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Working Paper

Announcement Effects of Federal Reserve Quantitative Tightening on Financial Markets

Announcement effects of Federal Reserve Quantitative Tightening on Financial Markets[1]

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Abstract

This paper analyses the effects of Fed's QT announcements on financial asset prices and financial stability metrics, and compared them with those of (i) QE and (ii) tapering. We find evidence of strong heterogeneity in the announcements effects of these three balance sheet measures. QE and Tapering events lead to strong readjustments in prices of all asset classes, while QT announcements had been fully anticipated by market participants.

Keywords: Monetary Policy, Quantitative Tightening, Balance Sheet, Announcement's Effects, Event Study

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I. Introduction

In 2022, central banks began tightening their monetary policy to counter inflation running well above their long-run target, with policy rates hikes and the normalisation of their balance sheet. While much has been said about how and how much quantitative easing (QE) affects asset prices and the economy, much less is known about quantitative tightening (QT). The uncertainty regarding the effects of QT was stressed by Jerome Powell at the Press Conference on May 4, 2022: « I would just stress how uncertain the effect is of shrinking the balance sheet ». The Fed's quantitative tightening from 2017 to 2019 is the only other experience of QT, and the reduction of about USD 700 billions reversed course in September 2019 after a spike in various short-term market rates suggested that the reduction in reserve supply led to an undesired scarcity of liquidity.

In this paper, we study the announcements effects of unwinding Fed balance sheet on a wide range of financial assets prices and financial stability metrics. Our valuable contributions are to (i) compare the reaction of our financial variables to quantitative easing, tapering and quantitative tightening announcements, and (ii) dress an overall vision of financial markets' reaction to QT announcements. We build on the methodology of Cahill et al. (2013), who rely on relative price changes of financial assets in small time windows around QT announcements.

Our findings show strong asymmetries in the reaction of financial markets to balance sheet expansions, normalisation and unwinds. QE and Tapering events lead to strong variations in the price of all asset classes, while QT announcements had been fully anticipated by the market players. These asymmetries demonstrate the power of central bank communication in affecting market expectations. Our second main result is that none of these measures led to financial instability at the time of their announcements, except QT which affects the liquidity of the treasury market. This finding is consistent with the fact that QT drains liquidity from markets by removing a guaranteed buyer of massive amounts of debt securities.

II. Data and estimation strategy

We focus on a narrow set of official communications, each of which contained new information concerning the potential or actual expansion or diminution of the size, composition, and timing of these measures[1]. A total of 18 communication events for QE, 3 for tapering and 12 for quantitative tightening are identified and reported in tables 1, 2 and 3 in the Appendix. We built our dataset by capturing the average reaction of yield variables and price variables to all announcements related to (i) QE, (ii) Tapering and (iii) QT between 2008 November and 2022 May. We study the announcement effects of QT, Tapering and QE on (i) a wide range of asset classes and on (ii) market financial stability metrics:

- **Bond market** with UST yields from different maturities (2-, 5-, 10-, 30y)}, Bloomberg US Mortgage-Backed-Securities index average yield-to-worst (MBS), 10y Treasury term premium, Bloomberg Global aggregate total return index (Global bond) and global high yield total return index (HY). The idea is to look at the effect of QT, QE and tapering on the most impacted asset classes by theses balance sheet measures (Treasuries and MBS) and the impact on other bond classes (i.e. High Yield corporate bonds).

[1] Sources: Smith & Valcarcel, 2021; FOMC Meeting calendars, statements, and minutes; Federal Reserve History of the FOMC's Policy Normalization Discussions and Communications.

