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Thoughts on Quantitative Tightening, Including Remarks on the Paper
“Quantitative Tightening around the Globe: What Have We Learned?”

Remarks by

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Thank you, it is great to be here. I'm pleased to participate in this panel to discuss a policy action now being implemented by central banks around the globe: quantitative tightening (QT).¹ I want to thank Kristin, Matt, and Wenxin for putting together a great paper that provides an overview of the effects of QT across seven central banks.

Often called “large-scale asset purchases” (LSAPs) by central bankers, the view of quantitative easing, or QE, as a tool to add monetary policy accommodation and QT to tighten policy has changed over time. When it was used during and after the Global Financial Crisis, QE was deemed an “unconventional” tool in central banks’ arsenals. But QE has now been used numerous times in the past two decades for extended periods when the policy rate was at the effective lower bound, so I would say it is no longer unconventional.

Given the role of QE and QT in the policy toolkit, it is good to have researchers and policymakers examine how asset purchases work and talk about current issues associated with their implementation. This paper is very timely and thorough in looking across countries and their experiences with QE and QT. There is a lot packed into this work that makes it a little difficult to fully assess in the time we have today. So I will focus my comments on four points: (1) the evidence that the effects of QE are asymmetric to the effects of QT; (2) the execution of QE versus the execution of QT in the United States; (3) the role of announcement effects of QT; and, finally, (4) who has taken the Fed’s place in buying assets when we withdraw from the market. I will then end with some thoughts about issues facing the Federal Reserve as we move forward with normalizing our balance sheet.

¹ The views expressed here are my own and are not necessarily those of my colleagues on the Federal Open Market Committee.

The Asymmetry of Quantitative Easing versus Quantitative Tightening

For me, one of the most interesting results of the paper is that the announcement effects of quantitative easing are much larger than the announcement effects of quantitative tightening. The authors find that announcements of QT have a small but statistically significant effect in increasing government bond yields—about 4 to 8 basis points. But this effect is much smaller, in absolute terms, than the prevailing estimates of the decrease in yields from announcements of QE. The conclusion is that the interest rate effects of QE and QT are asymmetric. For an economist, this result may seem puzzling—why would changing the sign on an action lead to asymmetric effects on prices and real variables?

Ever since central banks initiated QE in response to the Global Financial Crisis, academics have debated its effectiveness. One view is that it has a very limited effect in situations where a central bank is swapping zero interest-bearing reserves for zero interest-bearing shorter-term Treasury securities. Because the two assets would seem to be nearly perfect substitutes, there can be no price effects from altering the composition of the two assets. The central bank is simply swapping two \$10 bills for a twenty. If this is true, then undoing the trade via QT has no effect either. It should be symmetrical.

The alternative view, based on market segmentation or preferred habitat theory, is that when a central bank uses reserves to pay for government securities, it is decreasing the supply of these securities to private investors, which will bid up the price and lower the interest rate on government securities.² By lowering interest rates on longer-maturity

² There are several theories for how QE works. The market segmentation theory suggests that assets of different maturities are imperfect substitutes, so a lower supply of long-term assets and a higher supply of short-term assets would imply that long-term interest rates fall and short-term interest rates rise. The

assets, which pay a higher interest rate than reserves, the central bank can stimulate the economy in a manner similar to lowering the policy rate. But by this logic, when QT reverses QE, asset prices should fall and yields should rise in equal magnitude. Thus, any positive effects derived from QE would be reversed when QT occurs. This suggests that QE and QT may cancel each other out in welfare terms. But if there are no net benefits from the action, what is the point of doing it? To illustrate this point, suppose someone is given a weight-loss drug and they lose 80 pounds, but then the drug is taken away and they regain the 80 pounds. What was the point of the exercise if there was no net welfare gain?

