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IN THIS ISSUE

Inflation is close to the inflation targets in most of the countries we monitor, the exception being Switzerland. Economic growth mostly slowed further across the economies under review. However, a further significant slowdown is not expected for now. The Fed lowered its benchmark interest rate but has yet to say that the move will start a cycle of gradual rate cutting. The ECB reduced its deposit rate and announced both new unconventional monetary measures and changes to those already in place. All the measures are intended to support monetary easing and monetary policy transmission. By contrast, the Norges Bank was the only central bank to raise its key interest rates. Spotlight *examines the flexibility of inflation targeting at the central banks we monitor. In our* Selected speech*, Chilean central bank governor Mario Marcel focuses on central bank independence.*

1. LATEST MONETARY POLICY DEVELOPMENTS AT SELECTED CENTRAL BANKS

Key central banks of the Euro-Atlantic area

	Euro area (ECB)	**USA (Fed)**	**United Kingdom (BoE)**
Inflation target	<2%[1]	2%[2]	2%
MP meetings (rate changes)	25 Jul (0.00) 12 Sep (0.00); (-0.10)[3]	18–19 Jun[5] (0.00) 30–31 Jul (-0.25)	20 Jun (0.00) 1 Aug (0.00)
Current basic rate	0.00%; -0.50%[3]	2.00–2.25%	0.75%
Latest inflation	1.0% (Aug 2019)[4]	1.8% (Jul 2019)	2.1% (Jul 2019)
Expected MP meetings	24 Oct 12 Dec	17–18 Sep 29–30 Oct	19 Sep 7 Nov
Other expected events	12 Dec: publication of Eurosystem staff projections	16 Oct: publication of Beige Book	19 Sep and 7 Nov: publication of Monetary Policy Summary
Expected rate movements[6]	→	→	→

[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; [6] direction of expected change in rates in next three months taken from Consensus Forecasts.

Key interest rates

Inflation
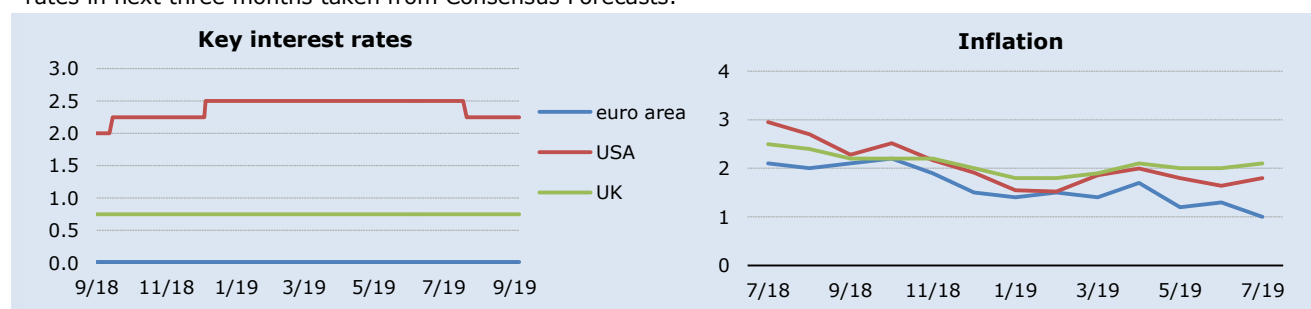
The **ECB** lowered its deposit rate by 10 bp to -0.5%. It kept the rates on the main refinancing operations and the lending facility unchanged at 0% and 0.25% respectively. The Governing Council expects the rates to remain at their present low levels until the inflation outlook robustly converges to a level sufficiently close to 2%. The asset purchase programme (APP) will be restarted at a monthly pace of EUR 20 billion as from 1 November. The ECB will continue reinvesting, in full, the principal payments from maturing securities purchased under the APP past the date when it starts raising rates. The ECB also changed the TLTRO III rate and introduced a two-tier system for reserve remuneration (see *News* for details). In its new macroeconomic projections, the ECB lowered the inflation outlook to 1.2% (from 1.3% in June) for 2019, 1.0% (from 1.4%) for 2020 and 1.5% (from 1.6%) for 2021. It also reduced the GDP growth outlook to 1.1% (from 1.2%) for 2019 and to 1.2% (from 1.4%) for 2020.

As expected, the **Fed** lowered the target range for its benchmark rate by 0.25 pp to 2.00%–2.25% in July. The minutes of the FOMC meeting revealed that its members disagreed about the path of rates. The interest rate paid on excess reserve balances (IOER) was simultaneously lowered by 25 bp to 2.10%. The Fed also announced it would end the reduction of its balance sheet on 1 August (i.e. maturing securities in its portfolio will be fully reinvested in US government bonds). The FOMC members' median macroeconomic projections published in July 2019 (before the rate cut) expected the rate to be 2.1% in 2020. The FOMC left the GDP outlook virtually unchanged. It expects GDP to grow by 2.1% this year, 2.0% in 2020 and 1.8% in 2021. The inflation forecast is 1.5% for this year and around 2% for the following two years. The unemployment outlook ranges from 3.6% to 3.8%.

