

Unconventional Monetary Policies: Lessons from the Past and the Present to Future Monetary Policy Frameworks

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Abstract:

This article intends to shed light on important aspects related to past and recent experiences of monetary policy accommodation, with particular attention to unconventional monetary policies. We intend to draw lessons from these experiences to discuss the design of future monetary policy frameworks.

First, by reporting several historical experiences of major central banks (UK 1825, USA 1932, UK and USA 1940s and 1950s, USA 1961, Japan 1999 and 2000s), we highlight that policies which after 2008 crisis were considered “unconventional” (i.e., broad liquidity provision operations, asset purchases programs, yield curve controls) were not new. Even if in some of those past experiences central banks took considerable time to act, they ended up intervening to avoid a broader deterioration of macroeconomic and financial conditions.

Moreover, we describe the recent experience of the European Central Bank after 2008. This institution has adapted its measures according to its own former programs (“learning by doing”), and to other central banks experiences (“learning by observing”), to face numerous challenges posed by Euro area’s macroeconomic/financial conditions and to enhance its framework.

Finally, we center our attention on the discussion about how will be shaped future monetary policy frameworks, and to which extent policies previously classified as “unconventional” will be removed, or maintained (and considered as new tools available in monetary policy frameworks). We participate to the literature by arguing that central banks should not promote a complete return to pre-2008 standards (“normalization”) but need to take advantage from past and more recent experiences to improve their future monetary policy frameworks. Based on this, measures previously implemented would have three possible destinations in new frameworks: i) Be discarded, due to their predominantly negative effects; ii) Not be regularly implemented, but be kept as tools if needed to achieve central banks’ goals, especially under situations of crisis; iii) Be incorporated as regular measures of the monetary policy framework. In this sense, monetary authorities will need to be increasingly evolving institutions, in a continuously adaptive and innovative process, to face challenges posed by financial markets that are each day more dynamic, innovative, complex, interconnected and globalized.

Keywords: unconventional monetary policy, European Central Bank, monetary policy frameworks

Resumo:

Este artigo tem por objetivo esclarecer aspectos importantes de experiências passadas e recentes de acomodação monetária, com atenção particular a políticas monetárias não convencionais. Pretendemos extrair lições dessas experiências para discutir a configuração dos arcabouços futuros de política monetária.

Primeiro, ao relatar diversas experiências históricas de alguns dos mais importantes bancos centrais mundiais (Reino Unido 1825, EUA 1932, Reino Unido e EUA 1940 e 1950, EUA 1961, Japão 1999 e 2000), argumentamos que políticas que após a crise de 2008 foram consideradas “não convencionais” (ex: operações de provisão ampliada de liquidez, programas de compras de ativos, controles de curva de juros) não eram novas. Mesmo que em algumas dessas experiências passadas os bancos centrais tenham levado um tempo considerável para agir, acabaram intervindo para evitar uma deterioração mais ampla das condições macroeconômicas e financeiras.

Além disso, descrevemos a experiência recente do Banco Central Europeu após 2008. Esta instituição adaptou suas medidas de acordo com seus próprios programas anteriores (“aprendizagem pela prática”), e com outras experiências dos bancos centrais (“aprendizagem pela observação”), para enfrentar numerosos desafios impostos pelas condições macroeconômicas/financeiras da Área do Euro e melhorar o seu conjunto de políticas.

Finalmente, centramos nossa atenção na discussão sobre como serão moldados os arcabouços futuros de política monetária, e até que ponto as políticas previamente classificadas como “não convencionais” serão removidas, ou mantidas (e consideradas como novos instrumentos disponíveis nos arcabouços de política monetária). Complementamos a literatura argumentando que os bancos centrais não devem promover um retorno completo aos padrões pré-2008 (“normalização”), mas precisam aproveitar as experiências do passado e mais recentes para melhorar seus arcabouços futuros de política monetária. Com base nisso, as medidas implementadas anteriormente teriam três possíveis destinos em novos arcabouços: i) Serem descartadas, devido a seus efeitos predominantemente negativos; ii) Não serem implementadas constantemente, mas serem adotadas caso necessário como instrumentos para atingir as metas dos bancos centrais, especialmente em situações de crise; iii) Serem incorporadas como medidas regulares do arcabouço de política monetária. Nesse sentido, as autoridades monetárias precisarão se tornar instituições em uma crescente evolução, em um processo continuamente adaptativo e inovador, para enfrentar os desafios impostos por mercados financeiros que são cada dia mais dinâmicos, inovadores, complexos, interconectados e globalizados.

