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CENTRAL BANK MONITORING – JUNE

Monetary Department
Monetary Policy and Fiscal Analyses Division

2017

In this issue

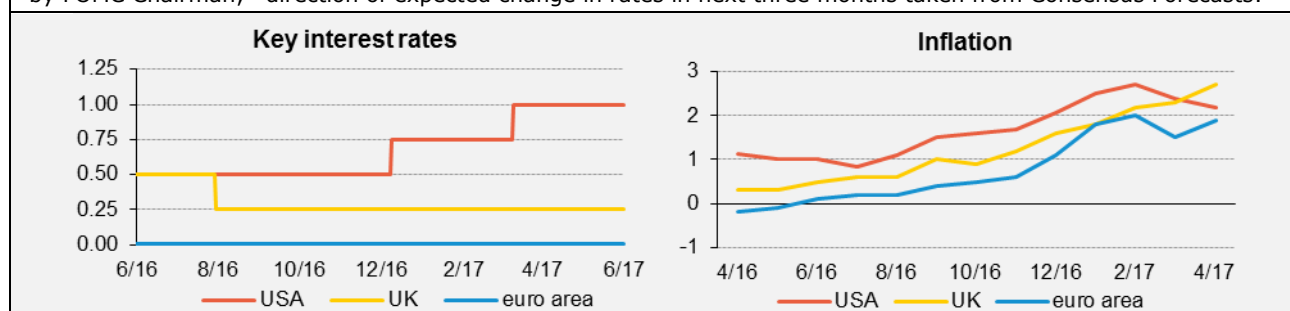
Most of the central banks under review, including the ECB, are keeping their interest rates at low levels. The US Fed was alone in raising its key interest rate by 0.25 pp to 0.75%–1.00% as expected, and is addressing the issue of reducing its balance sheet. Although inflation is close to central banks' inflation targets in all the economies under review except Switzerland, most of the banks are maintaining their unconventional monetary policy programmes. The Swedish Riksbank raised its target amount for government bond purchases. Spotlight focuses on the options and strategies for reducing the US Federal Reserve's balance sheet. In our Selected Speech, SNB Governor Thomas J. Jordan talks about the effect of the increase in the SNB's balance sheet on its investment policy.

1. LATEST MONETARY POLICY DEVELOPMENTS AT SELECTED CENTRAL BANKS

Key central banks of the Euro-Atlantic area

	<u>Euro area (ECB)</u>	<u>USA (Fed)</u>	<u>United Kingdom (BoE)</u>
Inflation target	< 2% ¹	2% ²	2%
MP meetings (rate changes)	27 Apr (0.00) 8 Jun (0.00)	14–15 Mar (+0.25) 2–3 May (0.00)	16 Mar (0.00) 11 May (0.00)
Current basic rate	0.00%; -0.40% ³	0.75–1.00%	0.25%
Latest inflation	1.4% (May 2017) ⁴	2.2% (Apr 2017)	2.7% (Apr 2017)
Expected MP meetings	20 Jul 7 Sep	13–14 Jun 25–26 Jul	15 Jun 3 Aug
Other expected events	7 Sep: publication of ECB staff projections	12 Jul: publication of Beige Book, Jun: publication of Monetary Policy Report	3 Aug: publication of Inflation Report
Expected rate movements⁶	→	↑	→

¹ ECB definition of price stability “below, but close to 2%”; ² January 2012 definition of inflation target; ³ deposit rate; ⁴ flash estimate; ⁵ meeting associated with summary of FOMC economic forecasts and press conference given by FOMC Chairman; ⁶ direction of expected change in rates in next three months taken from Consensus Forecasts.



The **ECB** kept its key interest rates unchanged and confirmed its monthly asset purchase programme (APP) at EUR 60 billion. The APP will run until the end of December 2017, or beyond, if necessary. An increase in purchases is not entirely ruled out, but is not expected in the current conditions. Mario Draghi directly expressed confidence in the strength of the APP. The ECB also confirmed that it expects interest rates to remain at their present levels well past the horizon of the APP. Lower rates would be considered only if necessitated by the economic situation. The ECB’s current forecast is only slightly higher than in March and expects GDP growth of 1.9% in 2017 and 1.8% in 2018. The inflation forecast for this year was reduced from 1.7% to 1.5% and that for 2018 from 1.6% to 1.3%, mainly due to lower oil and food prices. According to Draghi, deflation risks have definitely disappeared.