The **BoE** kept its key rate at 0.75% and maintained the stock of government and corporate bond purchases at GBP 435 billion and GBP 10 billion respectively. The BoE sees higher volatility in the data on economic activity and slower investment growth due to Brexit-related uncertainties. Quarterly GDP growth was 0.5% in Q1. GDP is expected to have been temporarily flat for Q2 and then to increase by 0.3%.

Selected central banks of inflation-targeting EU countries

	Sweden (Riksbank)	Hungary (MNB)	Poland (NBP)
Inflation target	2%[3]	3%	2.5%
MP meetings (rate changes)	2 Jul (0.00) 4 Sep (0.00)	25 Jun (0.00) 23 Jul (0.00) 27 Aug (0.00)	2–3 Jul (0.00) 10–11 Sep (0.00)
Current basic rate	-0.25%; -1.00%[2]	0.9%; -0.05%[2]	1.50%
Latest inflation	1.7% (Jul 2019)	3.3% (Jul 2019)	2.9% (Jul 2019)
Expected MP meetings	23 Oct	24 Sep 22 Oct 19 Nov	1–2 Oct 5–6 Nov 3–4 Dec
Other expected events	24 Oct: publication of Monetary Policy Report	24 Sep: publication of Inflation Report	1/2 Nov: publication of Inflation Report
Expected rate movements[1]	→	→	→

[1] Direction of expected change in rates in next three months taken from Consensus Forecast survey; [2] deposit rate; [3] CPIF – consumer price index including fixed interest rate.

Key interest rates

Inflation
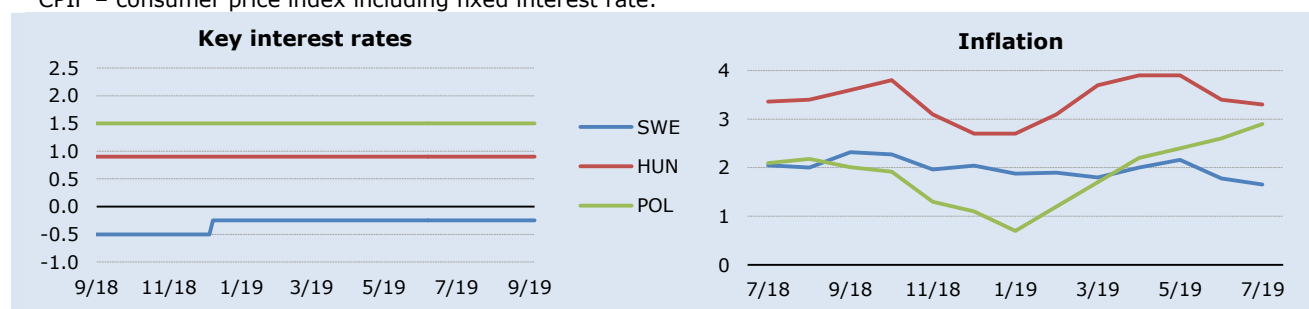
The **Riksbank** left its policy rate unchanged at -0.25%. It still expects the rate to be raised towards the end of the year or at the beginning of next year. The Riksbank noted that the rate will be increased at a slower pace than it had previously expected due to worsened sentiment and low interest rates abroad. With effect from July 2019 to December 2020, the Riksbank will purchase government bonds totalling SEK 45 billion. This corresponds to around half of the principal payments and coupons that the Riksbank will receive from the bond portfolio during this period. The purchases are intended to maintain the portfolio at an appropriate level and continue the Riksbank's presence on the market. In its September forecast, the Riksbank predicts inflation of just under 2% in 2019–2021. The bank lowered its GDP growth forecast to 1.5% in both 2019 and 2020. It expects 1.9% growth in 2021.

The **MNB** maintained its base rate at 0.9% and its deposit rate at -0.05%. It expects core inflation (excluding indirect tax effects) to decline from 3.7% in July to 3% at the end of 2019. The Hungarian economy grew by almost 5% in Q2, mainly driven by industry, construction and services. The expected slowdown in GDP growth (to 5.3% in Q1) has been confirmed. However, the growth will remain strong (at 4.3% in 2019 and 3.3% in 2020) according to the MNB forecast. The MNB has been buying corporate bonds to diversify funding to the domestic corporate sector. The scheme's target amount is HUF 300 billion. Corporate bond issuance is expected to pick up in Q4. Under the complementary *Funding for Growth Scheme Fix*, participating credit institutions have concluded loan contracts with domestic SMEs totalling HUF 219 billion.

The **NBP** left its interest rate at 1.5% over the past three months. Despite slowing economic growth abroad, GDP growth remained buoyant in Q1 (at 4.5%). It continued to be driven by household consumption, fuelled by increasing employment, rapid wage growth, positive consumer sentiment and social benefit payments. Investment also contributed to GDP growth, although less so than in the previous quarter. According to the NBP forecast, GDP will grow by 4.5% this year and slow to 4.0% next year. According to the flash estimate, consumer inflation stood at 2.8% in August, driven primarily by growth in food prices. After a temporary rise above the inflation target in 2020 Q1, the NBP expects inflation to return to the target at the end of the monetary policy horizon.