- **Stock market** with S&P 500, S&P 500 Banks (to take into account the potentially greater impact on banks, more affected by rates changes), S&P 500 Equity risk premium total return index (Risk prem.). Equity markets can be impacted by QT through its effects on bond yields: rising interest rates (i) may cause investors to switch from equities to bonds, which now offer a better return than before and (ii) may amplify the economic downturn, which could negatively affect corporate earnings and de facto negatively impact equities performance.
- **Other asset classes** with dollar index (DXY), gold price spot in USD (by ounce), Brent Crude Oil Continuous Contract (USD/bbl). The first two variables are directly affected by rate variations.
- **Market stability metrics** with CBOE VIX (volatility indicator of the US equity market), MOVE index (volatility indicator of the US Treasury market), FRA-OIS Spread (funding market liquidity indicator), US Gov. securities liquidity index (UST Liquidity), 10y UST Bid-Ask spread (US Treasury liquidity indicators), OFR FSI index (FSI) (global financial market stress indicator).

We follow Krishnamurthy and Vissing-Jorgensen (2011) and Smith and Valcarcel (2023) and study the change in asset prices and financial stress measures in a two-day window around Fed announcements, measured from the closing level the day prior to the announcement to the closing level the day after the announcement. The two-day window allows for late-in-the-day announcements effects to fully reflect though to asset prices the following day. However, we risk the estimated reaction being contaminated by other news events. To prevent this, we add two control variables to our model: (i) the CME 30 days Fed fund futures and (ii) the Bloomberg economic surprises to neutralize changes in asset prices due to (i) announcements related to changes in Fed fund rates (conventional monetary policy) and (ii) United-States macroeconomic publications.

We run OLS regressions for each financial markets variables:

$$\Delta Yt = \beta^{QE} QE_t + \beta^{Taper} Taper_t + \beta^{QT} QT_t + \alpha_1 X_1 + \alpha_2 \Delta X_2 + \varepsilon t \quad (1)$$

Where ΔYt is the two-day change in the yield or percent change in asset price and QE_t, $Taper_t$ and QT_t are dummy variables, which takes a value 1 on the dates that were related quantitative easing, tapering or quantitative tightening events. X_1 and X_2 the control variables correspond respectively to economic surprises and Fed fund futures.

III. Results

Table 1: Two-days change in variables in basis points

	UST 2y	UST 5y	UST 10y	UST 30y	MBS
All QE Events	-3.03*	-7.88*	-11.05**	-8.07**	-23.67**
	(1.35)	(1.81)	(1.83)	(1.82)	(2.69)
All Taper Events	3.93	15.72***	13.45**	9.09**	20.61***
	(3.30)	(4.42)	(4.48)	(4.44)	(6.57)
All QT Events	-0.50	-0.07	0.45	0.17	1.07
	(1.65)	(2.21)	(2.24)	(2.22)	(3.29)

	Term premium	CBOE VIX	FRA-OIS	UST Liquidity
All QE Events	-12.92***	1.48*	4.96	30.77
	(4.26)	(0.62)	(3.67)	(20.33)
All Taper Events	9.35	0.87	0.40	15.67
	(10.40)	(1.51)	(8.96)	(49.64)
All QT Events	1.64	0.43	-1.70	-0.10
	(5.21)	(0.75)	(4.48)	(24.86)

Table 2: Two-days change in variables in %

	Global Bond	HY	S&P500	S&P500 Bks	Risk prem.
All QE Events	0.58***	-0.29**	-0.65*	-0.62*	-1.70***
	(0.10)	(0.14)	(0.39)	(0.13)	(0.63)
All Taper Events	-0.63**	-0.63*	-1.20	-0.91	0.18
	(0.26)	(0.36)	(0.96)	(0.33)	(1.55)
All QT Events	-0.28	-0.28	-0.30	-0.10	-0.34
	(0.13)	(0.18)	(0.48)	(0.16)	(0.77)

	DXY	Gold	Brent	UST Bid-Ask	FSI	MOVE
All QE Events	-0.38*	1.22***	-2.36	0.58	19.61	-5.35*
	(0.16)	(0.37)	(2.62)	(10.02)	(20.01)	(2.91)
All Taper Events	0.67*	-2.64***	-1.25	-3.86	-13.70	11.53
	(0.39)	(0.91)	(3.86)	(24.46)	(48.85)	(7.10)
All QT Events	0.16	-0.22	-0.84	28.66*	-7.11	-0.29
	(0.19)	(0.45)	(1.93)	(12.25)	(24.46)	(3.55)