To me, for QE to be beneficial on net, there *has* to be asymmetry in the effects of QE relative to QT. My thinking on this has long been guided by the conclusions of a paper I wrote with Alex Berentsen about optimal stabilization policy, which is what QE and QT ultimately should be about.³ The gist of the argument is that when shocks and frictions to trading arise suddenly, the central bank can take actions such as injecting reserves to ease trading frictions or credit constraints and improve welfare. But by waiting until the frictions and shocks dissipate before undoing the injections, the positive effects are not reversed. As an example, when a house is on fire, pouring water on the fire will put it out, which has great benefits for all. But when the fire is out, draining the water away does not reignite the fire—the initial benefits are not undone. The punchline here is that QE is conducted under different market conditions than those that occur when

preferred habitat theory suggests that financial market participants prefer certain asset maturities over others and the price (or interest) rate needs to adjust to change their desired mix of holdings.

³ For details of the model and results, see Aleksander Berentsen and Christopher Waller (2011), “Price-Level Targeting and Stabilization Policy,” *Journal of Money, Credit and Banking*, vol. 43, Supplement 2 (October), pp. 559–80.

QT is done, so it is not surprising that the effects will be different. The authors' findings that QE has asymmetric effects compared to QT is not a puzzle but an indication that central banks timed QE and QT in the right manner such that society was better off.

The Execution of Quantitative Easing versus Quantitative Tightening

Turning to the impact of QE and QT on interest rates, analysis often focuses on the term premium. There are three key elements of asset purchases that change the term premium: (1) the expected path of QE, which includes the amount and timing of purchases; (2) the length of time the central bank is expected to hold the additional securities; and (3) the expected path of QT, including the amount and timing of redemptions, which importantly depends on the desired ultimate size of securities holdings (and reserve balances) of the central bank. As soon as an asset purchase program is announced, these expectations are formed, resulting in the term premium effect, or TPE, on interest rates.

Over time, the TPE will change, based on both the passage of time and any updates to the public's expectations for the components I just mentioned. Let me talk about three factors that affect both the expected path of asset purchases and interest rates. These factors are things to keep in mind for future policy decisions.

First, there are two ways that QE can be implemented, and they have different impacts on interest rates. These are what I call *closed-* or *open-ended* QE programs. Closed-ended QE programs involve an announcement of a fixed stock of purchases over a fixed period of time. An example of this type of asset purchase program was initiated by the Fed in March 2009.⁴ Open-ended QE simply gives a purchase amount per month

⁴ An example of a closed-ended program is from March 2009, when the Federal Open Market Committee (FOMC) noted that "to help improve conditions in private credit markets, the Committee decided to

but no calendar endpoint, so the expected size of the program is unspecified. A set of economic conditions for reducing or ending purchases may be stipulated, but when they will occur is not perfectly predictable. Here, one can think of the Fed's most recent asset purchase program.

At the time of an asset purchase announcement, it will be easier for markets to fully price in a closed-ended program, since its purchase amount and end date are given, whereas the open-ended program's pricing will depend on market expectations for the evolution of the economy. So if one wants a particular impact on interest rates at the announcement date, one might lean toward a closed-ended program or be aware that additional guidance on the expected path of the open-ended program will be needed.

As time passes and the economy evolves, the two programs work differently. One might prefer an open-ended program over time because it dynamically responds to the evolution of economic conditions. The program could be halted or extended as conditions improve or worsen, unlike a closed-ended program. But, of course, the criteria set in the open-ended program must be carefully considered. As I said in a recent FEDS Note and in several speeches, the 2020 criteria for when to begin QT may have been too restrictive and did not allow the Committee to taper as soon and as gradually as

purchase up to \$300 billion of longer-term Treasury securities over the next six months"; see paragraph 3 of the March 2009 FOMC statement, which is available on the Board's website at <https://www.federalreserve.gov/monetarypolicy/fomccalendars.htm>. An example of an open-ended program is from December 2020, when the FOMC stated it would keep buying \$120 billion per month in securities "until substantial further progress has been made toward the Committee's maximum employment and price stability goals"; see paragraph 4 of the December 2020 FOMC statement, which is available on the Board's website at <https://www.federalreserve.gov/monetarypolicy/fomccalendars.htm>.

desired.⁵ Setting the appropriate criteria ahead of time to create the flexibility needed to respond to changing economic and financial conditions is very hard to do.