Other selected inflation-targeting countries

	Norway (NB)	Switzerland (SNB)	New Zealand (RBNZ)	Canada (BoC)
Inflation target	2%	0–2%	2%	2%
MP meetings (rate changes)	20 Jun (+0.25) 15 Aug (0.00)	13 Jun (0.00)	26 Jun (0.00) 7 Aug (-0.50)	10 Jul (0.00) 4 Sep (0.00)
Current basic rate	1.25% 0.25%[1]	-0.75%[3]	1.0%	1.75%
Latest inflation	1.9% (Jul 2019)	0.3% (Jul 2019)	1.7% (2019 Q2)	2.0% (Jul 2019)
Expected MP meetings	19 Sep 24 Oct	19 Sep 12 Dec	25 Sep 13 Nov	30 Oct 4 Dec
Other expected events	19 Sep: publication of Monetary Policy Report	29 Sep: publication of Quarterly Bulletin	13 Nov: publication of Monetary Policy Statement	30 Oct: publication of Monetary Policy Report
Expected rate movements[4]	↑	→	→	→

[1] Only on reserves exceeding quota; [2] chart displays centre of band; [3] new SNB monetary policy rate; [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.

Key interest rates
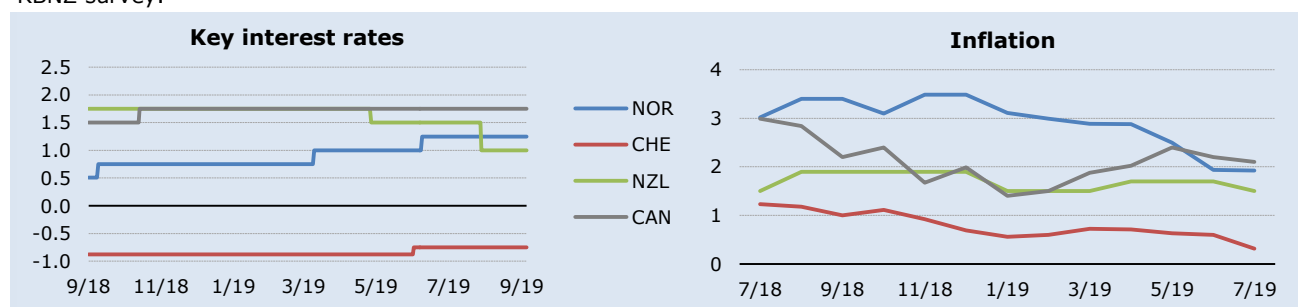
Inflation

As expected, the **NB** raised its policy rate by 0.25 pp to 1.25% in June. It also increased the rate on reserves in excess of banks' individual quotas by 0.25 pp to 0.25%. Inflation is slightly above the target and growth in the Norwegian economy is solid. At the same time, uncertainty regarding global trade tensions is weighing on the economy. Based on the June forecast, the NB expects the policy rate to be increased further in 2019 H2. The rate outlook for the end of 2022 remained at 1.75%. Inflation will reach the target in early 2020 and stay there over the rest of the forecast period. By contrast, CPI-ATE (inflation adjusted for tax changes and excluding energy products) will hit the target from above and remain there for the rest of the forecast period.

The **SNB** abandoned the 3M LIBOR in June and introduced the new SNB policy rate as its key rate. It will use this rate in taking and communicating its monetary policy decisions; the rate remains at -0.75% (see *News* for details). The SNB continues to reserve the right to intervene in the foreign exchange market as necessary. GDP grew by 2.3% in Q1. The SNB still expects the economy to grow by 1.5% this year. The inflation forecast for the coming four quarters moved higher. The SNB reduced the inflation outlook for 2019 from 0.3% to 0.6% and that for 2020 from 0.6% to 0.7%.

The **RBNZ** reduced its official rate by 0.5 pp to 1.0% in August due to a need for monetary stimulus to maintain maximum sustainable employment and meet the inflation objective. Inflation is currently below the inflation target (at 1.7% in Q2) and is likely to remain below it in 2020. Employment is near its maximum sustainable level and the output gap is close to zero. GDP growth has slowed to 2.5% (from just below 3%) over the past year and will probably remain soft (2%) in the coming quarter. According to the RBNZ forecast, the economy will expand at a rate of under 3% this year. The growth will slow further to around 2% in 2020.

The **BoC** maintained its key rate at 1.75%. Inflation was at the target of 2% in July and will stay around it in the coming months. Core inflation indicators also remain close to 2%. The Canadian economy grew faster in Q2 than the BoC had predicted in its latest forecast. However, this stronger growth is temporary, as "trade war" risks have increased. The economy is currently operating close to potential. In the period ahead, the Governing Council will pay particular attention to the global trade environment and its impact on the outlook for inflation and GDP.

