

What's next? In search of monetary policy objectives and toolset after the crisis

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The 2008 crisis forced central bankers and the representatives of academia to reassess the prevailing consensus on the theory and practice of monetary policy. In an effort to mitigate the financial market and macroeconomic impacts of the crisis the central bank measures provided an additional incentive. This paper summarises opinions on core questions regarding the objectives and unconventional tools of monetary policy and offers our own conclusions. We first examine the opportunities and the necessity of altering the objectives of monetary policy. We conclude that there is no recommendable alternative to the current inflation targeting regime that could more effectively foster growth and social welfare. We also look at the unconventional monetary tools applied in recent years and their potential impact. Taking into consideration their degree of success in managing the crisis, the fact that quantitative easing has determined central bank balance sheets in the long term, and that a low interest rate environment is likely to persist, we believe that applying them when needed, will not rule out the efficient use of traditional tools in normal times, so their consecutive use is a realistic opportunity going forward.

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Introduction

Prior to the 2008 crisis, monetary policy in the developed world was simple in the sense that its role, basic objective and toolset were based on broad consensus spanning academia, markets and economic policymakers. The macroeconomic results justified all of the above: price stability and more stable business cycles confirmed the adequacy of monetary policy thinking. However, the crisis created such challenges for monetary policy that theoretical researchers, central bankers and economic policymakers were forced to revise the earlier comfortable consensus.

The aim of this article is to summarise the questions regarding the objectives and the applied tools that may be decisive in terms of the future of monetary

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policy. We present the often conflicting views and opinions on the main issues along three topics.

We first summarise the initiatives to revise monetary policy objectives. Some of these, such as Blanchard et al. (2010), address the advantages and drawbacks of raising the current 2 percent price stability objective. Other researches offer recommendations for amending the policy rule or the introduction of alternative objectives such as price level or nominal GDP level or path. Theoretically, these would allow for more efficient monetary policy for the central bank at the zero lower bound (ZLB); however, they are fairly uncertain in shaping and anchoring expectations. As neither theory has clearly shown that alternative objectives perform better in the longer term than the current mainstream regime, nor is there sufficient practical experience, central bankers are understandably reluctant to bring about such a change in objectives.

After revising the objectives, we address the use of unconventional tools, the related debates and their long-term consequences on the central bank's operation. When categorising the different tools, our premise was that restoring financial market stability was the priority for central banks at the beginning of the crisis, while creating macroeconomic stability, avoiding deflation and recovering from recession became priorities later on. We analysed emergency liquidity providing programmes in the context of the former and looked at quantitative easing (QE), negative interest rates and forward guidance in the context of the latter. As the latter tools were essentially applied simultaneously, leveraging their mutually reinforcing effect, it is difficult to gauge their individual success and they should rather be assessed collectively.

Despite some scepticism, a broad consensus has emerged that unconventional tools have proven successful at the ZLB and have been successfully applied by central banks to reduce long-term interest rates, ease financing constraints and have a positive impact on the real economy, resulting in faster and more robust recovery from the shock of the crisis. The success does not, however, mean that unconventional tools can serve as adequate additions or perhaps alternatives to traditional tools under normal circumstances, since their long-term impact is surrounded by many unanswered questions. The degree to which unconventional tools distort markets is uncertain, and whether market instability or potential bubbles emerge during the normalisation is questioned. The costs and effectiveness of preserving price stability alongside a largely increased monetary

base, the horizon required for implementing the exit from QE and the apparent central bank losses during the exit also will entail risks. But given that they have formed an important part of the central bank practice for nearly a decade now and that their phasing out will presumably be a long process, while the low interest rate environment remains, we have concluded that the long-term use of unconventional tools is warranted based on a comparison of opinions for and against their use.

Consensus on monetary policy objectives prior to the crisis

Goodfriend and King (1997) and Woodford (2009) summarised the theoretical synthesis achieved before the financial crisis of the monetary policy objective, and of its main institutional issues. Based on these papers, the primary objective of monetary policy is to stabilise inflation at a level close to zero, but still in the positive range. Monetary policy is able to foster growth and welfare in a sustainable manner by guaranteeing price stability in this sense. Although monetary policy is capable of influencing aggregate demand and is therefore an effective economic policy tool, it is only capable of achieving trade-off between output and inflation meaningfully in the short run. Monetary policy is able to indirectly offset demand side shocks and thus to keep the economy close to optimal output levels while also stabilising prices. In case of supply-side changes, it smoothes adjustment to shocks. Therefore, it is only in this strict sense that the monetary policy proposed by the synthesis is an activist policy, its objective is strictly limited in line with the above: the reduction of the volatility of output while ensuring price stability.

Mishkin (2011) and Stark (2010) analysed, amongst others, the consensus on central bank operation. In line with the theory, the proper forming of expectations is pivotal to achieving the inflation target, so achieving and maintaining central bank credibility is a crucial element of modern monetary policy. This has several consequences: the monetary policy fundamentally follows rules and allows only for constrained discretion, and the independent and broadly transparent central bank operation has become the norm, which builds largely on the use of macroeconomic models. The term “constrained discretion” is introduced by Mishkin and Bernanke (1997) and it means that the central bank has some flexibility to pursue objectives other than price stability such as reduce unemployment in the short term.

In the context of the institutional development of monetary policy, inflation targeting became the predominant regime by the 2000s, and there are currently 28 national central banks conducting inflation targeting-based monetary policies (Felcser et al. 2016). At the same time, not all major central banks defined an explicit quantified nominal anchor or used inflation targeting exclusively. In fact, the Federal Reserve (Fed) did not define an explicit quantified inflation target until early 2012. However, under the chairmanship of Alan Greenspan, the Fed successfully held inflation at low for a long time. The central bank prevented a rise in inflation by using a broad macrodata-based analysis, and by applying forward-looking measures (Goodfriend 2004). Although the European Central Bank's (ECB) monetary policy does have an explicit target, it is not inflation targeting either. Issing (2008), the ECB's former chief economist, mentioned two main explanatory reasons. First, due to the heterogeneity of the Member States, there is no macroeconomic model to forecast an inflation rate applicable to the entire euro area that would be required for inflation targeting. Second, alongside the macroeconomic analysis that shapes inflation in the short to medium-term, the ECB – inspired by the German example – also takes into account trends in monetary aggregates. As the correlation between the latter and the long-term inflation trends can be considered obvious, they form another pillar of the ECB's monetary policy.