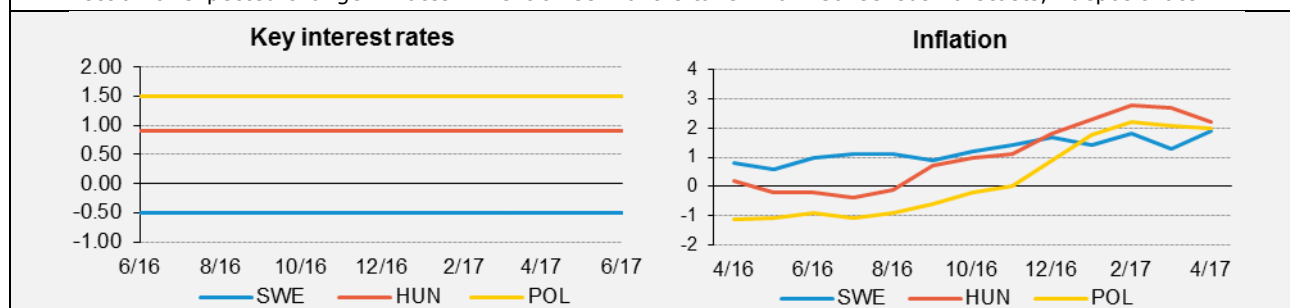
As expected, the **Fed** raised its key interest rate by 0.25 pp to 0.75%–1.00% in March 2017. No further changes were made to rates at the May meeting. According to the FOMC members’ projections (for the March meeting), there will be approximately two further interest rate hikes of 0.25 pp this year, i.e. a rise of 0.50 pp from the current level overall. The FOMC considers the slower GDP growth in 2017 Q1 to be transitory, and the labour market is continuing to strengthen despite this slowdown. The unemployment rate decreased further to 4.4%. Inflation is close to the 2% inflation target. A possible process for reducing the Fed’s balance sheet was discussed at the May meeting (for more information, see *Spotlight*).

The **BoE** left its key interest rate at 0.25%, although MPC member Kristin Forbes voted for an increase of 0.25% (the voting ratio was 7:1). The BoE’s securities purchases reached the announced targets, i.e. GBP 435 billion for government bonds and GBP 10 billion for corporate bonds. Inflation rose to 2.7% in April and thus remains above the 2% inflation target. The BoE expects it to rise further to around 3% in 2017 Q4.

Selected central banks of inflation-targeting EU countries

	Sweden (Riksbank)	Hungary (MNB)	Poland (NBP)
Inflation target	2%	3%	2.5%
MP meetings (rate changes)	26 Apr (0.00)	28 Mar (0.00) 25 Apr (0.00) 23 May (0.00)	4–5 Apr (0.00) 16–17 May (0.00) 6–7 Jun (0.00)
Current basic rate	-0.50%; -1.25% ²	0.9%; -0.05% ²	1.50%
Latest inflation	1.9% (Apr 2017)	2.2% (Apr 2017)	2.0% (Apr 2017)
Expected MP meetings	3 Jul 7 Sep	20 Jun 18 Jul 22 Aug	4–5 Jul 5–6 Sep
Other expected events	4 Jul: publication of Monetary Policy Report	20 Jun: publication of Inflation Report	10 Jul: publication of Inflation Report
Expected rate movements¹	→	→	→

¹ Direction of expected change in rates in next three months taken from Consensus Forecasts, ² deposit rate.



The **Riksbank** left its policy rate at -0.5% in April and does not expect it to rise until mid-2018. It decided to extend the government bond purchase programme by SEK 15 billion during 2017 H2. Government bond purchases of SEK 30 billion remain valid for 2017 H1. The purchases will thus total SEK 290 billion. The Riksbank is considering changing the targeted measure from CPI inflation to CPIF inflation with a fixed interest rate (for more information, see *News*). The bank left its CPI outlook at 1.6% for 2017 and slightly increased its CPIF outlook to 1.8%. It increased its GDP growth outlook from 2.5% to 2.8% for this year and expects 2.3% for next year.

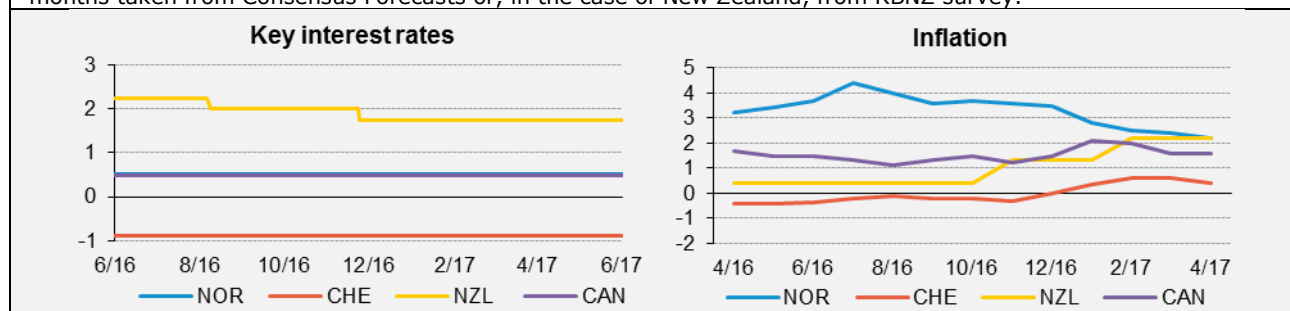
The **MNB** maintained its base rate at 0.9%, its deposit rate at -0.05% and its overnight lending rate on collateralised loans to banks at 0.9%. The Hungarian economy grew at a fast annual rate of 4.1% in Q1. The MNB expects economic growth of between 3% and 4% in 2017. The Funding for Growth Scheme ended at the end of March 2017. The programme of lending to SMEs through the Market-Based Lending Scheme continues. Since October, the MNB has been limiting the amount that commercial banks may deposit with it under the Self-Financing Programme. It reduced this amount further at the March meeting, from HUF 750 billion to HUF 500 billion.