2. NEWS OVER THE LAST THREE MONTHS

ECB introduces further measures to support economy

At its September meeting, the ECB lowered its deposit rate further into negative territory to -0.5%, adjusted the conditions for its existing unconventional monetary measures and announced some new ones. The measures are aimed at easing monetary conditions and supporting monetary policy transmission. The three key reasons for the September actions were specified by the President of the ECB, Mario Draghi: (i) the protracted and more marked than expected slowdown in the eurozone economy, (ii) the persistence of downside risks of both a trade and geopolitical nature, and (iii) the downward revision in projected inflation levels and the fact that current inflation remains muted. The following actions were introduced:

- As from 1 November the ECB is to restart net purchases under the asset purchase programme (APP) at a monthly pace of EUR 20 billion. The Governing Council expects them to run for as long as necessary to reinforce the accommodative impact of its policy rates, and to end shortly before it starts raising the key ECB interest rates.
- Reinvestments of the principal payments from maturing securities purchased under the APP will continue, in full, even past the date when the Governing Council starts raising the key ECB interest rates, and in any case for as long as necessary to maintain favourable liquidity conditions and an ample degree of monetary accommodation.
- The modalities of the new series of quarterly targeted longer-term refinancing operations (TLTRO III) will be changed to preserve favourable bank lending conditions, ensure the smooth transmission of monetary policy and further support the accommodative stance of monetary policy. The interest rate in each operation will now be set at the level of the average rate applied in the Eurosystem's main refinancing operations over the life of the respective TLTRO. For banks whose eligible net lending exceeds a benchmark, the rate applied in TLTRO III operations will be lower, and can be as low as the average interest rate on the deposit facility prevailing over the life of the operation. The maturity of the operations will be extended from two to three years. More details are available on the ECB website.
- The ECB introduced a two-tier system for reserve remuneration in which part of banks' holdings of excess liquidity will be exempt from the negative deposit facility rate in order to support the bank-based transmission of monetary policy. The measure will apply as of 30 October 2019. More details are available on the ECB website.

Christine Lagarde most likely to become new ECB boss, Kristalina Georgieva to head IMF

Christine Lagarde, until recently the head of the International Monetary Fund, will lead the ECB after the departure of Mario Draghi, whose mandate expires on 31 October. She will be definitively appointed by the EU summit in October. After her nomination in July, Lagarde resigned as the IMF's chief, and the current World Bank head Kristalina Georgieva was nominated for this position in early August by the EU countries (after defeating Dutch finance minister Jeroen Dijsselbloem and Finnish central bank governor Olli Rehn in a difficult vote). Georgieva's chances of definitive appointment as head of the IMF are substantial, as the candidate of the European countries has traditionally led this institution (while the World Bank has been headed by a US candidate). IMF member countries had until 6 September to nominate additional candidates to lead the IMF, but no official nomination was announced. The selection of a new IMF boss should be completed by 4 October. Former British finance minister George Osborne and current Bank of England governor Mark Carney were mentioned as potential other candidates.

This year's Jackson Hole symposium addresses challenges for monetary policy in era of global economic uncertainty

This year's August central bankers' conference in Wyoming, USA, chose "Challenges for Monetary Policy" as its topic. As the symposium took place in an atmosphere of slowing global economic growth and looming trade wars, the contributions dealt mainly with the limited ability of central banks to protect the global economy from the adverse effects of increasing political uncertainty. The opening speech was made as usual by US Fed chair Jerome H. Powell, who among other things referred to trade disputes between the US and China and warned that incorporating business uncertainty into central bank monetary policy decisions presents a "new challenge" for the Fed and stressed that the Fed has little ability to influence international trade negotiations. Other participants included leading central bankers and academics. Bank of England governor Mark Carney made a radical proposal to create an IMF global

electronic currency as a counterweight to the US dollar. Other speakers included Israeli central bank governor Amir Yaron, Australian central bank governor Philip Lowe, former Brazilian central bank governor Ilan Goldfajn, MIT professor and former BoE external MPC member Kristine J. Forbes, MIT professor and former governor of Central Bank of Cyprus Athanasios Orphanides, IMF chief economist Gita Gopinath and LSE professor and Bank of England external MPC member Silvana Tenreyro.

SNB to leave LIBOR

In June, at the press conference following its monetary policy meeting, the Swiss Central Bank announced it was to abandon its current 3M LIBOR target range and use the "SNB policy rate" as its main monetary policy interest rate to communicate its monetary policy decisions. The rate remains at -0.75%. The overnight SARON rate (the Swiss average rate overnight), developed jointly by the SNB and the Swiss stock exchange in 2009, will be used as a rate signalling the conditions on the financial market. The SARON rate is calculated from the repo transactions actually conducted on the CHF secured interbank money market (consisting of around 150 banks). The SNB aims to keep the two rates approximately the same by means of open market operations. The SARON rate is currently -0.75%. The SNB's monetary policy will not change in any way.

Switzerland is not the first country to move away from the reputationally damaged LIBOR (and generally from IBOR interbank unsecured rates) to alternative reference rates. The UK has SONIA (Sterling Overnight Index Average) administered by the Bank of England, the ECB administers the €STR rate (euro short-term rate), and the Secured Overnight Financing Rate (SOFR) is starting to be used in the US. The Bank of Canada announced in July that starting next year it will become the administrator of the Canadian Overnight Repo Rate Average (CORRA).