Palavras-chave: política monetária não convencional, Banco Central Europeu, arcabouços de política monetária

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1 Introduction

This article intends to analyze important aspects related to past and recent experiences of monetary policy accommodation, with particular attention to unconventional monetary policies. We draw lessons from these experiences to discuss the design of future monetary policy frameworks.

The main questions we aim to answer are the following: i) In which occasions the measures known today as “unconventional” monetary policies have been previously adopted?; ii) How was the evolution of the monetary framework implemented by the European Central Bank (ECB) since 2008?; iii) Can we expect complete removal of unconventional policies, with a return to pre-2008 standards (“normalization”), or incorporation of some unconventional policies as new tools in future frameworks (“new normal”)?

In order to answer these questions, the article is structured as described in the sequence. After this introduction, section 2 centers its analysis on past experiences of monetary accommodation. We describe the historical background of unconventional monetary policies (UMPs), mentioning experiences which they were implemented before 2008 (i.e., UK 1825, USA 1932, UK and USA 1940s and 1950s, USA 1961, Japan 1999 and 2000s). In section 3, we discuss the recent experience of UMPs in the Euro area. Following numerous macroeconomic and financial challenges that occurred in the area after 2008, we observe the evolution of ECB’s framework, with the institution trying to improve more recent programs based on shortcomings observed in initial measures. In section 4, we turn our attention to the debate on future monetary policy frameworks. In particular, to which extent policies previously classified as “unconventional” will be removed (promoting a return to pre-2008 standards, or so-called “normalization” of monetary policies) or maintained (and considered as new tools available in future monetary policy frameworks, or so-called “new normal”). Section 5 brings the conclusions.

2 Historical Background

Although the expression “unconventional monetary policies” gained notoriety to name the set of extraordinary measures implemented by central banks after 2008 crisis, it does not mean those policies are completely new or have never been practiced before. In fact, what is called “conventional monetary policy” today - central banks keeping short-term interest rates at positive levels, controlling them according to a Taylor rule (Borio and Zabai, 2016) - has become a common practice only after the 1990s. Before that, central banks have used many other instruments and did not focus exclusively on controlling short-term interest rates. We highlight in the sequence some periods in the past when instruments that are now being called “unconventional” (e.g., expanded liquidity provision facilities, asset purchase programs, yield curve control measures) have already been used by major central banks, and explain the context of their implementation.

2.1 BOE as lender of last resort in 1825

The 1825 banking crisis in London is considered to be one of the first systemic financial crises in modern history. According to authors as Smith (2009) and Morgan and Narron (2015), this crisis did not have a single event as a trigger. In fact, it had several factors behind it: i) Expansionary monetary policy fueled an increase in asset prices and stock market boom; ii) Stimulus in demand for financing infrastructure projects - including in newly independent South American countries - fostered increase in debt issuance; iii) New financial instruments blurred the distinction between sound projects and speculative/fraudulent “investments”; iv) Lack of discipline by banks and market oversight by authorities helped to spread risky activities. All of them precipitated into an environment of “panic” and contagion, with a bubble burst and a bank run. Surprisingly, the Bank of England did not react to those problems initially, later receiving strong criticisms from authors as Bagehot (1873). Bagehot argued that in those occasions, the central bank had a crucial role in stopping the panic with three major rules. First, supplying all the liquidity needed by financial institutions. Second, supplying this liquidity at high interest rates. Third, supplying liquidity against good quality collateral. Only after the failure of some large banks in London, Bank of England (BOE) assumed this lender of last resort (LOLR) role. It performed extensive credit provision against different types of collateral, purchased public bills and used other tools, to put a floor on asset prices and avoid a liquidity freeze. So, after some delay, BOE ended up using many

mechanisms it had on its hands at that time to backstop the banking system. The institution managed to contain the panic, although the stock market downturn and recession lasted into 1826.

