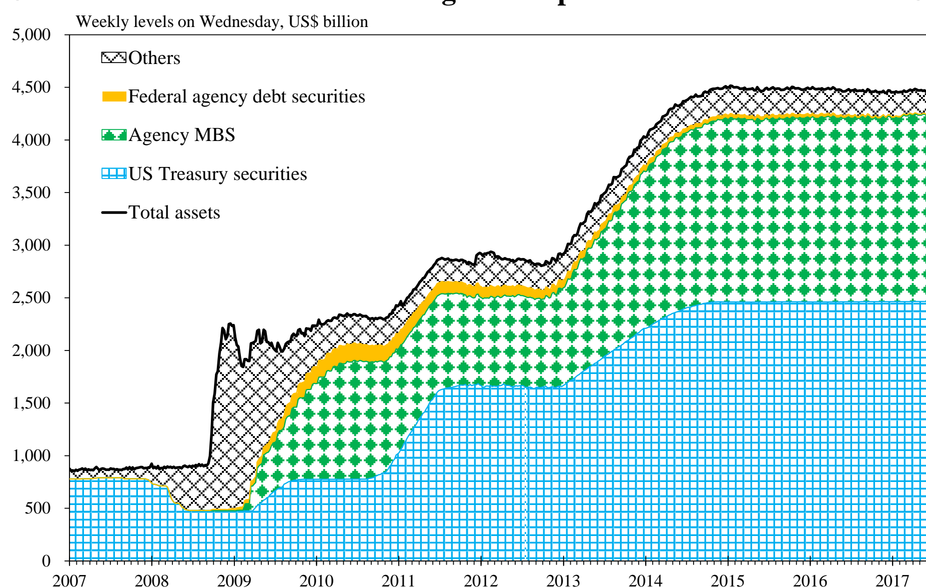
Box 2.1

The US Federal Reserve's balance sheet normalisation

In June 2017, on top of announcing the fourth interest rate hike since December 2015, the US Federal Reserve (Fed) unveiled a plan on normalising its balance sheet, which was expected to start relatively soon according to its statement following the latest Federal Open Market Committee (FOMC) meeting in late July. As reducing the size of the Fed's balance sheet is one of the key aspects of the ongoing monetary policy normalisation in the US, this note intends to examine the Fed's plan and explore its possible implications.

The Fed conducted a series of large-scale asset purchases under its quantitative easing programmes in the wake of the global financial crisis of 2008 (GFC) to ease overall financial conditions and stimulate economic activity in the US. Since then, the Fed has kept its securities holdings at unprecedented levels by reinvesting principal payments received from maturing US Treasury securities, federal agency debt securities and agency mortgage-backed securities (MBS). The amount of assets held by the Fed hovered around US$4.5 trillion since its asset purchase programmes ended in late 2014, representing a significant increase from the pre-crisis level of around US$900 billion (***Chart 1***). Within this, US Treasury securities and agency MBS comprised 55% and 40% of the Fed's total assets respectively.

Chart 1 : The Fed's total assets surged to unprecedented levels after the GFC



Source: Federal Reserve Bank of New York.
Note: Latest position as of 26 July 2017.

Table 1 shows the maturity distribution of the Fed's securities holdings as of 26 July 2017. More than half of the Fed's US Treasury securities will mature by end-2021, while less than 1% of agency MBS will mature within the coming five years. As for federal agency debt securities, the majority will reach maturity by end-2018 and will be reinvested into agency MBS under the Fed's current reinvestment policy.

Table 1 : The maturity distribution of the Fed's securities holdings as of 26 July 2017

Maturity date		Rest of 2017	2018	2019	2020	2021	2022	Beyond 2022	**All**
US Treasury securities*	US$ billion^	90	426	370	232	239	201	889	**2,447**
	% of total	4	17	15	10	10	8	36	**100**
Agency MBS	US$ billion#	&	&	&	0.2	0.4	0.1	1,768	**1,769**
	% of total	&	&	&	0.01	0.02	0.01	99.95	**100**
Federal agency debt securities	US$ billion^	4	2	0.1	-	-	-	2	**8**
	% of total	46	24	0.8	-	-	-	29	**100**