Croatia wants to adopt euro

In July, Croatia officially applied to join ERM II and subsequently enter the euro area. The conditions for ERM II entry are likely to be met by mid-2020. In line with the EU principle of equal treatment, Croatia has been subject to the same conditions as Bulgaria (which applied for ERM II membership in 2018), including the requirement to simultaneously join ERM II and the Banking Union. The earliest possible euro adoption date in Croatia is 2023.

Changes at Turkish central bank

Turkish President Erdogan unexpectedly replaced Murat Cetinkaya, governor of the Turkish central bank (CBRT), in early July over "personal disagreements" and replaced him with his deputy Murat Uysal. The replacement stems from the president's long-running dissatisfaction with the policy of the CBRT, which raised interest rates to 24% in the fight against high inflation and held them at this high level despite the president's objections to them stifling economic growth (see the September 2018 CBM). Other personnel changes took place in mid-August, when the CBRT moved at least nine senior economic experts from their managing positions, including the chief economist and the head of the monetary policy unit. At the end of July, the CBRT made a sharp rate cut of 4.25 pp to 19.75%, enabled by falling inflation and a more stable currency. Nevertheless, the president has called for further interest rates cuts. Governor Uysal immediately indicated that a reduction could occur. The CBRT did indeed lower rates by 3.15 pp to 16.50% at its regular monetary policy meeting in September.

3. SPOTLIGHT: FLEXIBILITY OF INFLATION TARGETING AT CENTRAL BANKS

Inflation targeting, which is applied by central banks in most developed countries, is not applied strictly by any of them. The regime applied is referred to as "flexible inflation targeting", as banks focus on their inflation target over the medium term and tolerate short-term deviations from it in the event of large shocks. This article analyses the flexibility of inflation targeting at the central banks we monitor.

The following article describes the experience with flexible inflation targeting at the central banks covered regularly in *Central Bank Monitoring*. All these central banks refer to their monetary policy as flexible, emphasising its focus on the medium term and the possibility of inflation deviating from the target in the event of large shocks. The level of flexibility is not derived from the legislative mandate, which often accentuates only the primary objective of price stability. Below, we analyse the main elements of the flexibility of the monetary policy regime: the existence of a secondary objective, the communication of a tolerance band around the target, the communication of a monetary policy horizon, the existence of explicit exemptions from fulfilling the inflation target, whether or not other variables besides inflation enter the reaction function in the central bank's primary model, and what the central bank's time horizon for the deviation of inflation from the target is in the reaction function.

Concise theoretical basis

For central banks showing some flexibility in response to short-term shocks, Bernanke and Mishkin (1997) began to use the concept of constrained discretion. This flexibility is limited by the fact that a central bank must keep inflation low and inflation expectations anchored. In the case of cost-push shocks, for example, a central bank does not need to aggressively increase interest rates to maintain inflation at its target. This would only happen at the cost of a marked slowdown of the economy or adverse impacts on financial stability. Therefore, the central bank responds more moderately to this type of shock and inflation returns to the target with a lag.

The term flexible inflation targeting was coined by Svensson (1999). He defined it as a situation where the central bank minimises a quadratic loss function containing both the deviation of inflation from the target and the deviation of output from its potential. If the loss function contains only the deviation of inflation, Svensson terms this strict inflation targeting. A large proportion of theoretical models assume a relatively simple case in which there is usually no conflict in achieving both mentioned objectives. Monetary policy can thus focus on achieving the inflation target and, as a result, also achieve a zero output gap on average ("divine coincidence"; Blanchard and Gaul, 2007). Some models – and the majority of central banks – use more complicated loss functions enriched with, for example, interest rate smoothing (Rudebusch and Svensson, 1999). The Norwegian central bank also includes financial stability considerations in its loss function by minimising the deviation of interest rates from their equilibrium levels (Evjen and Kloster, 2012).

From the settings of the loss function and other equations in macroeconomic models, a "reaction function" is derived. This is an equation describing the central bank's optimal behaviour given the structure and parametrisation of the entire model (including the given monetary policy regime) and with regard to minimising the loss function (the "implied reaction function").[1]

Practices of individual central banks[2]

The **European Central Bank** (ECB), pursuant to the Treaty on the Functioning of the EU, primarily maintains price stability. Its secondary objective is to support the general economic policies in the EU with a view to contributing to the achievement of the objectives of the EU. The ECB interprets its mandate as achieving inflation below, but close to, 2%. The ECB uses neither a tolerance band, nor a

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[1] The reaction function should not be confused with the statistical relationship between rates and inflation, which can be derived from historical data. The best-known such relationship is the Taylor rule (Taylor, 1993), proposed to describe the behaviour of the Fed. This rule, which assumes a real equilibrium interest rate of 2% and the same weight for the deviation of inflation from the implicit 2% target and for the output gap, copied the Fed's behaviour quite accurately in 1987–1993. It should be pointed out, however, that the Taylor rule was not originally intended to be normative, that is, it did not give guidance on what the central bank should do, but merely approximated the relationship between the variables over time. In time, however, the economic literature shifted the meaning of "Taylor rule" to describe the reaction function itself.