In a comparison between LOLR rules prescribed by Bagehot after 1825 crisis, and actions taken by central banks right after 2008 crisis, one can say that numerous authors argue that central banks have deviated from Bagehot's rules in 2008 episode. For instance, Hellwig (2014) claims that, instead of lending freely to solvent banks, against good collateral, and at high rates, central banks right after 2008 lent freely, to banks of doubtful solvency, at mixed-quality collateral and low rates. In fact, central banks enacted tools to extend liquidity to a wide variety of agents beyond banks (i.e., non-bank financial institutions, firms, and households), acting as market makers of last resort (Mehrling, 2011).

However, analyzing several historical experiences of financial crises in the 19th and 20th century, other authors as Mishkin and White (2016) argue that central banks "unprecedented actions" like the ones taken right after 2008 (deviations from Bagehot's rules) are the norm, and not the exception. This would be the case because by following Bagehot's rules reactive (*ex-post*) approach, central banks would provide remedial relief for solvent banks, but not impede financial shocks to spread to other financial institutions and the real economy. Hence, central banks often preferred a preventive (*ex-ante*) approach, trying to avoid failures of large institutions and buffer the economy from crises shocks. However, this approach could foster moral hazard problems, since it can incentivize financial institutions to engage in excessive risk-taking, eventually leading to another financial crisis. Thus, the authors argue that a successful preventive approach, which reconciles price stability and financial stability, should not only focus if central banks can follow instrument rules strictly. Instead, this approach should open the way for central banks to pursue target or contingent rules that give monetary authorities more room for maneuver under such interventions, with transparency but limited discretion, so that monetary authorities can retain their credibility and mitigate moral hazard.

2.2 Fed asset purchase program in 1932

In the aftermath of the New York stock exchange crash in 1929, the USA experienced a "Great Contraction" until 1933. The Federal Reserve System (Fed) was faced with a tradeoff during that occasion (Eichengreen, 2008). On the one hand, there was a call to pursue an expansionary monetary policy to try to provide stimulus to the economy. On the other hand, the Fed had to keep a relatively tight monetary policy stance, to avoid further capital outflows, which were undermining the convertibility of the dollar (gold standard). Faced with this dilemma, Fed opted to try to safeguard dollar convertibility, by keeping a relatively tight monetary policy stance (a contraction of monetary base and decline of nominal interest rates lower than of inflation, implying an increase in real interest rates). Even if Fed discount rates were lowered, banks were not using the discount window, for two reasons: i) For reputational effects, to avoid that depositors interpreted it as a sign of weakness and withdrew their funds; ii) Banks were unable to borrow from it because they lacked eligible collateral. This "inaction" by Fed after the 1929 crash (neither serving as lender of last resort, nor using its tools to prevent deflation or the collapse of real economic activity) was considered one of the major policy flaws at that time, as mentioned by Friedman and Schwarz (1963) and Bernanke (2000).

One exception of Fed inactivity during Great Contraction was a brief period from April to August 1932. In this occasion, under pressure from Congress, the Fed engaged in the purchase of US\$ 1 billion in Treasuries, around 2% of GDP at that time (Anderson, 2010). According to Bordo and Sinha (2016), this program had significant effects in reducing Treasuries yields: short-term bills -90 basis points (bps); medium-term notes -114 bps; long-term bonds -48 bps. It also temporarily reversed the decline in money supply and led to a quick revival in industrial production and real output. This effectiveness would be explained by the high segmentation in bond markets that prevailed at that time (non-bank agents had difficulty in accessing public bond markets, concentrated in few banks). This fact allowed that central bank purchases increased Treasury prices and lowered their yields, providing a positive stimulus for output.