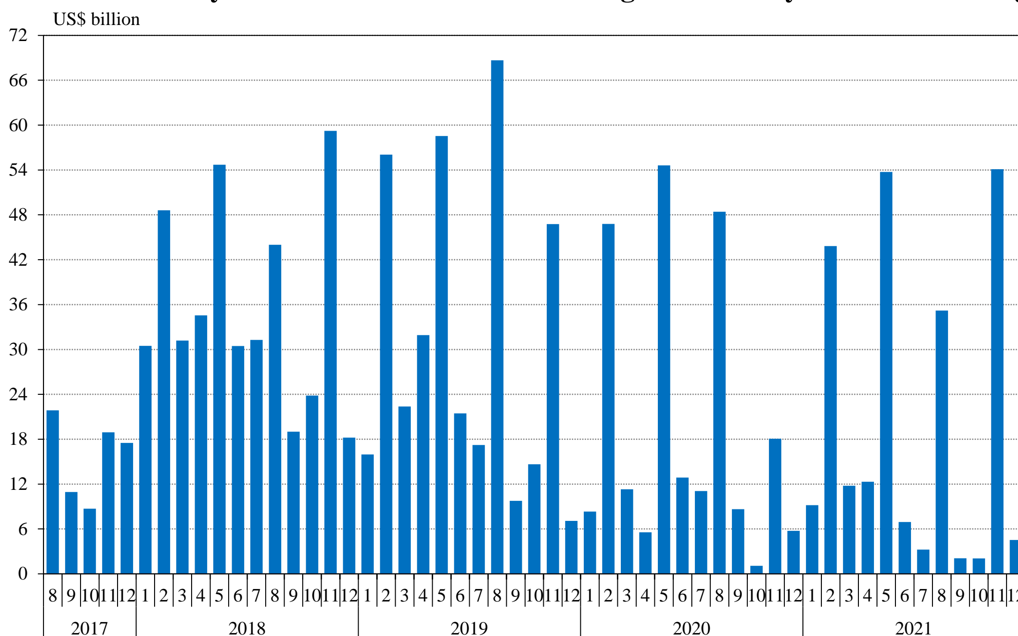
Notes: Compiled based on data from the Federal Reserve Bank of New York.
* Does not include the compensation that adjusts for the effect of inflation on the original face value of inflation-indexed securities, which amounted to US$19 billion as of 26 July 2017.
^ Face value.
\# Remaining principal balance of the securities.
& Less than US$5 million and 0.005%.

Box 2.1 (Cont'd)

To unwind its balance sheet, the Fed plans to gradually scale back reinvestments of its securities holdings by setting monthly caps[(1)], such that only the amount exceeding these caps will be reinvested each month. According to this plan, the scale of the Fed's balance sheet reduction is relatively small when compared to its prevailing securities holdings. The amount of securities that would be rolled off over the first twelve months is capped at US$300 billion, equivalent to 7% of the Fed's current total securities holdings. Provided that the monthly caps as announced are to remain in place, the decline in the Fed's balance sheet over each subsequent twelve-month period would be limited to US$600 billion or 14% of its current total securities holdings.

These monthly caps, however, may not be binding. As an illustration, ***Chart 2*** shows that the monthly face value of maturing US Treasury securities ranges from less than US$6 billion to over US$65 billion. Hence the amount of maturing US Treasury securities in a particular month can be lower than the corresponding monthly cap in many occasions. As for agency MBS, while most of the Fed's holdings have a rather long period of maturity (over 10 years), the amount of principal payments received from these holdings is more difficult to determine in advance, as it consists of scheduled mortgage repayments and homeowners' mortgage prepayments of part or all of their remaining principal balance prior to the maturity date. The latter of which does not follow a pre-set schedule and depends on a range of factors, including the interest rate outlook, changes in house prices and credit conditions. Nonetheless, generally speaking, considering the maturity patterns of the Fed's Treasury securities and agency MBS holdings, the Fed's pace of scaling back its balance sheet could be slower than that suggested by its intended monthly caps.

Chart 2 : The monthly face value of the Fed's maturing US Treasury securities varies greatly



Source: Federal Reserve Bank of New York.
Note: Data as of 26 July 2017.

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(1) Based on the Addendum to the Policy Normalization Principles and Plans released on 14 June 2017, the caps will be set at US$6 billion per month for US Treasury securities and US$4 billion per month for federal agency debt securities and agency MBS. These caps will be raised once every three months by US$6 billion and US$4 billion per month respectively until they reach US$30 billion and US$20 billion per month in a year's time. The caps are anticipated to remain in place until the FOMC judges that the Fed is holding no more securities than necessary for efficient and effective monetary policy implementation.

Box 2.1 (Cont'd)

While the process of the Fed's balance sheet normalisation is expected to be gradual, its scale-down would presumably reverse some of the stimulating effects achieved by previous quantitative easing programmes. Large-scale asset purchases and subsequent reinvestments by the Fed have not only provided abundant liquidity to the financial system after the GFC, but have also lowered longer-term interest rates, thus holding down borrowing costs for households and firms and rendering support to the overall US economy. By means of its asset purchases that began in the wake of the GFC and ended as recently as in late 2014, the Fed had sent a signal of intent to the financial markets on its resolve to maintain an exceptionally accommodative monetary policy stance for a prolonged period of time. The successive asset purchases had effectively lowered market expectations for the future path of policy rates and posed downward pressures on longer-term interest rates. Besides, through the portfolio balance channel, the substantial increase in the Fed's longer-term securities holdings had reduced the amount of these assets available in the market, not only raising the prices of these assets and lowering their yields, but also raising the prices and lowering the yields of other assets with similar risk and return characteristics (e.g. longer-term and high quality corporate bonds) as well.