Although advanced central bank regimes differ in practice, they nevertheless converged towards some form (explicit or implicit) of flexible inflation targeting, in line with the advice derived from the theory.

Reformulating the monetary policy objectives

The magnitude of the crisis fundamentally shook the traditional framework of monetary policy. Although central banks successfully alleviated the panic that ensued after the crisis by using emergency liquidity-providing instruments, their usual toolset proved insufficient to implement further easing, offset deflationary pressure and stimulate demand. Once the zero lower bound was reached, the monetary policy lost its traditional room for manoeuvre.

Two factors formed the basis of the debate on monetary policy objectives that emerged. First, the likelihood of monetary policy ending up in the liquidity trap of the ZLB should be reduced. Second, the revision of the objectives is not impossible either, in order to ensure that monetary policy remains an effective

economic policy tool even in the case of a liquidity trap. The impact of the crisis on the real economy was so strong that it even called into question the reconsideration of the earlier consensus. Central banks thus have to face social and political expectations that require effective action and support from monetary policy to the government's economic policy. It is natural and legitimate for central banks to regard this issue while keeping their independence unquestionable as a basic principle, but this cannot be an argument for refusing the debate on a possible alteration of the objectives.

Recalibrating the price stability objective is one possibility in terms of objectives. The central banks of advanced economies have consensually agreed to 2% as the medium-term inflation target. This target, on the one hand, takes into consideration the fact that the indicators used for measuring inflation slightly overstate actual inflation, and on the other hand, it also appears to provide a sufficient buffer for monetary policy to avert the risk of deflation. With regard to the former, price stability is associated with an inflation rate of around 1% as measured by the consumer price index (CPI) (Billi–Kahn 2008). With regard to the latter, the question is how often, to what degree and for how long does monetary policy using various targets comes up against the limits of the ZLB, in other words, how often, to what extent and for how long does the Taylor rule imply a negative central bank interest rate.

Empirical analyses are sensitive to input parameters, such as the period under review, the equilibrium real interest rate and the policy rule. Williams (2009) demonstrated that with a 2% inflation target, the ZLB presents constraints to monetary policy more frequently than previously assumed in the broadly accepted Reifschneider and Williams (2000) paper, where the ZLB constraint only seemed significant if inflation was 1% or lower. Based on this new result, a higher macroeconomic cost might be estimated due to greater output volatility and more frequent severe economic downturns. The current crisis confirmed that the ZLB remains a constraint for far longer than assumed earlier, the downturn may be severe and the threat of deflation may persist enduringly. This is why the IMF's chief economist speculated whether raising the inflation target to 4% yielded greater benefits than the cost of higher inflation (Blanchard et al. 2010), and in particular, whether the frequency of periods entailing severe downturns could be reduced by increasing the inflation target.

Krugman (2014) also stressed that euro area countries facing a debt problem were compelled to carry out a significant internal devaluation in an effort to

realign their balance of payments, which resulted in persistent depression in these countries. This will be a long process given the current inflation target and will exert a lasting negative effect not only on countries compelled to perform stabilization, but also on the entire Eurozone economy via spillover effects. However, the necessary adjustment in external balances currently and in potential future cases may be faster and easier alongside a higher inflation target: a higher, 3-4 percent inflation target would have a smoothing effect on the entire euro area economy.

However, the issue of raising the inflation target has divided economists. A 4% inflation target cannot be regarded as price stability; therefore, inevitable costs – such as growing losses from relative price distortions or losses stemming from the depreciation of money holdings – must be acknowledged even in the case of firmly anchored expectations. Amongst others, Mishkin (2011) claims that the greatest risk is that raising the inflation target will render the anchoring of expectations more difficult and increase the costs of keeping inflation under control. In the comment on Williams' results, Woodford stresses (see Williams 2009, 38–45) that changing the policy rule³ may be a better option instead of raising the inflation target, because the stabilisation outcome of the latter is uncertain, depending on the input parameters mentioned in the previous paragraph.

This suggestion, however, is an even more sensitive area than modifying the inflation target. As mentioned earlier, the credible monetary decision-making, that fundamentally follows rules and allows only for constrained discretion, is supported by general consensus. Obviously, this does not mean mechanical and slavish compliance with a specific rule. The rule provides an information element for decision-making, a sort of reference for economic agents on the current stance of monetary policy. As shaping expectations is pivotal for the success of monetary policy, central banker discretion, that is, the room for diverging from the rule, is constrained in order to preserve credibility. For this reason, the rule must be simple and stable because of its role in shaping expectations. Any potential alternative rules must both comply with all of these criteria and meet the aforementioned requirements: they have to decrease the likelihood of a ZLB trap, while providing greater opportunity for taking into consideration economic growth at the ZLB

³ The Taylor rule is the most widely known form of the classical rule, which defines the applicable interest rate as a function of the deviation of inflation from the target and the output gap.

compared to the inflation targeting framework. Meanwhile, we must not forget that monetary policy is incapable of increasing economic growth in the long run.

In view of all this, history dependent strategies have been proposed for formulating possible alternative rules. While the inflation targeting framework has a forward-looking manner and defines the central bank policy based on macroeconomic models and knowledge that forecast expected inflation trends, the history dependent rules also consider the deviation of current and recent inflation trends from the target. One such possible rule is price level targeting, which defines the inflation target dynamically. For example, a 2% inflation target is a long-term reference target (to be achieved as a long-term average) in the context of price level targeting. This means that in the event of a shock such as the one triggered by the current crisis, when the economy is facing a period of deflation or near-deflation, the price level targeting rule requires the central bank to achieve a period of temporarily higher inflation. The average above-target inflation can be allowed until the price level returns to the value corresponding to the 2 percent long-term inflation trend through a temporarily higher rate. Such a rule offers far greater room for monetary policy at the ZLB, as it will not be restrained prematurely by rising inflation. As a result of this, the central bank can maintain an accommodating monetary policy stance for a provisionally longer period despite growing inflation. This, in turn, increases the effectiveness of the tools applied through the expectation channel and for this reason, allows for faster recovery from a situation threatened by deflation.

