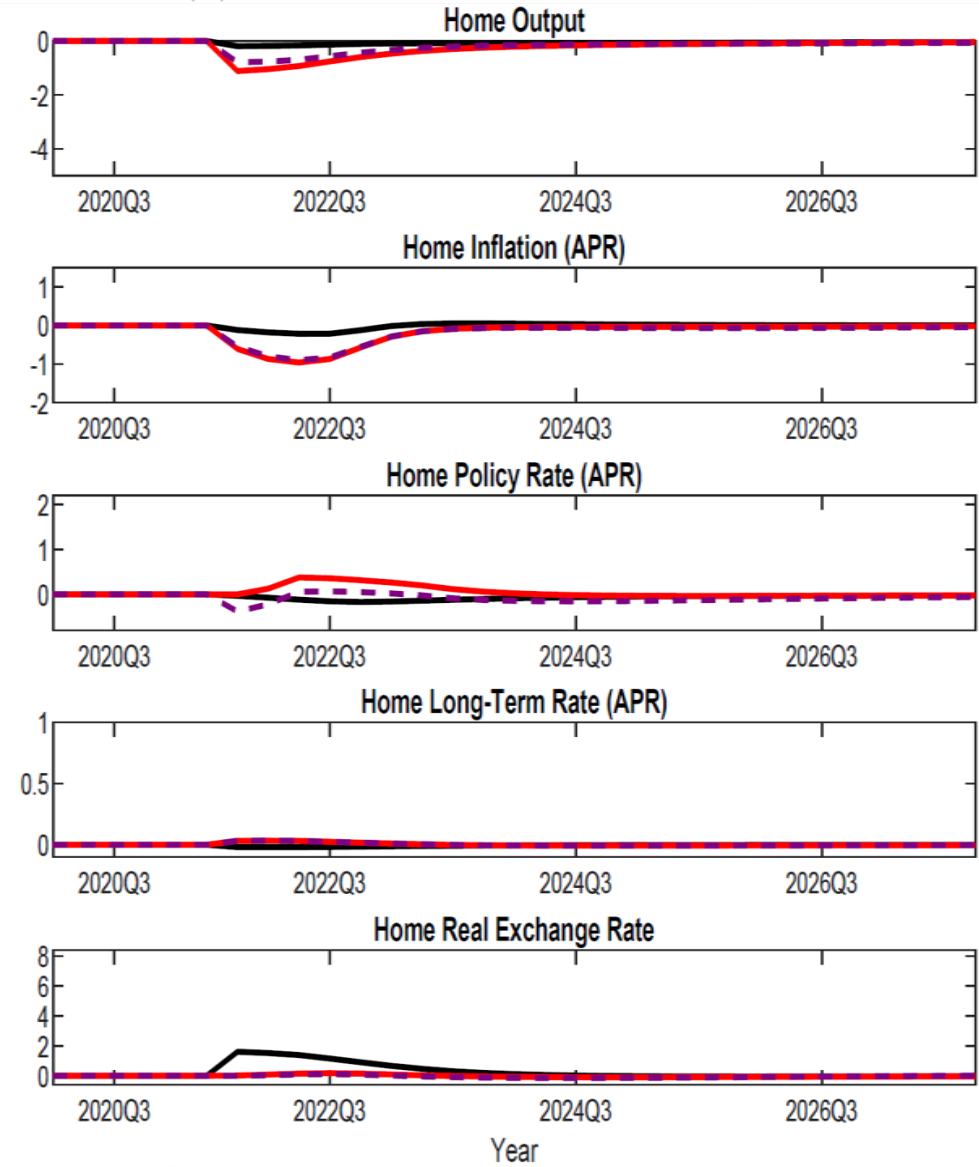


Results Spillovers

(A) Quantitative Tightening



(B) Tightening via Short Rate



— Baseline Rule — Const. NEER - - - Const. NEER with FXI

Effective Monetary Policy May Now Require a Balance Sheet Larger than Before GFC

Growth in demand for reserves has been large, partly because of new liquidity regulations

There is also uncertainty about the demand for reserves

Both suggest a gradual and flexible approach to quantitative tightening

There are still good reasons to keep balance sheets as small as possible in the long run

Conclusions

- The main trade-off associated with the exit from monetary accommodation is that a more gradual QT allows policy rates to rise more and thus creates conventional policy space
- Analysis suggests that tightening via the short-term policy rate is associated with smaller negative output spillovers, particularly to EMs
- Effects on foreign economies larger under QT due to larger exchange rate and term-premium effects

Conclusions (ctd)

- Results are sensitive to the assumed conduct of foreign monetary policy, with spillovers particularly dire when inflation targeting is replaced by exchange rate stabilization
- FX interventions can create policy space and mitigate adverse effects somewhat, but they do require ample reserves
- Central banks should be attentive to risks to market functioning and must clearly communicate their strategy