The **NBP** left its interest rate unchanged at 1.5%. Annual economic growth accelerated to 4% in Q1, due mainly to consumer demand driven by wage growth and good consumer sentiment. Exports and imports rose, while investment grew at a near-zero rate. According to the NBP forecast (published on 13 March), the economy will grow by 3.7% and 3.3% in 2017 and 2018 respectively. Inflation reached 2% in April. Measures of core inflation remain low. The NBP expects inflation of 2%, i.e. below the inflation target, in both 2017 and 2018.

Other selected inflation-targeting countries

	Norway (NB)	Switzerland (SNB)	New Zealand (RBNZ)	Canada (BoC)
Inflation target	2.5%	0–2%	2%	2%
MP meetings (rate changes)	16 Mar (0.00) 4 May (0.00)	16 Mar (0.00)	23 Mar (0.00) 11 May (0.00)	12 Apr (0.00) 24 May (0.00)
Current basic rate	0.50% -0.50 reserve rate ¹	from -1.25 to -0.25% ² ; -0.75% ³	1.75%	0.5%
Latest inflation	2.2% (Apr 2017)	0.4% (Apr 2017)	2.2 % (2017 Q1)	1.6% (Apr 2017)
Expected MP meetings	22 Jun	15 Jun	22 Jun 10 Aug	12 Jul 6 Sep
Other expected events	22 Jun: publication of Monetary Policy Report	21 Jun: publication of Monetary Policy Report	10 Jun: publication of Monetary Policy Statement	12 Jul: publication of Monetary Policy Report
Expected rate movements⁴	→	→	→	→

¹ Only on reserves exceeding quota; ² chart displays centre of band; ³ negative sight deposit rate on account balances held at SNB, graded according to balance amounts; ⁴ direction of expected change in rates in next three months taken from Consensus Forecasts or, in the case of New Zealand, from RBNZ survey.



The **NB** left its interest rate unchanged at 0.50% at its March and May meetings and expects it to be kept at this level for longer than projected earlier. The rate stability is the outcome of considerations where, on one hand, the inflation outlook, which is below the inflation target, and weaker economic growth imply lower interest rates, while, on the other hand, a rapid rise in house prices and household debt and the resulting financial imbalances preclude any further cut in rates. In line with this, the Ministry of Finance, acting on advice from the NB, raised the countercyclical capital buffer rate for banks from 1.5% to 2%, effective 31 December 2017.

At its March meeting, the **SNB** left the target range for its monetary policy rate (the 3M Libor) at between -1.25% and -0.25%. The rate on banks' account balances with the SNB also remained unchanged at -0.75%. The SNB is still communicating its willingness to intervene in the foreign exchange market if necessary and has long been of the view that the Swiss franc is overvalued. The SNB continues to expect GDP growth of roughly 1.5% for 2017. It anticipates inflation of 0.3% in 2017 and 0.4% in 2018.

The **RBNZ** left its key interest rate at 1.75% in May. According to the RBNZ, monetary policy will remain accommodative for a considerable period. GDP growth in 2016 H2 was weaker than it had expected, but the growth outlook remains positive, supported by accommodative monetary policy, strong population growth and high levels of household spending and construction activity. The increase in inflation in Q1 (to 2.2%) was mainly due to higher tradables inflation, but this effect is temporary. Non-tradables inflation is moderate. House price inflation also moderated, partly reflecting previous LTV ratio restrictions by the RBNZ and tighter lending conditions.

The **BoC** left its key interest rate unchanged at 0.5%. Inflation dropped to 1.6% in April, due mainly to a decline in food prices because of intense retail competition. Measures of core inflation (for more information see the [December CBM](#)) are in the range of 1.3% and 1.6%. Following strong (annualised) GDP growth (of 3.7%) in 2017 Q1, the BoC expects a slowdown in the coming quarters. The BoC expects GDP growth of 2.5% this year and 1.9% in 2018.