However, besides the advantage at the ZLB, the extent to which such a rule can anchor inflation expectations is generally questionable. Applying the rule in the short run allows for greater inflation volatility, which not only contradicts the original macroeconomic objective, i.e. taking advantage of the benefits of smoother cycles, but also may lead to some uncertainty of expectations. Although the benefits of the regime over inflation targeting would stem precisely from the long-term stabilisation of inflation (i.e. Svensson 1999), the essence of this, whether it is able to anchor expectations accordingly, is uncertain. However, in the event of negative supply shocks, the drawbacks of the regime are clear. In such scenarios, the rule would require stronger tightening compared to inflation targeting, resulting in greater macroeconomic loss. The pace of returning to the long-term inflation trend in the case of a major inflation shock would also be a

general issue. Defining temporary deflation or protracted close to zero inflation as a target would obviously come up against serious obstacles.

Another history dependent rule, the nominal GDP targeting, would partially offset such drawbacks. In essence, this would consist of using the deviation from the economy's long-term growth path and from a nominal GDP level associated with low inflation as guidance for monetary policy decision-making. If the nominal GDP surpasses the value associated with the potential path as a result of growth, monetary policy will remain tight as long as the overheating persists. The reverse would hold true for values below the benchmark. Similarly to the history dependent rule discussed earlier, in the context of recovering from the ZLB trap, the inflation rising above the target does not, in and of itself, restrict the central bank; in other words, it can maintain accommodative conditions without any credibility loss until the economy recovers. Contrary to price level targeting, the paradox caused by supply shocks does not apply. The central bank is not constrained to tighten the monetary conditions since inflation and the GDP develop in opposite direction of each other in such a case; in other words, neither tightening nor applying an escape clause – the exception of diverging from the rule and its explanation – by central bank is required.

At the same time, many counter-arguments can be brought against the nominal GDP target rule. The first thing to mention is the higher uncertainty of anchoring expectations. The HM Treasury (2013) paper identifies several causes in this respect. First, the rule does not explicitly state anything separately about the quantified value of inflation and growth. As developments in nominal GDP depend on real GDP and inflation, the distribution between the two may vary during any given period; i.e. it can fluctuate from time to time. In addition, developments in nominal GDP depend on the GDP deflator instead of headline consumer price inflation that economic agents are used to, and these two indicators are quite different even if their values tend to move in the same direction. All of this results in uncertain developments in expectations.

Another issue is that the GDP data are published later in time, at a lower frequency and with greater inaccuracy than inflation figures, so monitoring them is also more difficult and would increase the reaction time of monetary policy even further; in other words, increase the inside lag. Csermely and Tóth (2013) stress that the estimation of potential output is, in and of itself, more inaccurate, so its direct implication in the target variable creates further uncertainty. The

flawed estimation of equilibrium growth leads to either more accommodative or tighter monetary policy based on the direction of the error, and accordingly, to the overheating of long-term inflation or its excessively low value, and risk of ZLB. This may be further exacerbated if the long-term growth rate changed in the wake of a permanent supply shock, because in this case, the central bank should change the nominal GDP target or, in its absence, the benchmark inflation rate would adjust automatically. For instance, if the potential growth rate slows in the wake of such a shock, the implicit inflation rate will increase by the same degree in the absence of any amendment to the rule.

The IMF paper (2013) considers forward guidance as more promising compared to history dependent strategies. The forward guidance ties maintaining an accommodating monetary policy or the central bank commitment to such a monetary policy to a specific time horizon or until a certain economic threshold value (such as the unemployment rate) is achieved, and thus guiding expectations. At the same time, Woodford (2013) demonstrates that the right history dependent strategy (i.e. targeting a nominal GDP level) does not contradict the medium-term inflation target, nor does it require any significant change in central banks' current post-crisis strategy. According to Woodford, applying the nominal GDP rule while maintaining the long term inflation target value would underpin more credibly and effectively the central bank's short-term decisions than the practice of forward guidance during a post-crisis period. The credibility risk would be a real risk for central banks if they tied the current developments in monetary policy to a real economic variable that cannot be influenced in the long run. We address the questions of forward guidance in detail in the section on tools.

We may conclude that the revival of debates surrounding alternative objectives was basically generated by the experiences drawn from the ZLB. The monetary policy frameworks applied by leading central banks conducting explicit or implicit inflation targeting policies and their efforts to avoid losing credibility restricts a more efficient management of the crisis consequences. The situation is essentially characterised by a paradox: if the central bank is credible, the market believes that the central bank will increase interest rates in accordance with the framework when there is inflation, whereas the central bank's interest would be for the market to believe that this will not take place for a while.

The circumstances required and continued to require the persistent maintenance of easy monetary policy while inflation expectations are kept low by

the monetary regime and its fundamental element, the central bank commitment to low inflation. Meanwhile, there is great pressure on central banks to contribute as much as they can to improving growth prospects.

Monetary policy can set off aggregate demand shocks in the short term, but it is unable to hasten growth in the long term. On the one hand, the unconventional measures applied by central banks after the crisis open room for manoeuvre for fiscal policy by reducing financing costs and relaxing budget constraints of the government. However, governments should use this support coming from monetary policy to carry out necessary structural reforms, which can promote economic growth in the long term. On the other hand, the fiscal stance influences the effectiveness of monetary policy, as well. An early fiscal consolidation after the crises may weaken the accommodative measures of the central bank.

History dependent alternative objectives would indeed assist central banks in conducting more effective monetary policies at the ZLB. By weighing their benefits and drawbacks, these objectives would provide in such situations a better monetary policy framework than inflation targeting. Nevertheless, the greatest weakness of history dependent strategies is that they are uncertain in terms of how well they shape expectations; that is, specifically in the area where the current regime has been particularly successful, namely in having anchored inflation expectations at a persistently low level.

As neither theory has shown clearly that alternative objectives perform better in the longer term than the current mainstream regime, nor is there sufficient practical experience, central bankers are understandably reluctant to bring about such a change in objectives. For example, with regard to price level targeting, the Bank of Canada arrived at the conclusion that a change in regime could be beneficial in terms of long-term price stability and short-term macroeconomic stability compared to inflation targeting, but the risks stemming from the uncertain impact on expectations and potential credibility losses by the central bank would be too high compared to the potential benefits (Bank of Canada 2011).