[2] This section is based on publicly available information given on the individual banks' websites.

monetary policy horizon. In the event of cost-push shocks, the bank declares only a gradual monetary policy reaction. The ECB uses a range of models. The two main ones – the New Area Wide Model II (NAWM II) and the New Multi-Country Model (NMCM) – both contain the output gap. While the NMCM is estimated using the GMM method from real data, NAWM II is a DSGE model and uses the European Commission's estimate of potential output. Both models contain the current output gap in the reaction function. In the case of inflation, the horizon is the current quarter for the NAWM and the next quarter for the NMCM. When creating forecasts and formulating ECB monetary policy, however, these models only serve as analytical simulation tools. The ECB bases its forecasts on market outlooks and not endogenous monetary policy.

The **Federal Reserve** is subject to a 1913 law defining its mandate in the form of achieving full employment, stable prices and moderate long-term interest rates. The FOMC interprets this mandate as achieving a 2% inflation rate, as measured by the PCE (Personal Consumption Expenditures) price index, which is less volatile than the CPI. The Fed does not use a tolerance band, a monetary policy horizon or exemptions. The FRB/US macroeconomic model is based on a reaction function that contains the current deviation of inflation from the target and the current output gap.

The **Bank of England** (BoE) became independent in 1998 and its statutory mandate became price stability, with a secondary objective of supporting government economic policy. The inflation target is set by the government at 2% with no tolerance band. However, there is a de facto tolerance band, because if the target is missed by more than ±1 pp, the central bank must explain the deviation to the finance minister in writing. The BoE does not have an explicit monetary policy horizon, nor does it communicate any exemptions from fulfilling the target. The bank uses a number of models, the central one being the COMPASS DSGE model. The reaction function contains the last four deviations of inflation from the target and the current output gap. The latter is measured either as the gap in value added relative to the level that would prevail with flexible prices, or as the deviation of output from the trend calculated using the production function. Like the ECB, the BoE bases its final forecast on market interest rates, not on its endogenous response.

The **Swedish Riksbank** has a statutory mandate to maintain price stability. It interprets this objective to mean 2% inflation, as measured since September 2017 by the CPIF, an index assuming a fixed mortgage rate, instead of the previously used CPI, which is directly affected by interest rate changes. Since September 2017, the Riksbank has also been using an inflation variation band of 1–3% to illustrate uncertainty. The Riksbank communicates neither a monetary policy horizon, nor exemptions. Its core DSGE model RAMSES II uses a reaction function containing the current deviation of inflation from the target, the current gap in hours worked and the first derivatives of those two variables. According to the Riksbank, the reason for using the gap in hours worked (calculated using the HP and KAMEL filters)[3] is that it is an observed variable and that this specification increases the empirical relevance of the model.

The **Hungarian National Bank** (MNB) maintains price stability. Its secondary objective is to support the general economic policies of the government. Price stability is interpreted as 3% inflation; since 2015, the target has been communicated with a tolerance band of ±1 pp. In its communications, the MNB uses a monetary policy horizon of 5–8 quarters. The bank explicitly states that in cases of severe, one-off shocks, it applies an exemption to their first-round price effects. The MPM (Monetary Policy Model) core gap model contains the inflation gap at a horizon of four quarters and the current output gap.

The **National Bank of Poland** (NBP), by law, maintains price stability. Its secondary objective is to support the general economic policies of the government, unless this is in conflict with its primary objective. The NBP targets inflation at a rate of 2.5% with a tolerance band of ±1 pp. In recent years, it has been using the entire width of the band, i.e. it has been tolerating future inflation at the borders of the band. The bank does not communicate an explicit monetary policy horizon. The length of the horizon of most effective transmission is several quarters and can change over time. The NBP does not use explicit exemptions from fulfilling the target. The core hybrid NECMOD model – lying on the borderline between a DSGE (long-run steady states) and VAR model (short-run dynamics) – uses a reaction function containing the deviation of inflation from the target (one quarter ahead) and the output gap (current).

Norges Bank (NB) is by law owned by the government and the king, along with the ministry of finance, plays a major role in its decision-making (for example when determining the exchange rate regime). In

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[3] KAMEL is a model developed by the National Institute of Economic Research to describe the demographic evolution of the labour market.

the law its mandate is formulated technically (in terms of regulation, payments and issues), but in the area of monetary policy the bank interprets it to mean price stability The bank does not communicate secondary objectives, saying only that inflation targeting should contribute to high and stable output and employment and to counteracting financial imbalances. Since March 2018, the inflation target has been 2% (until then, it had been higher at 2.5%), with no tolerance band. NB communicates neither a monetary policy horizon, nor exemptions. Its core DSGE model NEMO (Norwegian Economy Model) contains the current inflation and output gaps in its reaction function.