Nevertheless, the Fed opted to end this asset purchase program just five months after its implementation, for several reasons. Bordo (2014) argues Fed feared that the expansionary policy reinvigorated stock market speculation, created inflationary pressures and threatened gold convertibility. Epstein and Ferguson (1984) point to an additional reason: the banking sector did not want that asset

purchases continued pushing interest rates down, the fact that could reduce further their profitability, which was already weak. That is why Epstein and Ferguson (1984) argue that facing conflicting objectives – protecting the soundness of a specific sector (financial) and overseeing the protection of other business/real economy - Fed ended up opting for the former.

One should note that the asset purchase experience in 1932 and the first quantitative easing program implemented by the Fed in 2008 (Large Scale Asset Purchase Program, LSAP 1) had various similarities. Bordo and Sinha (2016) affirm that both programs had the following common elements: i) Were measures to boost economic activity, adopted during severe economic downturns; ii) Were large scale operations; iii) Were not planned to continue for an indefinite period. Nevertheless, they also point to important differences between the two programs: (i) Use of a fixed exchange rate regime based on the gold standard in 1932; (ii) Announcement of program's size and time extension during the LSAP 1 episode; (iii) Use of other unconventional tools in 2008-2009 (including lending facilities and asset purchases from non-financial agents), instead of the single focus in public bonds in 1932. Beyond the similarities and differences between the two experiences, those authors argue that, as bond market segmentation was higher in 1932, and the program showed significant positive effects in the short period it was implemented, "Great Contraction" could have ended earlier if the program had been prolonged for more time, and accompanied by other tools that reinforced it (e.g., better communication of Fed's reaction function to market, and bolder set of additional fiscal and regulatory measures by government).

2.3 Yield caps on sovereign bonds by the BOE/Fed in the 1940s/1950s

During World War II, the expansion of government budget deficits and debts exerted upward pressure on long-term interest rates of major economies. Central banks in the United Kingdom and the United States reacted by implementing a cap on long-term sovereign bond yields, to curb the cost of government financing and to stabilize government bond markets.

In the United Kingdom, the large expansion of government debt led Treasury to commission a National Debt Enquiry in 1945. The Enquiry report recommended that the government should establish a term structure of yields on government securities and allow the maturity structure of government's debt to be determined by investors. The policy implemented came to be known as "ultra-cheap money", as described by Allen (2012). According to this author, this policy was implemented with Treasury refusing to issue government securities at yields higher than those which government deemed acceptable. For long-term gilts, it was adopted a cap of 2.5%, with Treasury and Bank of England conducting gilt purchases to try to keep this cap. Conversely, Treasury had to reduce the debt maturity profile, by increasing significantly issuance of short-term bills to ensure its financing. Concerns with the rapid growth of credit and inflation led Treasury/BOE to abandon the 2.5% cap in 1947, although net gilt purchases continued until 1948.

In the United States, Fed policy to control the rise of government bond yields began before, in 1942, as described by Meltzer (2003). Fed imposed a cap not only for long-term bonds (2.5%) but also for three-month bills (0.375%), incurring in large bond purchases to try to keep those caps. The cap on short-term bills was gradually raised to around 1% and finally abandoned in 1948, but the cap on long-term bonds was kept in 2.5% until 1951.

Broadly speaking, those policies managed to control long-term government bond yield levels. However, some agents at that time posed strong criticisms to it, as mentioned by Shirai (2018): i) Market excessive reliance on central banks' actions could not develop proper trading volumes/pricing mechanisms by its own; ii) Central banks' purchases were raising inflationary pressures; iii) Central banks' policies became subordinated to governments' debt management framework, instead of pursuing central banks' own objectives (e.g., control inflation). All these criticisms led to the removal of the sovereign bond yield caps previously implemented.

In the UK, after removal of the cap, the objective of monetary policy in the 1950s shifted towards managing a balanced growth of aggregate demand and supply, containing excessive credit growth, inflation and keeping exchange rate parity (Allen, 2012). However, debt management policies and lending controls were still seen as important parts of the monetary framework, as mentioned in the Radcliff Committee Report in 1959. Therefore, there was some coordination between the Treasury and Bank of England, with

government funding operations trying to support monetary policy efforts to control credit. For instance, Treasury carried out operations to sell gilts and absorb short-term bills, thus reducing banks' liquidity and adding to efforts of containing credit growth.