Notes: Coefficients β^{QE}, β^{Taper} and β^{QT} from the regression: $\Delta Yt = \beta^{QE} QE_t + \beta^{Taper} Taper_t + \beta^{QT} QT_t + \alpha_1 X_1 + \alpha_2 \Delta X_2 + \varepsilon t$. OLS standard errors are reported in parenthesis. Sample Period: November 2008 to May 2022. Observations: 3712. *** < 0.01, ** < 0.05, * < 0.10.

We observe huge heterogeneity in the reaction of yields to these three types of monetary announcements. QE announcements lead to the decrease of medium and long-term UST and MBS yields, consistent with the term premium channel Vaccaro-Grange 2019). Fed's assets purchases create a shortage of long-term safe bonds on the market, that leads to an increase in these bonds prices and a decrease in the term premium component of the associated yields. Then, market's participants re-balance the composition of their portfolio towards shorter-ones, or invest in maturity-equivalent corporate bonds (and other riskier assets). This mechanism appears here with a 13 basis point decrease in the term premium following QE events. The immediate reaction of yields to tapering events is perfectly symmetric. Taper announcements led to meaningful upward revisions across much of the yield curve from market participants while these remain perfectly stable following QT communication. The lack of announcements effects from communication relative to balance sheet unwinding is compliant to the objective of the Fed. It announced its plans for shrinking the balance sheet well in advance, and the QT process is happening passively following a fixed schedule.

Additionally, we observe no significant announcement effects of QT on broader financial markets in contrast to QE and Taper events which affect financial variables not directly related to the content of the balance sheet of the Fed. Currency exchange rates move in response to rate differentials, in accordance with the Uncovered Interest Rate Parity theory. Gold price increases

of 1.22% following QE events, decreases of 2.64% following Tapering announcements and has no reaction following QT events. When bond yields decreases, investors may turn to gold as an alternative safe-haven asset to park their money. Tapering announcements exacted negative performance of the S&P500 of 1,20%. In contrast, announcements related specifically to unwinding past asset purchases caused no similar tightening. Similar to higher interest rates, which can decrease corporate profitability and depress stock prices, QT can have an adverse effect on equities. When long-term bonds yields increase, investors may want to shift from stocks to long-term bonds. Indeed, if expected returns from bonds are higher, it reduces the need to own riskier assets (equities) to meet long-term investment goals for an investor. This effect does not materialize at the time of the announcement because the Fed had been transparent enough beforehand and investors have already readjusted their expectations in asset prices.

Regarding the effects on financial stability metrics, no effect is significant except QT events which lead to an increase of 28% of the bid-ask spread of US 10y Treasuries, i.e. an increase of the difference between the price that someone is willing to pay (the bid) and where someone is willing to sell (the offer or ask). Wider bid-ask spreads occur in less liquid or highly-volatile markets. This spread widening following QT announcements suggests that bond investors are concerned by evaporating liquidity as the Fed winds down its Treasury holdings. This is consistent with the fact that QT drains liquidity from markets by removing a guaranteed buyer of massive amounts of debt securities.

IV. Conclusion

According to Janet Yellen, quantitative tightening is supposed to be boring by design ("it'll be like watching paint dry", 2017), but there has been little empirical analysis of the financial market impact of balance sheet unwinding. The objective of this paper is to better understand this monetary policy dimension, at a time when several major central banks have initiated the normalization of their balance sheets. Our results confirm that quantitative tightening's announcements had no effect on the valuation of all asset classes, because they had been well-communicated and are likely reflected in current market prices. The absence of effects on asset prices is specific to quantitative tightening. The lack of financial markets effects around QT communication does not guarantee that this measure will not lead to disruptions in the markets as it is implemented. Bank's reserves level, money market and treasury market liquidity must requires close monitoring by central bankers.