The **Swiss National Bank** (SNB) by law ensures price stability, taking due account of economic developments. Officially, it does not target inflation, but de facto it is often classified as doing so. The SNB defines price stability as inflation below 2%. It does not communicate a monetary policy horizon and applies exemptions to one-off shocks such as changes in oil prices. The SNB uses a number of models. Its DSGE model (Rudolf and Zurlinden, 2014) uses the current deviation of inflation from the target and the output gap, and also the change in the output gap, in the reaction function.

The **Reserve Bank of New Zealand** (RBNZ) is explicitly tasked by law with reducing undesirable fluctuations in employment and economic activity in addition to achieving price stability over the medium term. The target is set by the minister of finance and is currently 2%, the midpoint of the 1–3% band in which inflation is expected to stay over the medium term (the tolerance band). The RBNZ's monetary policy horizon is 6–8 quarters, but is not actively communicated. In the past, agreements between the minister of finance and the governor of the bank (Policy Targets Agreements, PTA) contained a list of exemptions, but the RBNZ now no longer issues an explicit list of situations in which it is willing to tolerate off-target inflation, merely stating that such situations may occur. The DSGE model KITT (Kiwi Inflation Targeting Technology) contains a reaction function where interest rates are only influenced by the deviation of inflation from the target one quarter ahead.

The **Bank of Canada** (BoC) has a relatively broadly defined legal mandate to "promote the economic and financial welfare of Canada", which it achieves through inflation targeting. The target is the 2% midpoint of a "control range" of 1–3%. The BoC emphasises the flexibility of its regime; its usual monetary policy horizon of 6–8 quarters changes according to the type of shock it faces in any given period. The bank mentions three situations that could lead to an extension of the horizon: (i) large and persistent shocks to inflation, for example due to oil prices or a global slowdown, which may lead to the zero lower bound on interest rates being reached; (ii) financial imbalances (for example when tighter monetary policy could prevent financial imbalances), (iii) "risk management" of future inflation (for example when there is a high risk of a negative shock to inflation, the bank may tolerate higher inflation over a longer period of time to "buy some insurance" against that risk). The reaction function in the core general equilibrium model TOTEM II (Terms-of-Trade Economic Model, a DSGE-type model) contains both the deviation of inflation from the target (at a horizon of two quarters) and the current output gap.

Summary

Besides their primary mandate of price stability, five out of the ten central banks we monitor also have a legally defined secondary objective. For six central banks, a specific point inflation target is complemented by a tolerance, or variation, band that takes into account the fact that meeting the target to exactly one-tenth of a per cent is unlikely even in tranquil times due to the usual volatility of inflation. The vast majority of central banks using a tolerance band do not, however, view it as an action/inaction band. Rather, it is used as a tool to communicate the uncertainty the central bank faces in achieving its objectives, or as a metric for ex post evaluation of when the central bank was relatively successful in hitting its targets and when the deviations of inflation from the target were "larger than small". The Swiss central bank is the only bank we monitor that uses a target in the form of a band (see Chart 1).

Chart 1: Inflation targets compared
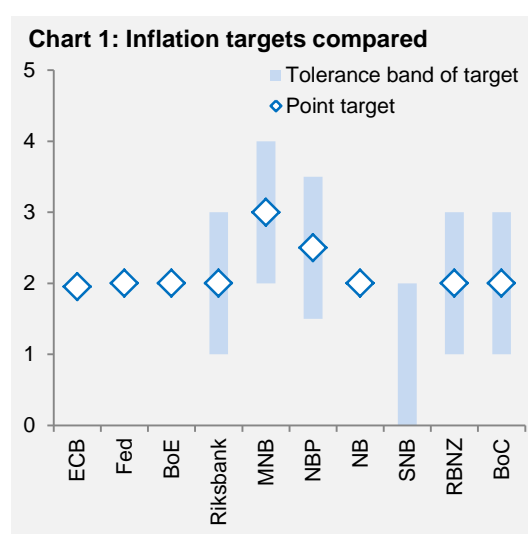
The inflation targeting flexibility of central banks is reinforced by active and explicit communication of exemptions. Of the banks we monitor, half communicate exemptions. Most of the banks do not

communicate the length of the monetary policy horizon, and if they do, the horizon is usually relatively long (6–8 quarters). Given the endogeneity of the specification of the reaction function, it is difficult to evaluate the effect of the calibration of the reaction function on the degree of flexibility. On the one hand, most of the banks also have variables capturing cycles in the real economy in their reaction function. On the other hand, they usually respond to deviations of inflation from the target at a relatively short horizon (usually 0–1 quarters).