Finally, the changing role of central bank in financial stability also may alter the consensus on objectives. It is widely agreed that financial stability must be treated as a priority; but questions about the form in which this should be achieved remain open: integrated directly into or separately from the monetary policy decision-making. The first approach is the so-called “leaning against the wind”

(LATW). The essence of this policy is that the central bank plays an active role in preventing and managing market turmoil by taking into account the financial cycles in decision-making, which often consists of leaning against the wind of markets.⁴ The latter approach, in the form of the so-called “modified Jackson Hole consensus” seems to be gaining more ground now.

Before the crisis, the central banks’ views on asset price bubbles as a cause of financial instability were based on the Jackson Hole consensus reflecting the American approach that emerged during the Greenspan era. According to this approach, while asset price developments serve as an important indicator for monetary policy, central banks only intervene in market processes if these affect the inflation target. Accordingly, the main task of central banks was limited to restoring order after asset price bubbles burst, in the course of which they provided the liquidity necessary for market clean-up.

Within the framework of the modified Jackson Hole consensus, the price stability objective is the mandate of monetary policy while financial stability is the mandate of macroprudential policy. At present, the financial stability mandate is predominantly within the competence of supervisory authorities, managed independently from monetary policy, and it is not explicitly integrated into the central bank’s decision-making process (even if these authorities themselves have been recently integrated into central banks in many countries). In this context, macroprudential supervision emerged alongside the reinforcement of traditional supervision, between monetary policy and microprudential supervision. The implementation of the modified Jackson Hole consensus also means that in terms of financial stability, the role of monetary authorities remains broadly unchanged while the supervisory and regulatory frameworks are to be radically transformed.

Although the implementation of this framework has already been under way, questions abound regarding the use of macroprudential tools. Practical experience in the future regarding the success of macroprudential regulation and its proper cooperation with monetary policy and the theoretical development of the LATW may finally answer the question on how the financial stability will be secured. As a result, the objectives of monetary policy may be amended.

⁴ For instance, in case of an excessive credit outflow and asset price increase, the central bank keeps the interest rate higher than required by the conventional objective.

Changes in central bank instruments

Traditional central bank instruments include open market operations, the standing facility and minimum required reserves. According to the conventional practice that emerged prior to the crisis, central banks influenced the short term, typically between O/N and two-week maturity yields on the money market – in particular, the interbank market – mainly through deals with commercial banks, that are institutions subject to minimum reserve requirements through open market operations. The central bank's operative objective was to influence short-term money market yields through the key policy rate. The focus on a short term horizon stems from two factors. For one, influencing such short-term yields leaves far less room for speculation in the money market before interest rate decisions. In addition, the response of short-term interest rates to the central bank action exerts an impact on the entire yield curve. Assuming that the central bank's step is consistent with the inflation target, movements in nominal long term rates alters the forward-looking long-term real interest rates, and thus the central bank has an impact on the real economy through the monetary policy transmission.

Central banks also smooth money market volatility in a passive manner by using the standing facility, alongside open market operations. One form would be the overnight interest rate corridor, while another classic type is the solely credit-side, marginal lending facility. The O/N corridor borders serve as mitigating limits on the money market rates, because banks may deposit their excess reserves in the central bank at the rate of the lower edge and borrow reserves from the central bank – providing eligible assets as collateral – at the rate of the higher edge of the corridor. However, the latter type of standing facility (such as the discount window lending of the FED) allows the bank only to borrow reserves at the rate above the main rate. Thus, this kind of instrument sets up only an upper limit on the money market rates.

The reserve requirement is the third element within the traditional central bank toolset. Changing the rate, however, is rare in the developed monetary systems. The role of the reserve requirement, similarly to the standing facility, is to foster financial stability and boost the efficiency of the central bank's interest rate policy.

The central bank action that does not fit into the above conventional practice is broadly referred to as unconventional (Pál 2013). This includes cases where the central bank implements radical changes in its traditional tools and/or uses

them to an extraordinary extent, or applies non-operative tools in an operative manner; applies innovative tools with an effect that departs from conventional logic; extends its corresponding operations beyond conventional market agents and markets; defines unconventional operative or intermediate objectives; and substantially alters its communication.

Bernanke and Reinhart (2004) identify the grounds for and the nature of using unconventional tools as a possible alternative to a monetary policy framework when, hitting the ZLB, the central bank cannot take action against deflation by cutting the current short-term interest rate. Smaghi (2009) considers the use of unconventional tools warranted even above zero interest rates if the monetary policy transmission is not functioning correctly due to market turmoil. The IMF (2013) paper adds the restoration of the financial market operation when faced with a severe crisis as another scenario would be to warrant the unconventional central bank action, in the context of which the central bank provides sufficient liquidity for market players as lender of last resort and also intervenes directly on distressed markets.

If we add to this the experience during the crisis, two factors warranting the unconventional monetary measures can be identified. The first is the financial market crisis, which carries the threat of undermining financial intermediation and/or causing sustained or serious damage to monetary policy transmission, jeopardising the objectives of monetary policy. The second is the shock affecting the real economy (not exclusively, but in this case specifically in the wake of the financial market crisis) which is of such an extent that the central bank comes up against the ZLB. Addressing the shock requires further monetary easing, but the ZLB prevents any further central bank rate cuts. While the possibility and limits of negative interest rates are addressed later in this paper, they should be considered as an unconventional measure in any event, and the ZLB is mentioned here as a common reason for applying unconventional tools.

Under financial stress, central banks mop up turmoil in the role of lender of last resort by extending the conventional tools; in other words, by providing abundant liquidity and maintaining accommodative conditions. However, the financial crisis that first signed in 2007 jeopardised financial stability and central bank objectives to an unprecedented degree. It quickly became clear that the collapse of financial intermediation could not be averted by merely extending the conventional tools at an early stage. In their unconventional role, central banks focused on the market

segments, whose functioning was critical for financial intermediation. First, they expanded their role of lender of last resort beyond the traditional banking system to also a part of the shadow banking system. In addition, central banks temporarily replaced the market through direct intervention until poorly functioning segments recovered. In some cases, this took on the form of purchasing – or accepting as collateral – toxic or less liquid assets, which in the past were not regarded to be eligible assets. In addition, they also encouraged market players to purchase such assets through dedicated refinancing and the partial takeover of risk.