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Appendix

Table 3: Major QE events by the Federal Reserve, 2008 - 2022

Date	Description
25.11.2008	Fed announces its intention to purchase up to $100bn of agency debt securities and up to $500 billion of agency MBS.
01.12.2008	Bernanke stated Fed "could purchase longer-term Treasury or agency securities."
16.12.2008	Fed is "ready to expand its purchases of agency debt and MBS as conditions warrant", and suggests of extending QE to UST purchases.
28.01.2009	Fed was ready to expand the quantity and duration of MBS purchases.
18.03.2009	FOMC "will purchase up to an additional $750bn of agency MBSs, up to $100bn agency debt this year and up to $300bn longer-term UST securities over the next six months."
10.08.2010	FOMC states that it will keep constant the Fed's holdings of securities at their current level "by reinvesting principal payments from agency debt and MBS in longer-term UST securities"
27.08.2010	Bernanke suggested additional QE "should further action prove necessary."
21.09.2010	FOMC "is prepared to provide additional accommodation if needed."
15.10.2010	Bernanke commented the drawbacks of large scale asset purchases.
03.11.2010	FOMC announces its LSAP2.
09.08.2011	FOMC "is prepared adjust those (securities) holdings as appropriate."
21.09.2011	FOMC announces the maturity extension program (MEP).
20.06.2012	FOMC states that it will extend its ongoing MEP through the end of 2012.
22.08.2012	In FOMC Minutes, FOMC members "judged that additional monetary accommodation would likely be warranted fairly soon."
13.09.2012	FOMC announces its LSAP3, an open-ended purchases of $40 billion per month in MBS.
16.03.2020	The Committee will increase its holdings of Treasuries by at least $500 billion and its holdings of agency MBS by at least $200 billion over the coming months.
23.03.2020	The Fed will increase its holdings of UST and MBS in the amounts needed to support the smooth functioning of markets for UST and MBS.
10.06.2020	The Fed will increase its holdings of UST and agency residential and commercial MBS at least at the current pace to sustain smooth market functioning.

Table 4: Major Tapering events by the Federal Reserve, 2008 - 2022

Date	Description
22.05.2013	Bernanke says that the FOMC "could in the next few meetings, take a step down in its pace of purchases" if its members see continued improvement.
19.06.2013	Bernanke remarks that the FOMC "currently anticipates that it would be appropriate to moderate the monthly pace of purchases later this year."

18.12.2013	FOMC announces it will start to taper its purchases of MBS and longer-term Treasuries to a pace of $35 billion and $40 billion per month.

Table 5: Major Quantitative Tightening events by the Federal Reserve, 2008 -2022

Date	**Description**
21.05.2014	FOMC Minutes signals beginning of balance sheet normalization planning.
09.07.2014	FOMC Minutes discusses gradual approach to ceasing asset reinvestments.
15.07.2014	Yellen said “it will make further measured reductions in the pace of asset purchases at upcoming meetings.”
17.09.2014	FOMC releases Policy Normalization Principles and Plan.
29.10.2014	FOMC announces that it will “conclude its asset purchase program this month.” The policy of reinvesting the principal of maturing securities is maintained.
05.04.2017	FOMC Minutes state “most participants judged that a change to the Committee’s reinvestment policy would likely be appropriate later this year,” and that "reductions in the Fed’s securities holdings should be gradual and predictable".
24.05.2017	FOMC Minutes detail plan for phasing out reinvestment.
14.06.2017	FOMC states that it “expects to begin implementing a balance sheet normalization program this year.”
20.09.2017	FOMC announces that, “in October, the Committee will initiate the balance sheet normalization program described in the June 2017”.
19.12.2018	Powell states: “We would effectively have the balance sheet runoff on automatic pilot.”
06.04.2022	FOMC Minutes state “Participants generally agreed that monthly caps of about $60 billion for Treasury securities and about $35 billion for agency MBS would likely be appropriate”
04.05.2022	FOMC decides to begin reducing its holdings of Treasury securities and agency debt and MBS on June.