In the USA, removal of the yield cap happened in March 1951, when the Treasury-Federal Reserve Accord was signed. This accord not only removed the 2.5% cap but also paved the way to strengthen the Fed's operational independence, as mentioned by Meltzer (2003). Fed's independence was confirmed in 1953, when this institution stated that the goal of monetary policy was to achieve price stability. Furthermore, it announced the implementation of the "Bills Only" policy, limiting the target of its open market operations to Treasury Bills. This policy was based on the idea that both short-term and long-term interest rates should be determined by market forces. By then, Treasury Bills were large in terms of amounts outstanding and transaction volumes. By limiting its scope to Treasury Bills, Fed intended to influence reserve amounts held by commercial banks, attenuating direct effects of open market operations on the entire term structure of interest rates.

2.4 Fed "Operation Twist" in 1961

In the aftermath of the Korean War in 1960, USA was found in a difficult economic situation, both in external (dollar/gold outflows) and domestic (output downturn) terms. In this context, the priorities of incumbent President Kennedy were to improve the country's balance of payments and recover economic activity.

Under these circumstances, in 1961 Fed conducted a program that was coined "Operation Twist". The purpose of this program was to reduce capital outflows by keeping short-term interest rates high and to promote stimulus to the domestic economy by lowering long-term interest rates. In order to do so, the Fed sold short-term bills (US\$ 7.4 billion) and purchased long-term bonds (US\$ 8.8 billion, or 1.7% of GDP, according to Ehlers, 2012). Fed was also supported by the Treasury to reduce the maturities of the securities issued.

In theory, Operation Twist was expected to be effective if markets for long-term and short-term bonds were segmented and the two classes of bonds were not perfect substitutes, as claimed by the market segmentation theory (Tobin, 1958) and the preferred habitat hypothesis (Modigliani and Sutch, 1966). Conversely, from the viewpoint of the expectations theory of the term structure (Hicks, 1939), long-term bonds and short-term bonds were highly substitutable, which would turn Operation Twist ineffective.

Among several evaluations of the program that were conducted on that occasion, one of the most influential was published by Modigliani and Sutch (1966). Even if these authors supported the preferred habitat hypothesis, the analysis performed by them showed that the reduction of spreads between long-term and short-term debt was minimal, and not statistically significant. According to Amamiya (2017), this study ended up supporting a view that gradually spread after that occasion: "central banks can control short-term interest rates, but not long-term interest rates".

After 2008 crisis, this view lost some support, in the sense that even mainstream economists, who continue arguing against direct control of long-term interest rates by central banks, now recognize sometimes it is desirable to let long-term interest rates be indirectly "guided" by central banks through UMPs, to achieve their price stability objectives. For instance, a new "Operation Twist" was implemented by the Fed from September 2011 until December 2012. This time, the Fed did not count on explicit support of Treasury shortening the maturity of its issuances like in 1961. Instead, the Fed used open market operations, selling short-term Treasuries (less than 3 years), and buying US\$ 667 billion in medium/long-term bonds (from 6 to 30 years). The intention was to induce a reduction in long-term yields, without needing to expand its balance sheet like in previous LSAP programs. According to Ehlers (2012), the effect of 2011-2012 Operation Twist in long-term yields was temporary and partly offset by new issuances of long-term bonds by Treasury. However, the reduction in overall maturity of outstanding debt held outside Fed's balance sheet (from 7.7 to 5.5 years during the program implementation) may have lowered term premia and created a stimulative effect on the real economy.