2. NEWS

Riksbank considers new target variable and variation band

The Riksbank is considering changing the target variable for its inflation target from the current CPI to the CPIF, i.e. the consumer price index with a fixed interest rate (for more on the prior considerations and recommendations for the Riksbank see the [December 2015 CBM](#) and the [March 2016 CBM](#)). From the Riksbank's point of view, the CPI has become increasingly difficult to use as guidance for monetary policy, as it is directly affected by policy rate adjustments. Another change being considered is the introduction of a variation band of ± 1 pp to illustrate the uncertainty of reaching the exact target, not to change the inflation target value, which will continue to be 2%. The design of the variation band is linked to the historical development of inflation and should be reviewed as necessary.

The changes under consideration will not entail any change to the monetary policy being conducted and are now being referred for consultation. If the Riksbank decides in favour of the changes, they are expected to be implemented at the monetary policy meeting in September 2017.

Norges Bank to increase number of monetary policy meetings and publish minutes

The Norges Bank is seeking to increase monetary policy transparency and, starting this June, will publish the minutes of its Executive Board's monetary policy meetings. The minutes, together with the voting records of the Executive Board, will be included in the Executive Board's assessment, which is published at the same time as the interest rate decision is announced. The Executive Board has also decided to increase the number of monetary policy meetings from six to eight per year, beginning in 2018.

Federal Reserve Board modernises website

In late March, the Fed modernised the design, enhanced the functions and improved the structure of its [website](#). The site is now adapted to the needs of mobile devices. The Fed has thus joined the ranks of central banks with fully responsive website design (for more about the websites and modern communication tools of central banks, see the [March CBM](#)).

3. SPOTLIGHT: THE RETURN OF THE FED'S MONETARY POLICY TO NORMAL AND THE ISSUE OF REDUCING ITS BALANCE SHEET

The monetary policy of the US Federal Reserve is gradually returning to normal. At the end of 2015, following a long period of quantitative easing amid zero interest rates, the Fed tightened monetary policy by increasing its key interest rate. Since then, it has raised the rate two more times. Nonetheless, it is keeping its balance sheet at the high level attained after the previous bond purchases. Based on positive US economic outlooks, though, the balance sheet could be reduced relatively soon, possibly still this year. However, the untested process of reducing the balance sheet raises many issues not only about how to proceed, but also about the target size of the balance sheet and the effect of this process on the standard way of tightening monetary policy, i.e. raising interest rates. The following Spotlight looks at these issues. It follows up on earlier articles on the return of central banks' monetary policies to normal and the Fed's quantitative easing.¹

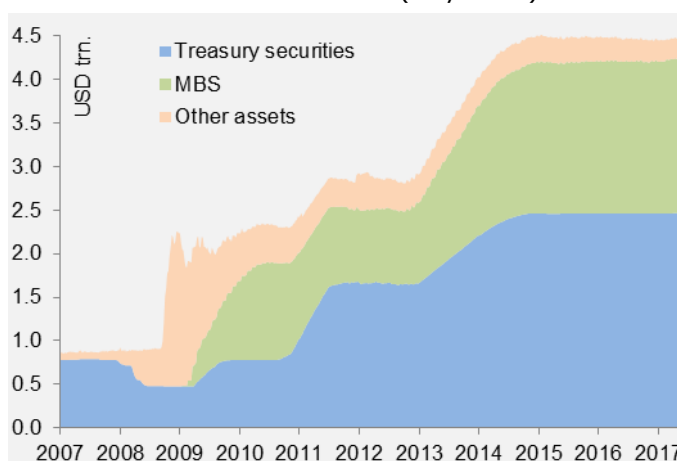
At the end of 2008, in response to the financial crisis, the US Federal Reserve launched a programme of quantitative easing (QE), under which it bought Treasury securities and agency mortgage-backed securities (MBS). Initially, the aim of this programme was to supply liquidity to the financial system and prevent a crash. After the key interest rate was lowered practically to zero, the QE programme started to be used as an unconventional monetary policy instrument for further easing monetary conditions.

The bond purchases were made in several rounds from December 2008 to October 2014. As a result, the Fed's balance sheet expanded from around USD 900 billion (i.e. roughly 6% of US GDP) to almost USD 4.5 trillion (roughly 25% of GDP). Since the bond purchases ended, the portfolio has been kept at the same level by reinvesting principal payments from asset holdings and rolling over maturing Treasury securities (see Chart 1).

The Fed's key monetary policy rate is the federal funds rate (FFR). In the pre-crisis period of a relative shortage of bank reserves, the rate was kept at the target level by means of open market operations (purchases and sales of securities), which the Fed used to maintain the amount of bank reserves in the system needed to achieve this rate.

However, the Fed's purchases caused the amount of bank reserves to increase, and the key rate is currently being maintained in the target range through the interest rate on excess bank reserves (IOER), which forms the ceiling of the FFR target range, and the overnight reverse repo facility (ON RRP), which applies to both banks and non-banks and forms the floor of the range. The spread between these rates is 25 bp.