Central banks initially attempted to make an impact by cutting interest rates and adjusting conventional tools in terms of their conditions and volume. In the US these measures included a significant expansion of the standing facility in late 2007 with the introduction of the Term Auction Facility (TAF), which provided direct and abundant liquidity to the banking system. Contrary to the traditional facility of Discount Window Lending, the TAF auctioned liquidity to banks without charging a premium and without having a punitive mark; and the volume of this liquidity operation exceeded by far the amount drawn down by the banks under the DWL during the crisis. The ECB provided additional liquidity to banks through its fine-tuning operations in an effort to appease the money market turmoil while also increasing the proportion of its longer-term facilities within its total allotment of liquidity and increasing the amount of liquidity provided during the first half of the reserve maintenance period, thereby reducing the likelihood of tensions emerging at the end of the period.

Until the collapse of Lehmann Brothers, these tools did not entail any substantial increase in the central bank balance sheet. After the collapse however, the additional liquidity supplied by central banks spiked and so did their balance sheet total, and tools targeted at non-bank market segments and agents stepped into the focus of the central banks' operations.

The general crisis of confidence dries out liquidity and prevents market players from accessing funding. The flight to quality places pressure on risky assets, leads to outflow of funds, and limits refinancing opportunities at the intermediaries and investors. This spurs market players to make fire sales, triggering further price falls and the freezing up of markets. The halt in market lending due to the need to cover losses and due to counterparty and asset quality uncertainty leads to liquidity hoarding. The process becomes self-reinforcing, with the depletion of market agents' liquidity due to investor panic, which pushes them to the brink of

bankruptcy and leads to the emergence of irrational risk and liquidity premiums on markets.

From September 2008, central banks supplied ample liquidity to markets in order to meet increased demands and extended targeted funds to specific segments in an effort to normalise market processes and prices. The IMF (2013) features a classification of central banks steps according to which they attempted to prevent investor panic and the meltdown of trust by aggressively providing targeted liquidity while attempting to stop negative market spirals in the wake of fire sales using targeted asset purchases. Partially building on this approach, there is also an objective to incentivise or restore active market activity by key market players and to cushion the impact on the real economy. Accordingly, we have a different assessment of the specific role of various measures.

The tools used, particularly in the US, were highly diverse. The Fed's targeted liquidity programmes, such as its standing facility announced for primary dealers (Primary Dealer Credit Facility – PDCF) and the securities lending programme (Term Securities Lending Facilities – TSLF, under which liquid securities collateralised by less liquid securities are borrowed by primary dealers) enabled leading market players to maintain their active market activity.

Other tools relieved the pressure on markets backstopping self-generating price falls and outflows of funds from key markets. At the same time, the impact of these tools spill over beyond financial markets, preventing an unexpected credit crunch affecting the relevant sectors of the real economy (i.e. those sectors that access credit through these markets). These include the Fed's facilities aimed at bringing liquidity to the commercial paper and asset-backed securities market and to money market funds, such as the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF), the Commercial Paper Funding Facility (CPFF), the Term Asset-Backed Securities Loan Facility (TALF) and the Money Market Investor Funding Facility (MMIFF) – however, no actual transactions materialised in the context of the latter.

Likewise, the individual loan agreements intended to prevent disorderly default among systemically important financial institutions are also examples of emergency liquidity providing instruments.⁵ These include also the currency swap

⁵ Only in the case of the Bear Sterns' acquisition and of the bailout of AIG benefited from actual lending, and a credit agreement was concluded with two banking giants, Citigroup and Bank of America; but eventually, there was no drawdown in their case.

agreements open to other central banks (mainly the ECB), which enabled partner central banks to provide dollar liquidity to financial institutions in their own monetary systems.

In Europe, the emergency liquidity provision was concentrated in the banking sector. The ECB measures were aimed at meeting the increased banking liquidity needs and at alleviating the disturbances in monetary policy transmission. In other words, ECB aims to handle the significant divergence of short-term interbank and money market yields from central bank interest rates, leading to the conditions in the market that were in conflict with the central bank's intention. The main tools were the changes to the tender rules of the main refinancing instrument (full allotment at fixed rate), the use of longer-term (6 and 12-months) refinancing facilities, the provision of dollar liquidity to Eurozone banks and the narrowing of the overnight interest rate corridor. This also included the first Covered Bond Purchase Programme, which was primarily aimed at improving the fundraising of European banks rather than intervening in a specific market segment. Indeed, this market played an important role in refinancing.

In sum, three factors could be named, which have arisen from the emergency liquidity provision applied during the crisis, and which have sustained impact on monetary policy for the future. Firstly, it became clear that the role of central banks as lenders of last resort cannot be interpreted exclusively in terms of the banking sector in the future. Due to mutual interconnections, the condition of the key players and segments of the shadow banking system has a decisive impact on the liquidity of monetary institutions, on the banks' access to funding and on the monetary policy transmission mechanism in times of crisis. The latter not only requires the expansion of eligible counterparties, but also calls for changes in the relevant central bank instruments (such as the standing facility) and the rules thereof. Moreover, the global interconnectedness of markets and participants requires cooperation and harmonised action by central banks when faced with the task of emergency crisis management. However, the relevant conceptual and institutional frameworks of this cooperation are not in place. Last but not least, the question of what additional tools and powers – mainly microprudential and macroprudential supervision and instruments – should be granted to central banks for them to fulfil their role in financial stability is unavoidable.