The second factor affecting the path of asset purchases is that it is very important that QE be credibly followed by QT. If QE is viewed as nothing more than a permanent injection of money into the economy, it would likely create inflation. This was widely predicted back in 2009, but the inflation didn't happen. Why? In my view, it didn't happen because the Fed credibly committed to withdrawing the injected reserves at a later date. Pre-committing to QT is what allows the injection of reserves into the economy without inflation or other longer-run distortions of market pricing. So when starting asset purchases or weighing how to approach asset runoff or sales, it is important that the central bank commit to normalizing its balance sheet.

The third factor is that it is important for a central bank to move carefully as it comes to the end of QT and the desired level of ample reserves. The endpoint should be related to the expectation of the banking system's demand for reserves. In the United States, we saw stresses in money markets in the fall of 2019, when the Fed reduced the level of reserves during balance sheet normalization through July and then there was heavy issuance of Treasury securities in September. The level of reserves likely went a bit too low.⁶ Learning from our experiences and trying to understand how the demand for reserves has changed over time suggests moving carefully toward the endpoint of QT.

⁵ See Jane Ihrig and Chris Waller (2024), "The Federal Reserve's Responses to the Post-COVID Period of High Inflation," FEDS Notes (Washington: Board of Governors of the Federal Reserve System, February 14), <https://doi.org/10.17016/2380-7172.3455>.

⁶ For a discussion of the September 2019 experience, see Sriya Anbil, Alyssa Anderson, and Zeynep Senyuz (2020), "What Happened in Money Markets in September 2019?" FEDS Notes (Washington: Board of Governors of the Federal Reserve System, February 27), <https://doi.org/10.17016/2380-7172.2527>.

For this reason, even if QE is an open-ended program, QT is more likely to resemble a closed-ended program. Central banks usually have an idea of how large they want their balance sheet to be when QT ends; therefore, once the pace of QT is announced, markets should be able to effectively price in the entire program at the announcement of the plan. After that, the actual execution of QT is simply validating the beliefs that market participants had at the announcement. This is why many refer to QT as merely draining unneeded reserves, which should be as interesting as watching paint dry.

Quantitative Tightening in the United States

Let me now turn more directly to the authors' paper and two of their findings. First, as I mentioned earlier, they find central banks' QT announcements have only a small effect on interest rates. To conduct this analysis, the authors do an event study around QT announcements, which requires them to identify "surprises" in the QT announcements. As the authors acknowledge, this is not a trivial exercise. My comment here is to point out why identifying a QT announcement surprise is challenging when considering examples in the United States.

Let me walk through the evolution of the Fed's QT communications in the spring of 2022 to consider how various communications affected the expected path of QT.⁷ Recall that QE ended in March 2022.⁸ Heading into April, it was likely that markets

⁷ Prior to the spring announcements, the Federal Open Market Committee (FOMC) began discussions on policy normalization as reported in the December 2021 FOMC minutes. It was noted that some participants observed that the balance sheet could potentially shrink faster than the previous experience. The 10-year Treasury yield moved up several basis points around the release of the minutes.

⁸ In March 2022, the Federal Open Market Committee (FOMC) indicated that it "expects to begin reducing its holdings of Treasury securities and agency debt and agency mortgage-backed securities at a coming meeting"; see paragraph 3 of the March 2022 FOMC statement, which is available on the Board's website at <https://www.federalreserve.gov/monetarypolicy/fomccalendars.htm>. This language signaled the Fed

expected a redemption path somewhat like the Fed’s 2017–2019 QT plan.⁹ That plan phased in redemptions over 12 months and ultimately allowed, at most, \$30 billion of Treasury securities and \$20 billion of agency mortgage-backed securities (MBS) to be redeemed each month. On April 5, 2022, then-Vice Chair Lael Brainard gave a speech that noted the balance sheet would shrink considerably more rapidly than in the previous case of QT; specifically, she said that “significantly larger caps and a much shorter period to phase in the maximum caps compared with 2017–2019.”¹⁰ The next day, the Federal Open Market Committee (FOMC) minutes provided additional information on the expected maximum monthly caps and phase-in period, saying participants generally agreed to a three-month phase-in and caps of \$60 billion and \$35 billion for Treasury securities and agency MBS, respectively.