Chart 1: The Fed's total assets (May 2017)



Source: FRED

¹ The first considerations about the return of monetary policy to normal were covered by Central Bank Monitoring in [September 2014](#), and the US Fed's quantitative easing and its macroeconomic effects were described in GEO in [November 2014](#) and [May 2015](#).

The return of the Fed's monetary policy to normal

The FOMC members first discussed the return of monetary policy to normal soon after unconventional monetary policy was launched. Selected discussions, decisions and actions are summarised in Table 1. The return of monetary policy to normal is happening essentially on two levels: by increasing the key FFR rate and by reducing the Fed's balance sheet.

Table 1: Selected FOMC releases relating to monetary policy normalisation

Jun 2011	minutes	first strategy for returning to normal: reinvestments will end first, then FOMC will modify forward guidance on FFR and start to increase FFR; MBS will then be sold for 3–5 years
Sep 2014	statement	official strategy: Policy Normalization Principles and Plans ("Principles"): ² FFR rate will be raised first, then reinvestments will be reduced (either all at once, or phased out); MBS will not be sold as part of normalisation process
Oct 2014	statement	action: purchases ended
Mar 2015	minutes	extension of Principles to include use of rates: continue to target FFR range of 25 bp during normalisation, with IOER as ceiling and ON RRP as floor; capacity of ON RRP will be temporarily elevated; facility will probably be reduced soon after normalisation starts
Jul 2015	minutes	discussion about setting start of phase-out of reinvestments: whether to specify economic conditions qualitatively or quantitatively, or whether to establish time interval following initial increase in rates; most members preferred qualitative assessment
Dec 2015	statement	action: first FFR increase since December 2008; statement that balance sheet reduction process will start after increase in rates is "well under way"
Mar 2017	minutes	discussion about whether reinvestments will stop all at once (easier to communicate) or be phased out (this would reduce risk of triggering financial market volatility – this issue resonates with FOMC members after taper tantrum experience in 2016).
May 2017	minutes	proposal to phase out reinvestments – increasing caps on assets that would not be reinvested after maturing

The issue of the timing of the balance sheet reduction process

As from December 2015, i.e. simultaneously with the first FFR increase, the FOMC statements contain a formulation referring to the start of the process of reducing the Fed's balance sheet. It says that the process will not start until normalisation of the level of the FFR is "well under way". The specific meaning of this formulation has become topical for the markets in a situation where the Fed has raised rates repeatedly, each time by 25 bp (in December 2015, December 2016 and March 2017, to the current 0.75%–1.00%). Fed Chair Janet Yellen said at a [press conference](#) after the March FOMC meeting that "well under way" does not mean some particular level, but refers to a time when the Fed will have confidence in a stable economic

² The detailed content of the individual points of the Principles is as follows:

- (1) The return of monetary policy to normal will be consistent with the Fed's dual mandate. It will thus depend on economic conditions and not follow a fixed time schedule.
- (2) When economic conditions allow, the FOMC will raise the FFR target range. To set this range, it will primarily use the IOER rate. As an additional instrument, it will use – among other things – an ON RRP facility, although only if necessary; it plans to phase this facility out when it is no longer needed to control the FFR range.
- (3) The Fed's securities holdings will be reduced in a gradual and predictable manner. This process will commence after the Fed begins increasing the FFR. The exact timing will depend on the outlook for economic and financial conditions. The portfolio will be reduced primarily by ceasing or phasing out reinvestments of principal payments from securities holdings; the FOMC does not anticipate selling MBSs as part of the normalisation process (although limited sales might be warranted in the longer run to reduce or eliminate residual holdings; the timing and pace of any sales would be communicated to the public in advance).

outlook and will not be worried about economic shocks that could reverse the process of monetary policy normalisation.

The Fed has not yet officially announced the exact timing of the balance sheet reduction process. However, some FOMC members ([Bullard](#), [Mester](#), [Dudley](#), [George...](#)) have given speeches this year arguing in favour of starting to reduce the balance sheet this year.

The minutes of the May 2017 meeting then explicitly state that most FOMC members prefer to begin reducing the balance sheet this year as long as economic conditions and the FFR evolve as currently expected.

The issue of how to proceed

The May meeting also agreed that the September 2014 Principles should be augmented soon. This will probably mean the inclusion of the operational plan to reduce the balance sheet presented at the May meeting:

- According to this plan, the FOMC will set gradually increasing monthly limits (caps) on the amount of bonds that will not be reinvested after maturing each month. Only the bonds exceeding these caps will be reinvested. As the caps gradually increase, reinvestments will decline and the Fed's securities holdings and hence its entire balance sheet will gradually shrink.
- The monthly caps will initially be set at low levels. They will then be raised every three months, over a set period of time, to their fully phased-in levels. The final values of the caps will then be maintained until the size of the balance sheet is normalised (i.e. reaches the level the FOMC considers optimal for monetary policy implementation).
- Specific figures regarding the values of the caps, the duration of their increase and the optimal balance sheet size have yet to be published.