As the financial crisis eased, market demand for the central bank's emergency liquidity providing tools also waned. The decline in loan-type central bank refinancing was accompanied by a simultaneous contraction of the central bank

balance sheet. At the same time, the severity of the impacts on the real economy became clear at this point. After the rapid downturn, economic recovery was uncertain, with the looming threat of a credit crunch and deflation. Given the severity of the crisis, leading central banks had already cut nominal interest rates to or close to zero. This meant that they had to find tools beyond traditional interest-rate policy in order to provide additional monetary stimulus. Bernanke and Reinhart (2004) had already mentioned three potential tools earlier that central banks could use as monetary stimulus at ZLB:

1. Influencing expectations through central bank communication that signal the prolonged maintenance of accommodative monetary conditions. As long-term interest rates can be generated as multiples of short-term interest rates, a credible central bank can impact the long end of the yield curve by influencing and altering market expectations on the future short-term interest rates.

2. In the context of classic quantitative easing (QE), the central bank provides additional liquidity to the economy and the banking system. This entails an expansion of the central bank's balance sheet, but the composition of the assets side of the balance sheet remains essentially unchanged, namely consisting of short term government papers. It is a different case when borrowed reserves are predominant on the assets side of the central bank balance sheet, as is the case with the ECB. In this case, the central bank's assets side also changes, with a rise in the ratio of non-borrowed items. Classic QE exerts its impact through several channels. The portfolio-rebalancing effect should be mentioned first and foremost. Money holders invest a portion of the increased holdings of money resulting from the QE into other financial instruments, increasing their price and thereby decreasing yields, including term and risk premiums. The greater the size of QE, the stronger this effect, as the central bank partially crowds out investors from short-term government bonds through its purchases. Obviously, the impact of QE is not independent of expectations. QE itself reinforces the credibility of the central bank's commitment to maintaining the accommodative monetary conditions for a prolonged period in the eyes of market participants and hence, it may play a pivotal role in shaping expectations. Finally, it makes government financing cheaper, which not only creates greater room for fiscal policy, but also mitigates expectations about future tax burdens.

3. The central bank may alter the assets side of its balance sheet. By purchasing longer-term assets, it can directly reduce term and risk premiums.

By purchasing longer-term government bonds, it can lower term premiums, which can be expected to have a spillover effect on additional markets as a result of portfolio rebalancing. Clearly, compared to traditional QE, this bolsters the perception of the central bank's commitment to maintaining accommodative conditions for a long time, as the prices which react sensitively to interest rate decisions accumulate in the central bank's balance sheet. Meanwhile, the purchase of non-government securities (such as mortgage bonds) by the central bank directly affects the risk premium on those instruments. At the same time, the purchase of securities other than government bonds leads to the area of direct credit market intervention, i.e. credit easing as a potential element thereof.

Based on the central bank practice of recent years, the possibility of negative interest rates must also be mentioned as a fourth factor supplementing those mentioned above.

Although the central bank may realign the assets side of the balance sheet by replacing the assets held in its portfolio, this may entail significant balance sheet expansion, as was actually the case in 2009. For this reason, it has become known both in common use and market jargon as QE, and will thus be referred to as such in the remainder of this paper. However, because both quantitative and qualitative changes actually occurred in the central banks' balance sheets, it should be noted that this goes beyond classic quantitative easing.

In recent years, each of the leading central banks – the Fed, the ECB, the Bank of England (BoE) and the Bank of Japan (BoJ) alike – has implemented QE programs. The common characteristics of their QE schemes were:

- Large volume: central banks significantly increased their balance sheet total (some of them multiple times compared to the earlier figure), which came to account for a large portion of the GDP and also relative to the size of the affected securities markets;
- QE was conducted at ZLB;
- Government bonds were either predominant within the purchased assets (ECB, BoE and BoJ) or in majority (Fed);
- The asset purchases also extended beyond government securities markets, and included GSE bonds and mortgage-backed securities⁶ (Fed), corporate bonds

⁶ Bonds and mortgage-backed securities issued by government-sponsored enterprises, which account for the majority of the US mortgage bond market and are commonly referred to as Fannie Mae, Freddie Mac and Ginnie Mae.

(ECB, BoE and BoJ), asset-backed bonds (ECB), ETF and property fund shares (BoJ); and bonds issued by local and regional governments and supranational institutions (ECB).

- They purchased long-term instruments with a broad maturity spectrum;
- The efficiency of the programmes was bolstered by forward guidance;
- In the context of the transactions, the central banks purchased securities not only from banks but from a wider range of counterparties.

Each globally important central bank mentioned above conducted a complex QE programme which, alongside substantial quantitative easing, comprised government bond purchases aiming at reducing long-term interest rates and credit easing measures. While the fundamental objectives were the same, the differences between the programmes stemmed from the difference of the financial intermediation systems involved. In the Fed's case, bonds of major mortgage refinancing institutions accounted for nearly the same portion of the Fed's purchases as of government bonds. The reason behind this can be found in the size and importance of the given segment. In terms of size, in other countries the relative degree of central bank purchases of privately issued securities did not reach the US level, but was nevertheless significant. At the same time, contrary to the US, the banking system plays a more prominent or dominant role in financial intermediation elsewhere. For this reason, the other three central banks mentioned above launched credit stimulating schemes that provided cheap and long-term refinancing for commercial banks in an effort to maintain or boost their corporate lending.

The QE programmes were accompanied by negative key policy rates in the case of the ECB and the BoJ.⁷ Negative interest rates were applied to commercial bank reserves above the reserve requirement. One of the main expected impacts is that the cost of holding reserves will motivate banks to engage in more money market activity and to increase lending, as passing on negative interest rates to depositors is less of an option for them. The higher this burden on commercial banks, the more it can help counter liquidity hoarding. At the same time, a negative interest rate may also exert an impact through traditional channels. A negative deposit rate not only reprices the interest rates on short-term and safer assets, but also lowers term and risk premiums through portfolio rebalancing, and indirectly increases investments and consumption.

⁷ The Danish, Swedish, Swiss and Hungarian central banks have also introduced negative interest rates recently, with various objectives.

The question of the actual applicability and success of negative interest rates remains open. Although every single bank may reduce its excess reserves by either increasing its lending or reducing other funds on its liabilities side, the entire banking system can only reduce its reserves to the extent that it decreases its other borrowed funding originated from the central bank. However, as a result of the QE programmes, with the exception of loan refinancing programmes, the reserve holdings of commercial banks increase through non-borrowed central bank funding. As the whole banking system was unable to rid itself of its negative interest-bearing free reserves, they broadly act as a tax levied on the entire banking system: they decrease the banking system's profitability and thus its lending capacity.