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	ECB	Fed	BoE	Riksbank	MNB	NBP	National Bank	SNB	RBNZ	BoC
Primary objective	Price stability	Full employment and price stability	Price stability	Price stability	Price stability	Price stability	Price stability	Price stability	Full employment and price stability	Price stability
Secondary objective	Support general economic policies of EU, contribute to achievement of objectives of EU	n/a	Support economic policies of government	n/a	Support economic policies of government	Support economic policies of government if not in conflict with primary objective	n/a	Take due account of economic developments in achieving price stability	n/a	n/a
Current target	<2%	2%	2%	2%	3%	2.5%	2%	≤2%	Near 2%	2%
Tolerance band	n/a	n/a	n/a	1–3%	± 1 pp	± 1 p	n/a	n/a	1–3%	1–3%
Length of monetary policy horizon	n/a	n/a	n/a	n/a	5–8 quarters	Several quarters, can be changed	n/a	n/a	6–8 quarters	6–8 quarters, can be changed
Exemptions	Yes (only gradual monetary policy reaction for cost-push shocks)	No	No	No	Yes (large shocks)	No	No	Yes (one-off shocks such as change in oil prices or exchange rate)	No	Yes (large shocks, effect on financial stability, intentional missing of target in event of asymmetrical risks)
Output/ employment in reaction function	New Area Wide Model II (NAWM II): yes, output gap, change in output gap. New Multi-country Model (NMCM): yes, output gap	FRB/US model: output gap	COMPASS: output gap	Ramses II: gap in hours worked and change in that gap	MPM (Monetary Policy Model): output gap	NECMOD: output gap	Norwegian Economy Model (NEMO): output gap	DSGE model: output gap and change in output gap	KITT: no	Totem II: output gap
Horizon in model	0 quarters (NAWM II), 1 quarter (NMCM)	0 quarters	0–3 quarters	0 quarters	4 quarters	1 quarter	0 quarters	0 quarters	1 quarter	2 quarters

4. SELECTED SPEECH: PUBLIC TRUST AND CENTRAL BANKING

In opening remarks *at the Central Bank of Chile conference held in July in Santiago, Governor Mario Marcel marked the 30th anniversary of the independence of this central bank. In addition to the importance of central bank independence for an effective impact on inflation, he discussed the link between central bank independence and credibility and ways to gain and strengthen public trust.*

According to Governor Marcel, central bank independence is one of the most remarkable contributions of economic thinking of the last half century. However, building independent central banking has not been easy. One thing is to be free from external interference, quite another is to build the policy frameworks, governance structures and standards to guide actions in a consistent and predictable way. Independence of central banks still cannot be taken for granted. No matter how deeply it is ingrained in the law, it can always be taken away or significantly undermined. In the real world, central bank independence relies on the willingness of stakeholders to play by the rules and on central banks' ability to gain legitimacy and credibility. Independence does not automatically guarantee credibility either. Yet credibility is important for the effective conduct of monetary policy. As a recent IMF study shows, anchored inflation expectations help central banks better accommodate shocks with smaller output loss and social cost.

A key question then is how to build credibility. The rational expectations school would suggest adopting a clear-cut policy rule, communicating it openly and ensuring compliance. But even this may be challenging in a changing environment. Credibility in a central bank refers to the public's belief that the bank will carry out the expected optimal steps. Nevertheless, the public may trust the central bank even when it is adopting a discretionary monetary policy strategy regardless of past promises. However, it is hard to imagine the opposite situation of a central bank engaged in the management of expectations without trust from the public. This also applies to communication: there is little that a communication strategy can do if the public does not trust the central bank. It is therefore crucial for modern central banks to understand the concept of trust and the mechanisms for fostering it. In this context, Governor Marcel outlined a recent OECD study on trust and public policy. This paper proposes a taxonomy distinguishing five dimensions of trust, which Governor Marcel put into the central bank context.

The first dimension is *reliability*. This refers to the extent to which an institution can deliver on the expectations set upon it. In the context of central banking, this means to do the proper balancing of risks to align monetary policy with long-run social welfare, as well as acting in a coherent way, explaining the measures taken and running the institution efficiently.

The second dimension, *adaptability*, refers to an institution's capacity to recognise changes in the environment and adapt to them without compromising its public commitments and also to explain these changes and their consequences to the public. For adaptability, a central bank must develop its analytical skills to identify structural changes and risks and must be prepared to react to unforeseen events.

Integrity, the third dimension, means putting the general interest above the interests of authorities, employees or other narrow groups. This requires not only strict regulation and control, but also ethical behaviour. Central bank integrity requires control of conflicts of interest and effective auditing.

The fourth dimension, *accessibility,* refers to the ability to understand people's needs and to use a wide set of information. An institution should thus develop transparency mechanisms, seek feedback from the public and foster dialogue. For a central bank, communication of monetary policy and financial risks is essential, as is consultation in the issuing of new regulations and well-structured accountability.

Lastly, *fairness* acknowledges differences across society and that institutional actions may be far from neutral. Fairness involves being aware of such differences and finding ways to mitigate undesired redistributive effects. A central bank can enhance the fairness dimension through crisis prevention, risk management and financial education and by ensuring equal opportunities for employees.

These points provide a useful framework to assess the current credibility of central banks and to address existing gaps and vulnerabilities. This is because trust needs to be protected and enhanced in a systematic way, as it can deteriorate pretty fast. And, as Governor Marcel pointed out at the end of his speech, public trust is important as a foundation of modern monetary policy and for the legitimacy of independent central banks in performing their broader mandates.