Most FOMC members expressed a favourable view of this approach. They particularly welcomed the fact that it is consistent with previous statements about gradual and predictable balance sheet reduction, that it is straightforward to communicate and that limiting the monthly reductions will help mitigate the risk of an excessive market reaction and outsized interest rate swings, as well as the fact that, under this approach, the process of reducing the Fed's balance sheet will be relatively automated. The possibility of reducing the Fed's balance sheet on "autopilot", i.e. without further FOMC interventions, has been emphasised many times by FOMC members.

According to analysts, this plan can be expected to be published – as a modification of the September 2014 Principles – at the June meeting.

The target size of the Fed's balance sheet – still an open issue

The Fed thus has not yet published the target size for its balance sheet. However, the balance sheet can be expected to be larger than before the crisis, as it will be affected, among other things, by growth in currency in circulation in the meantime and by a larger amount of bank reserve balances in the system than before the crisis. Before the crisis, the amount of assets, consisting mostly of Treasury securities, basically equalled the amount of currency in circulation. The balance sheet is substantially larger at present and bank reserve balances make up almost 50% of liabilities.

The current high reserve balances of banks will decline as the Fed's balance sheet shrinks. However, the optimal level they should attain is not set at present.³ There are essentially two options for the amount of reserve balances depending on the Fed's future monetary policy implementation framework:

³ The attainment of the optimal level of bank reserve balances is referred to as the "point of normalisation" in the process of reducing the Fed's balance sheet.

- (1) The Fed returns to its original pre-crisis monetary policy implementation framework based on only a small amount of bank reserves in the system; this “small amount” is estimated at around USD 100 billion;
- (2) The Fed continues with its current monetary policy approach where there is an excess of reserves – on which it pays interest – in the system; this reserves need will be much higher than before the crisis and could exceed USD 1 trillion.⁴

The Fed has not yet officially made public its balance sheet target size, but there are official simulations of the future size of the portfolio of the SOMA (System Open Market Account, the domestic securities portfolio, which accounts for roughly 95% of the Fed’s balance sheet and within which open market operations are conducted; the Fed’s balance sheet also contains, for example, assets denominated in foreign currencies).

The latest estimate of the possible balance sheet size was issued in [April 2017](#) by the New York Fed – the SOMA portfolio operator – in its annual report on open market operations. The estimate is based on the Principles set by the FOMC and surveys conducted before and after the December 2016 FOMC meeting. The baseline scenario for this estimate assumes that the point of portfolio normalisation will occur when banks’ reserve balances reach USD 500 billion,⁵ whereas the alternative scenarios assume USD 100 billion and USD 1 trillion. In line with the survey results, all the scenarios assume that reinvestments will continue until 2018 Q2 and end altogether in mid-2019.

An alternative estimate of the SOMA portfolio was published by the Fed’s economic research unit as a FEDS Note in [January 2017](#). The baseline scenario of this estimate builds on the FOMC members’ projections for the September 2016 meeting, and the confidence interval around this scenario is a model simulation based on the expected path of rates and the economy. The portfolio is normalised at the point when banks’ reserve balances decline to USD 100 billion. Reinvestments start to decrease in July 2018. The following Table 2 sums up the most important results of both estimates.

Table 2: SOMA portfolio predictions (USD trillions)

	point of normalisation		size of SOMA portfolio			
	size of reserve balances	date of attainment	at point of normalisation	in 2025		
				total	Treasury securities	MBS
NY Fed portfolio reduction start in 2018 Q2	0.1 (alternative)	2022 Q4	2.5	2.7	*	*
	0.5	2021 Q4	2.8	3.1	2.3	0.8
	1.0 (alternative)	2020 Q4	3.2	3.6	*	*
FEDS Note portfolio reduction starts in 2018 Q3	0.1	2022 Q4	2.3 (2.2–2.4)	2.5 (2.3–2.8)	1.7 (1.5–2.0)	0.9 (0.5–0.9)

*Note: Current size of SOMA portfolio (May 2017): USD 4.25 trillion in total, of which Treasury securities make up USD 2.5 trillion and MBS USD 1.8 trillion. Banks’ reserve balances account for USD 2.2 trillion of the Fed’s balance sheet. * = data not available.*

The decline in the portfolio to the required level (i.e. to the point of normalisation) occurs two to four years after the reduction process begins, depending on the target amount of reserve balances. After the optimal level is achieved, the portfolio increases only slightly, with the share of MBS declining and the share of Treasury securities rising.

⁴ See Ben Bernanke’s January 2017 article *Shrinking the Fed’s balance sheet*, <https://www.brookings.edu/blog/ben-bernanke/2017/01/26/shrinking-the-feds-balance-sheet/>.

⁵ According to some analysts, the USD 500 billion level for reserve balances is problematic from the point of view of the Fed’s monetary policy implementation framework, as it is too low for the current framework (with payment of interest on excess reserves) but too high for the original monetary policy-making approach.