Over those two days in April, the markets likely updated their expected QT plans to have sooner and larger redemptions. This change would be associated with a less negative term premium effect, meaning a rise in Treasury yields. The 10-year Treasury yield rose 19 basis points over the two days of the Vice Chair’s speech and the FOMC minutes—that is, 12 basis points on the day of her speech and another 7 basis points on the day of the FOMC minutes—and a total of 37 basis points over that week.

would be holding the peak amount of securities on its balance sheet for just a short period of time, which turned out to be between March and the end of May.

⁹ In January 2022, the Federal Open Market Committee provided a statement on “Principles for Reducing the Size of the Federal Reserve’s Balance Sheet,” but it did not provide information about the timing or pace of redemptions; the statement is available on the Board’s website at <https://www.federalreserve.gov/newsevents/pressreleases/monetary20220126c.htm>.

¹⁰ See Lael Brainard (2022), “Variation in the Inflation Experiences of Households,” speech delivered at the Spring 2022 Institute Research Conference, Opportunity and Inclusive Growth Institute, Federal Reserve Bank of Minneapolis, Minneapolis, April 5, <https://www.federalreserve.gov/newsevents/speech/brainard20220405a.htm>.

About a month later, on May 4, 2022, the FOMC communicated its “Plans for Reducing the Size of the Federal Reserve's Balance Sheet.” The plan was consistent with the FOMC minutes from April, and there was little change in the 10-year Treasury yield that day and week (negative 4 basis points on the day of the announcement and 2 basis points over the five-day period). So, when doing event studies, it may be difficult to estimate the full impact of QT announcements by simply looking at the formal announcement of the QT plan.

Let me turn to a second point of the paper, about which types of investors have increased their securities holdings as the Fed has reduced its holdings. When a central bank steps away from asset purchases and begins to shrink its balance sheet, a common question is, who will step in and take the central bank’s place in buying securities? I always respond by saying, “Why is this important?” If the government bond market is broad and deep, there will be plenty of buyers—there is no need to worry about who will buy the government debt. If the government bond market is not broad or deep, however, then the central bank’s actions can have adverse and unwanted effects on prices and market functioning. This would then affect how fast the central bank can reduce its balance sheet and whether it can do so passively or actively.

One could also argue that it matters because knowing the buyers helps one understand the transmission of QT to asset prices and interest rates. Does it matter if it is banks or nonbank financial firms that are doing the buying? Does it matter if it is hedge funds, pension funds, or actual households doing the buying? One needs to have a better understanding of why the question is being asked before one can fully understand the answers to the question.

The authors focus on the reduction in aggregate securities holdings of central banks and find that households and broker-dealers are the main investors absorbing the redeemed securities. For my discussion today, I decided to dig a bit deeper into the Financial Accounts of the United States in two ways. First, I decided to look at each type of security (Treasury securities and agency MBS) individually.¹¹ For Treasury securities, I also find that since the 2022 start of QT, households have boosted their market share the most, and broker-dealers have also increased their share. For agency MBS, not only has the market shares of those two investor types increased, but so has the market shares of money market funds.

Second, I dug into the household category a bit more. As currently categorized, the Financial Accounts household category includes hedge funds. The Federal Reserve Board is working to segregate hedge funds in this data set. In the interim, the Board publishes separate data on the balance sheets of domestic hedge funds.¹² Using this supplemental data, I find that it is not the hedge funds that are responsible for the increase in household market share. This means the increase is driven by the other household investors: actual households and nonprofit organizations.