Anyhow, the negative interest rate environment puts pressure on bank profitability. Combined with negative central bank interest rates, the QE programmes have pushed bond yields into negative territory, primarily those on government securities of the highest credit rating, regarded as safe havens. As banks are required to hold such bonds despite negative yields due to regulatory compliance and for liquidity management, they may incur losses on them. On the other hand, because banks are unable to pass negative interest rates on to customers on the deposit side, the decline in bond yields and lending rates lowers the interest margin. Shrinking interest margins not only dampen profitability, but also the willingness to lend. Besides pricing, other factors also play a role in lending trends. The weakness of economy, the worsening credit portfolio, the increasing risks of lending and the low credit demand may all contribute to the decline in lending. The regulatory changes of recent years – those that require higher and better quality capital and impose new liquidity requirements on banks – have also held back banks' lending capacity. In other words, the weakness stems not only from liquidity hoarding, but also from factors on which negative central bank interest rates have minimal impact. Furthermore, they may even inadvertently have an adverse impact on the banking system and lending.

Constâncio (2016) demonstrates through the example of the ECB, that the adverse side effects of negative interest rates should not be assessed alone, but in conjunction with other QE programme measures. In the Eurozone, negative central bank interest rates contributed to a rise both in the lending and the holdings of foreign government bonds by the banks of more stable Member States. Overall, it enhanced the portfolio rebalancing effect of QE.

Even if we accept this claim, the materialised impact is far more attributable to the fragmentation of the Eurozone's financial intermediation than to the overall positive outcome of negative interest rates. The safety created by the ECB's QE programme may have decreased the fragmentation of government securities markets within the Eurozone, however, the imbalance measured by the diverging positions of national central banks within the TARGET 2 system has increased since the start of the programme. In other words, the divergence in banks' excess reserves and in borrowed funding from central banks among the member states' banking systems started to increase again. This, however, shows that the ECB's purchases were not accompanied by an improvement in the fragmentation of the banking system; in other words, despite the incentive of negative interest rates, free reserves not only did not flow into countries with weaker macroeconomic positions and banking systems, but banks' reliance on central bank funding increased even further in these countries. Meanwhile, the rise in lending in stable countries materialised alongside a robust increase in free reserves.

Each of the aforementioned central banks used forward guidance to enhance their QE programmes. Viewed from above, forward guidance is essentially a reinforcement of central bank transparency achieved by the central bank through more detailed and open communication than in the past, in an effort to improve the efficiency of central bank measures by shaping expectations. Communication was assigned an even greater role within central bank policies after the crisis, mainly because it represented a possible and important tool in further necessary monetary easing in a ZLB environment.

Although in such an environment, it is an alternative that can be chosen independently by the monetary policy, as described above, it has nevertheless been closely connected with large-scale asset purchases by central banks in recent years. The two tools mutually reinforce each other's effect and exert their impact through not exactly the same channels. Forward guidance basically provides signalling about the future conduct of the central bank to market participants, shaping expectations on future short-term interest rates, and as such, it mainly exerts its influence through this channel. When applying them, central banks adjusted expectations suggesting that accommodative monetary conditions would be maintained over the long term. This plays a dual role. By lowering expectations on forward-looking short-term interest rates, the term premium decreases; i.e. it contributes to lowering the long-term interest rates. This signal also helps break

the liquidity trap by substantially alleviating fears about a central bank interest rate hike, which keeps investors away from longer-term investments or from lending, thereby increasing demand for these assets. It also increases the costs of the wait and see strategy if the expected period is extended alongside negative real yields, as opposed to the yields attainable with longer-term investments or lending, which are not only higher but will only be adjusted by a future interest rate hike at a distant point in time. In most cases, the core communication of forward guidance was linked to announcements on large-scale asset purchases or pertained not only to keeping interest rates low, but also to the maintenance period of the asset purchase programme or the conditions thereof.

The practice of forward guidance grew more sophisticated progressively, with the initial forecast type guidance replaced by time and state-dependent commitment type guidance or combinations thereof. This is because the efficiency of central bank communication depends on how convincing it is in suggesting that the central bank will maintain accommodative conditions for a sufficiently long time, or for longer than otherwise assumed. This, however, is also the source of the limitations of applying forward guidance. For the sake of effectiveness, i.e. in order to generate a meaningful shift in expectations, the central bank must make promises regarding its future conduct that somewhat differs from the one that the markets previously assumed.

In addition, it must do so knowing that its forecast for the future is neither more accurate nor any less uncertain than the market's forecast. Issing (2014) pointed out the uncertainties in the critical variables (such as output gap, unemployment rate, and real neutral interest rate) of the forecasts, a result of which credible commitment becomes questionable. Even if the data in the forecast are correct, there is still the issue of credibility. Guidance is only truly effective if it differs from the normal central bank strategy (for example, the central bank temporarily tolerates higher inflation and delays its interest rate hike longer than it normally would). But this is not time consistent, as over time, raising the interest rate earlier would be the right step as inflation rises.

Woodford (2012) therefore considers central bank commitment diverging from traditional forward-looking logic and reaction function as an important factor in terms of effectiveness. Woodford also emphasises that guidance promising a longer maintenance of accommodative conditions may be counterproductive, as market agents may interpret it as a sign that the economy is weaker than they

assumed. The author therefore claims that the state-dependent guidance might be a better option. Bean (2013) mentions another issue of credibility: future commitments undertaken by current policymakers are not binding for future decision-makers.

In sum, unconventional tools have been applied without being backed by significant experience. Nevertheless, these tools have been part of the central banks' daily practice for nearly a decade now as a core element of monetary policy. The Centre for Macroeconomics⁸ survey (CFM 2016) reveals that macroeconomists are divided on the topic of the need to use unconventional tools in the future under normal circumstances (nearly 50% of the respondents agree that unconventional tools must be used, exceeding the ratio of those fundamentally opposed to their use). The potential further expansion of unconventional tools is also on the agenda of policymakers and economists. This is why the question of whether the tools currently referred to as unconventional will turn out to be permanent central bank tools in the future still remains.