From the perspective of assessing the uncertainty ahead in the effect of unwinding some of the stimulus measures previously introduced by the Fed (in this case through gradually winding down its balance sheet), it is important to note that the Fed's prior quantitative easing programmes were unconventional measures and there is still yet to be a broadly agreed conclusion on the transmission channels through which they may have an effect on interest rates and macroeconomic variables, such as output, employment and inflation. Indeed, with factors such as investor expectations, economic policies and international economic, monetary and policy developments, intertwining with each other and affecting broader economic and financial conditions at the same time, it is challenging to quantify the standalone impact of the Fed's large-scale asset purchases. In a similar vein, there is no historical guidance for gauging the macroeconomic effects of the Fed's balance sheet normalisation, though the gradual unwinding of the Fed's long-term securities holdings could conceivably exert some upward pressure on bond yields and interest rates.

A recent paper by the Fed(2) released in April 2017 focused only on the portfolio balance channel and estimated that the 10-year US Treasury term premium effect was around negative 100 basis points at end-2016. In other words, this implies that the yield on a 10-year US Treasury security would be 100 basis points higher at end-2016 in the absence of the Fed's asset purchases and subsequent reinvestments, if considering solely the drag effect from this particular channel. Another Fed research paper(3) looked at whether the Fed's balance sheet reduction would have similar effects as raising interest rates. It is estimated that a US$675 billion reduction in the Fed's balance sheet over a two-year period could raise the term premium by around 25 basis points, which is roughly equivalent to around a quarter-point increase in the federal funds rate. But this result is largely dependent on the estimated term premium effect and the long-run neutral real rate of interest, which can vary when using different model frameworks and assumptions.

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(2) Bonis, Brian, Jane Ihrig, and Min Wei (2017). "The Effect of the Federal Reserve's Securities Holdings on Longer-term Interest Rates", Board of Governors of the Federal Reserve System, FEDS Notes, April 20.

(3) Davig, Troy, A. Lee Smith (2017). "Forecasting the Stance of Monetary Policy under Balance Sheet Adjustments", Federal Reserve Bank of Kansas City, The Macro Bulletin, May 10.

Box 2.1 (Cont'd)

Financial markets have reacted calmly to the Fed's announcement of its balance sheet normalisation plan thus far. Arguably, the looming balance sheet reduction by the Fed may have already been expected by market participants. However, uncertainties still abound, as the Fed did not offer a clear indication of the preferred size of its normalised balance sheet. So far, the Fed only stated that it would bring down its securities holdings to a level appreciably below that seen in recent years but larger than that before the GFC. Such a level would reflect the banking system's demand for reserve balances and the Fed's decisions about how to implement monetary policy most efficiently and effectively in the future. More importantly, while the Fed affirmed that changing the federal funds rate remains the primary means of adjusting its monetary policy stance, it is uncertain whether and how the scale-back of its balance sheet might affect the pace of its concomitant interest rate normalisation process going forward. In addition, although the European Central Bank and the Bank of Japan have maintained their asset purchase programmes in recent months, different monetary policy actions by major central banks could alter and complicate global financial and liquidity conditions.

Market speculations about these uncertainties could spark abrupt changes in risk sentiment and unintended increases in borrowing costs, and trigger sudden reversals of capital flows and oversized financial market reactions. Hence risks of renewed financial market volatility cannot be ruled out in the period ahead. For instance, in late May 2013, when the Fed signalled its intention of tapering its monthly asset purchases sometime later in the year, financial markets misinterpreted the Fed's signal as a tightening of its monetary policy stance and massive sell-offs in stock and bond markets took place across the globe. In the subsequent three months, the 10-year US Treasury yield advanced by almost 100 basis points.

Looking ahead, it is thus important that the Fed could give clarity about its future policy intentions with effective market communications, thereby containing the risks of a sharp tightening of liquidity conditions and abrupt disruptions to financial markets during the course of the Fed's monetary policy normalisation. Under such a more benign scenario, the US economy and the global economic and financial environment should hopefully be able to hold up.

As an international financial centre, massive capital flows go in and out of Hong Kong. Although the Fed's eventual balance sheet normalisation has added uncertainty to the global monetary environment, Hong Kong is capable of navigating through capricious global financial conditions with our resilient and robust financial system and strong economic fundamentals. That said, the Fed is poised to proceed with raising interest rates gradually, though the timing and pace of future interest rate hikes remain data-dependent. Under the Linked Exchange Rate System, interest rates in Hong Kong will eventually follow the movements of the US interest rates. The Government will continue to closely monitor the US monetary policy developments and stay vigilant to their possible impacts on the Hong Kong economy.