What do I make of this finding? My interpretation is that it reinforces the view that the demand for U.S. Treasury securities is broad and deep—the buyers are not a narrow set of deep-pocketed, sophisticated investors but rather the American public. As a result, the pace of runoff is not a problem. As we have seen with the current phase of

¹¹ My calculations look at how investor types' market shares change over time, as is done in Seth Carpenter, Selva Demiralp, Jane Ihrig, and Elizabeth Klee (2015), "Analyzing Federal Reserve Asset Purchases: From Whom Does the Fed Buy?" *Journal of Banking and Finance*, vol. 52 (March), pp. 230–44.

¹² Data on the balance sheet of hedge funds is available on the Board's website at <https://www.federalreserve.gov/releases/z1/20231207/html/b101f.htm>.

QT, runoff up to \$95 billion a month is not causing substantial strains in financial markets—something that a few years ago would have surprised a lot of people, given the worries about QT that were common prior to 2022.

Normalization

Let me conclude with a few comments on where I believe the Fed should be heading as it continues to normalize its balance sheet. By “normalizing” I mean reducing the size of the balance sheet but retaining enough assets to manage monetary policy using an ample-reserves regime.

As the Federal Reserve continues its QT program, I support further thinking about how many more securities to redeem. We have an overnight reverse repurchase agreement facility with take-up of more than \$500 billion, and I view these funds as excess liquidity that financial market participants do not want, so this tells me that we can continue to reduce our holdings for some time.

In addition, it is important to remember that we now have a standing repurchase agreement facility (SRF). The SRF serves as a backstop in money markets, since it takes in Treasury securities as well as agency MBS and puts reserves in the banking system. This facility may allow banks to lower the level of reserves below what reserves would be without the facility, and it may provide a signal for when reserves are getting close to ample.

Chair Powell has noted that the FOMC will begin to discuss slowing our redemptions at our FOMC meeting this month, which will help us transition into whatever definition of “ample” we deem appropriate. Changing our pace of redemptions will occur when the Committee makes a decision to do so, and the timing will be

independent of any changes to the policy rate target. Balance sheet plans are about getting liquidity levels right and approaching “ample” at the correct speed. They do not imply anything about the stance of interest rate policy, which is focused on influencing the macroeconomy and achieving our dual mandate.

Thinking about longer-term issues related to the Fed’s portfolio, I want to mention two things. First, I would like to see the Fed’s agency MBS holdings go to zero. Agency MBS holdings have been slow to run off the portfolio, at a recent monthly average of about \$15 billion, because the underlying mortgages have very low interest rates and prepayments are quite small. I believe it is important to see a continued reduction in these holdings.

Second, I would like to see a shift in Treasury holdings toward a larger share of shorter-dated Treasury securities. Prior to the Global Financial Crisis, we held approximately one-third of our portfolio in Treasury bills.¹³ Today, bills are less than 5 percent of our Treasury holdings and less than 3 percent of our total securities holdings. Moving toward more Treasury bills would shift the maturity structure more toward our policy rate—the overnight federal funds rate—and allow our income and expenses to rise and fall together as the FOMC increases and cuts the target range. This approach could also assist a future asset purchase program because we could let the short-term securities roll off the portfolio and not increase the balance sheet.¹⁴ This is an issue the FOMC will need to decide in the next couple of years.

¹³ A Treasury bill is a security backed by the U.S. Treasury Department with a maturity of up to 52 weeks. A bill is sold at a discount, and at maturity the investor receives the par value of the security.

¹⁴ There may be other considerations for holding a sizable share of bills in the Fed’s portfolio. For example, Vissing-Jorgensen (2023) argues for considering the convenience yield impact of bills; see Annette Vissing-Jorgensen (2023), “Balance Sheet Policy above the ELB,” paper presented at the ECB Forum on Central Banking, held in Sintra, Portugal, June 26–28.

In conclusion, let me be clear that this is a great paper that will serve as a major reference for researchers and central banks. The authors' analysis will surely have a much longer shelf life than my discussion of it.