The effect of reducing the balance sheet on monetary policy tightening

The process of reducing the Fed's balance sheet is a natural part of the return of monetary policy to normal. However, it will also imply a monetary policy tightening going beyond that provided by increasing the Fed's policy rate. The Fed's current asset holdings are pushing down the long end of the yield curve. This pressure will gradually decrease as the average maturity of its asset holdings shortens and the amount of reinvestments falls.

Balance sheet reduction thus represents an additional channel of monetary policy tightening. The FOMC must therefore take this additional channel (balance sheet reduction) into account when raising short-term interest rates. This issue has, of course, already started to appear in the speeches given by FOMC members and in discussions at their meetings. The specific effect of this reduction will depend on several factors, specifically the target size of the balance sheet, the speed and manner of reducing the portfolio and the final composition of the portfolio.

The specific numerical estimates of the effect of the change in the Fed's balance sheet structure suggest a potential increase in the yield of the ten-year Treasury note by about 15 bp for 2017 alone. According to the previous empirical facts, this corresponds to two FFR hikes of 25 bp.⁶

Estimate of shadow rates

The effect of the process of reducing the Fed's balance sheet on monetary policy tightening can also be captured using shadow rates.⁷ These express the hypothetical path market rates would follow if there was no zero lower bound, and they include the effect of unconventional measures, particularly government bond purchases. There are several models for deriving shadow rates for the USA. One option is to use the shadow rate model of Krippner (2014)⁸ which derives shadow rates from the yield curve (shadow short rates, SSRs).⁹

The following section attempts to estimate the potential future path of shadow rates in the USA with regard to the expected reduction of the Fed's balance sheet. For this prediction, however, it was necessary in the first step to model the relationship between shadow rates and their determining factors (market 3M Libor rates, the Fed's unconventional measures and financial stress in the USA). The ARDL (Autoregressive Distributed Lag) regression method¹⁰ was chosen as the empirical model. The resulting ARDL model (3, 1, 3, 1, 3, 1) estimates the path of shadow rates relatively well (see Chart 2).

⁶ See the speech *The Economic Outlook and the Conduct of Monetary Policy* given by Janet Yellen in January 2017, <https://www.federalreserve.gov/newsevents/speech/yellen20170119a.pdf>.

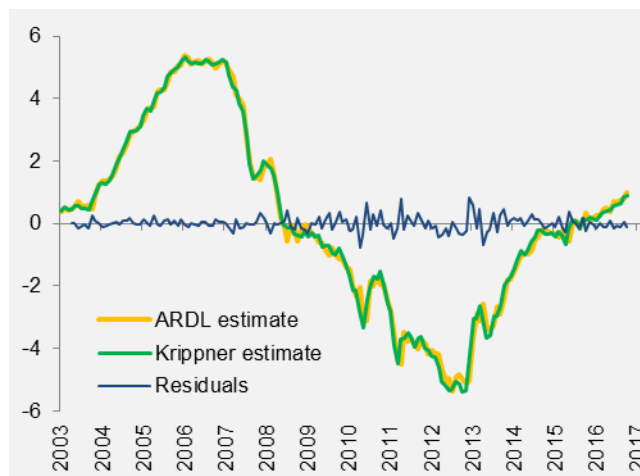
⁷ The analysis in this section was prepared by Soňa Benecká from the CNB. The analysis follows up on a similar simulation in the February issue of *Global Economic Outlook* – see https://www.cnb.cz/miranda2/export/sites/www.cnb.cz/en/monetary_policy/geo/geo_2017/gev_2017_02_en.pdf.

⁸ Krippner, L. (2014): "Measuring the stance of monetary policy in conventional and unconventional environments," CAMA Working Papers 2014-06, Centre for Applied Macroeconomic Analysis, Crawford School of Public Policy, The Australian National University.

⁹ See <http://www.rbnz.govt.nz/research-and-publications/research-programme/additional-research/measures-of-the-stance-of-united-states-monetary-policy/comparison-of-international-monetary-policy-measures>.