Ball et al. (2016) and Reza et al. (2015) presented summary papers by analysing the effectiveness of unconventional tools. According to their findings, broad consensus has emerged that unconventional tools have proven successful at the ZLB and enabled central banks to reduce long-term interest rates, ease financing constraints and have a positive impact on the real economy, resulting in faster and more robust recovery from the shock of the crisis. Some scepticism regarding the outcomes does remain. Thornton (2015) argues that it cannot be proven empirically, or only to a slight degree that the decline in the US yields during the period under review was the result of QE programmes. Central banks tend to use unconventional tools simultaneously, drawing on their mutually reinforcing effects; therefore, it is not possible to break down their individual level of success and assess their drawbacks accurately. This, however, does not mean that they must be handled together in terms of their future applicability. Ball et al. (2016) regard both asset purchases and negative interest rates as viable tools in a low inflation environment and during periods of recession and insufficient demand. The authors show that QE programmes were effective in practice, while their assumed negative impacts were in fact less significant than presumed, and

⁸ The Centre for Macroeconomics (CFM) is a research centre funded by the Economic and Social Research Council (ESRC). Its surveys reflect the opinions of European prominent macroeconomists.

despite earlier beliefs on the strict zero lower bound, the use of negative interest rates is in fact possible up to a certain point (even -2%).

According to IMF (2014), both theoretical arguments and empirical evidence corroborate the success of unconventional measures over the past period. However, the paper points out that during normal periods, with the exception of forward guidance, their drawbacks exceed their benefits. In the questions reformulated by that paper in a more general sense, it compares the possibility of directly shaping long-term interest rates or the entire yield curve with conventional short-term rate policy under normal circumstances, alongside the option of credit easing. In the former case, it emphasises the volatility in short-term interest rates caused by the change in expectations on central bank movement regarding long term rates and its adverse impact on the financial sector. Furthermore, it notes the correlation of QE with the fiscal policy, particularly the risk of monetary financing. It also stresses the issue of market distortion caused by credit easing.

Borio and Zabai (2016) warn that the damages of unconventional monetary policy may exceed short-term advantages in the long term. They argue that on the one hand, the returns of the unconventional measures as they follow each other are diminishing. On the other hand, the stronger the measures and the longer they are in place, their risks and costs are higher. They draw the attention to the narrowing of the room for manoeuvre of monetary policy if and when the next recession hits and to the credibility cost for central banks arising from the uncertain cost-benefit balance of the applied unconventional tools.

It is generally true that the expected negative impact of unconventional tools has so far not been perceived to an extent that would warrant the initial concerns about their use. For instance, the QE programmes have not created any significant inflation so far, the risks to central bank profitability do not seem unmanageable and negative interest rates have so far not jeopardised bank profitability to a dangerous extent. However, nothing certain can be stated about the future based on experience so far. This is because we cannot accurately forecast the future materialisation of numerous counterarguments or negative impacts, mainly because the exit from unconventional tools, i.e. the normalisation of central bank policy, has not yet taken place. Besides those mentioned above, there are other questions that will fundamentally shape views on unconventional tools, primarily on QE:

- QE and the related measures distort markets, as they put downward pressure on term and risk premiums. This, in turn, impacts risk-taking and
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may foster financial imbalances and the re-emergence of bubbles. This makes a return to normal particularly difficult, creating a contradiction between the fundamental objective of monetary policy and financial stability. A fundamental question is if the central bank has broadly set prices on financial markets by using unconventional tools, is it possible at all to return to a normal state for these markets without creating shocks that result in a negative impact that is potentially more severe than the one originally cured by the central bank with the unconventional tools.

- There is also a lack of experience on how to ensure and maintain the consistency between either the use of, or an exit from, unconventional tools and new macroprudential tools and objectives targeting financial stability.

- While QE created significant room for fiscal policy, the exit will have negative fiscal consequences, which may create growing political pressure on the central bank and may even impact statutory objectives and autonomy.

Firstly, the successful use of unconventional tools under exceptional circumstances does not mean that they are an adequate alternative or supplement to traditional measures in normal times, and secondly, final conclusions on these new tools cannot be drawn for the time being as their risks for the future are still uncertain.

However, viewed from a different angle, we can argue in favour of the long-term use of unconventional tools. As QE has permanently reshaped monetary policy, it cannot be regarded as temporary, because of the following:

- a short or medium-term exit is impossible. Central bank balance sheets have been restructured – filled up mainly with long-term government bonds – to such an extent that any rapid deleveraging is not feasible. For this reason, these assets will remain on central bank balance sheets for a long time;

- as it is suggested by more papers, i.e. Rachel and Smith (2015), we have to expect a permanently low interest rate environment, under which the fundamental tools of monetary easing may remain unconventional tools when monetary policy hits against the ZLB again. Thus, for instance, it is likely that during periods requiring monetary easing at the ZLB, the aforementioned balance sheet assets may increase temporarily within central bank balance sheets while slowly contracting during normal periods;

- if these assets remain persistently on the central bank balance sheet, sterilising the surplus liquidity created by them (if needed for monetary policy

reasons) is technically not a problem (through the interest paid on surplus liquidity held at the central bank, and using reverse repo transactions for fine-tuning), nor is it contrary to conventional monetary policy logic.

Conclusions

This paper analysed the main challenges facing monetary policy recently. We looked at the various opinions and continuously shifting practice that has emerged in the post-crisis period and on this basis, we tried to define the most probable future direction. In terms of the monetary objectives, in our opinion no meaningful change can be expected, and the regime that aims at price stability in a forward-looking and flexible manner is likely to remain in place. In terms of the quantified inflation target, although the debate is still open, the practical motives for moving away from the current 2 percent target will probably weaken as the risk of deflation dissipates.

The outcome of the issues regarding the future of policy tools is more uncertain, as there is no consensus on the phasing out of the currently broadly used unconventional tools and their long-term impact. For one, there is no alternative to unconventional tools in a persistently low interest rate environment; at this time, these tools represent possible and viable solution for achieving monetary policy objectives. Neither forward guidance nor QE are incompatible with the traditional tools. The former improves transparency and more accurate guidance of expectations during normal times also, and the latter, while boosting central bank balance sheets, does not rule out the efficiency of traditional interest rate policy even in normal times.

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