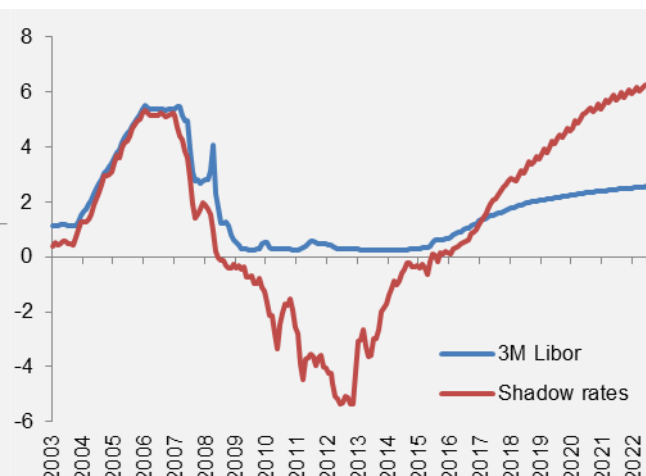
¹⁰ This is a regression model in ARDL form (p, q): $y_t = \beta_0 + \beta_1 y_{t-1} + \dots + \beta_p y_{t-p} + \alpha_0 x_t + \alpha_1 x_{t-1} + \dots + \alpha_q x_{t-q} + \varepsilon_t$. The explanatory variables are the 3M Libor, the main components of the SOMA portfolio (bonds, MBS and other) and financial stress in the USA (Kansas City Financial Stress Index, see <https://www.kansascityfed.org/research/indicatorsdata/kcfsi>).

Chart 2: Modelling shadow rates



Source: CNB calculations, Krippner (2014)

Chart 3: Shadow rates and the 3M Libor, including predictions



Source: Datastream, Krippner (2014), CNB calculations

The market outlook for 3M Libor interest rates, a constant financial stress value and the expected paths of the SOMA portfolio components in the January FEDS Note (see above) were used for the simulation.¹¹ The resulting expected path of shadow rates (see Chart 3) is rising and reaches 6% at the end of 2022, i.e. more than double the expected short-term market interest rates. The implied tightening of monetary conditions due to the reduction of the Fed's balance sheet/SOMA portfolio is thus significant according to the results of this method.

¹¹ The financial stress value is fixed at a low level (-0.56) equal to the average pre-crisis stress value in the sample.

4. SELECTED SPEECH: COMMENTS ON THE SNB'S MONETARY AND INVESTMENT POLICY

At the general meeting of Swiss National Bank shareholders in Berne this April, Chairman of the Governing Board Thomas J. Jordan gave a [speech](#) describing the SNB's current monetary policy and the impact of the bank's growing balance sheet on its investment policy.

According to Chairman Jordan, the Swiss economy showed its flexibility after the discontinuation of the minimum exchange rate, as GDP contracted in the first quarter of 2015 only. Since then, GDP has grown and the growth is expected to sustain. Still, considerable challenges for both the economy and the SNB remain, as inflation is only slightly positive and the Swiss franc is still under pressure. Expansionary monetary policy is therefore the right choice. If necessary, the SNB is willing to lower the negative interest rate further or buy additional foreign currency.

Due to the increase in the SNB's balance sheet in recent years (its foreign exchange reserves grew by CHF 86 billion in 2016 alone), the bank's investment policy is taking on importance. However, the SNB's monetary policy mandate places some restrictions on investment policy, as the latter has to serve monetary policy, particularly by ensuring the availability of the balance sheet for monetary policy purposes. Investment policy must also ensure that the currency reserves preserve their value over the long term, and the SNB cannot hedge currency risks, as such transactions would increase the pressure on the Swiss franc. In addition, investment policy should have minimal market impact. The fundamental distinction between investment policy and monetary policy is that monetary policy targets changes in market prices, while investment activity should not influence market prices. That is why the SNB always takes into account the absorption capacity of the markets when investing.

Bearing these requirements in mind, the SNB invests its assets according to the criteria of liquidity, security and return. Liquidity is crucial given the need for the balance sheet to be available for monetary policy purposes. Therefore, a substantial proportion of the foreign government bonds held by the SNB are invested in the world's most liquid bond markets.

The prerequisites for fulfilling the security criterion are investing in bonds with a high credit rating and diversifying as broadly as possible. This is why the SNB spreads its investments over different currencies and categories and includes corporate bonds and equities in its investment universe. The equity portfolio today accounts for 20% of its forex reserves.

For the long-term value preservation of currency reserves, the return on assets is key. In view of the potential losses resulting from the Swiss franc appreciation, it is important to achieve an adequate return in local currency. In practice the Governing Board sets specific bandwidths for various currencies and investment categories, and the portfolio managers aim to ensure the best allocation of bonds within them. The equity portfolio, by contrast, is managed as neutrally and passively as possible. The SNB buys equities of a particular company in proportion to its weighting in the country's stock index, thus ensuring a minimum impact on the relative share prices of individual companies. To avoid potential conflicts of interest, the SNB does not invest in equities of banks or bank-like institutions. The SNB also does not buy any shares of companies that produce internationally condemned weapons or of companies which seriously violate human rights or systematically cause severe environmental damage. To identify these companies, the SNB relies on the recommendations of recognised external experts.

According to Jordan, the SNB's investment policy is facing two challenges: growth in the balance sheet and related large fluctuations in its annual results in absolute terms. Occasional losses, however substantial, are not a major problem for monetary policy. The SNB could still operate with negative equity capital for a certain period. However, this is something the SNB is determined to avoid, so its investment policy is geared towards ensuring a sound capital base.

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