2.5 The Japan Experience in the late 1990s and 2000s

2.5.1 Zero Interest Rate Policy and Forward Guidance (1999-2000)

At the beginning of 1999, Japan registered deflation in its two main measures of underlying inflation: core (CPI excluding food) and core-core (CPI excluding food and energy) indexes. Before falling into deflation, Japan experienced in the early 1990s the collapse of a bubble in real estate and stock market prices, subsequently followed by a financial crisis in the second half of 1990s. In the view of authors as Koo (2011), this crisis was a typical case of a *balance sheet recession*: instead of maximizing profits, Japanese private sector as an aggregate tried to minimize debts/deleverage at the same time, pushing down asset prices and economic output.

However, this deflation was not a fast and acute deflationary episode, like ones experienced after the collapse of bubbles in other countries. Rather, it was a prolonged mild deflation, which lasted for most of 2000s decade, and could be explained by several factors. According to Shirai (2018), deflation was a result of chronic demand shortage and sluggish output growth experienced since the beginning of the 1990s. The potential growth rate itself was on a long declining trend, which according to this author was mainly attributable to a slowdown in capital stock accumulation and total factor productivity (TFP) growth. Unfavorable demographic dynamics (aging population) also played a role in the reduction of potential growth. Moreover, exchange rate developments, with a significant appreciation of the yen against the dollar during several periods of the 1990s and 2000s contributed to deflation. Overall, all those events have led households to save more because of growing concerns about future, discouraged firms from engaging in business fixed investment and innovative activities, and prompted financial institutions to undertake risk-averse investment strategies, explaining the prolonged environment of mild deflation and economic stagnation.

At the beginning of 1999, Bank of Japan (BOJ) did not have enough information to evaluate if the deflation registered was the beginning of a fast/acute deflationary episode or a prolonged mild deflation. However, the institution decided to act, by introducing a nominal Zero Interest Rate Policy (ZIRP) in February 1999. BOJ initially reduced the uncollateralized overnight call rate to around 0.15% and subsequently towards 0%. This was done by providing large amounts of short-term funds. In April 1999, BOJ Governor Masaru Hayami provided a kind of guidance to ZIRP. However, BOJ did not provide a formal Public Statement about its interest rate guidance at that time. Instead, during a press conference in April 1999, BOJ Governor informally expressed his view that BOJ would maintain its ZIRP “*until deflationary concerns were dispelled*”. This measure could be seen as open-ended forward guidance, trying to signal a more accommodative monetary stance. Nonetheless, this move received several criticisms at that time, according to Shirai (2018). First, for the vagueness of the definition of deflation (not clear which inflation index or other indicators would be considered in BOJ’s evaluations). Second, for allowing a wide range of interpretations about the date the policy could be ceased.

In fact, ZIRP was implemented for 18 months, until August 2000, when the policy rate was raised to 0.25%. In order to justify this decision, BOJ provided the following arguments: i) Downward pressures on prices coming from weak demand had receded; ii) Policy ceasing meant an adjustment to the degree of monetary easing in line with the improvement observed in the economy; iii) Policy rate would still be extremely low, and hence could support further economic recovery; iv) End of policy would raise public confidence that the economy was recovering and enhance markets’ dynamism.

However, this perception that the Japanese economy had improved was not broad-based. Although output and trade indicators (i.e., industrial production and exports) presented some improvement, inflation indexes (CPI and core CPI) remained negative. On following months, Japanese economy showed signs that it had been negatively affected by the dot-com bubble burst in the USA in that period, with exports and output dropping sharply in early 2001, while inflation remained negative. Hence, BOJ’s decision to increase the policy rate was reversed six months later. In February 2001, the increase in policy rate ceased, and it was lowered from 0.25% to 0.15% (with effect from March 2001).

2.5.2 Quantitative Easing (2001-2006)

Facing a more adverse scenario, in March 2001 BOJ adopted a new monetary easing framework, that later came to be known as Quantitative Easing (QE). This new framework was composed of three

essential elements, as explained in BOJ's Statement of Monetary Policy at the occasion. First, there was a shift from nominal interest rate targeting (uncollateralized overnight call rate) to reserve targeting (commercial banks' current account balances at BOJ, which roughly corresponded to the sum of required and excess reserves). The reserve target amount was raised nine times: from an initial 5 trillion yen to around 30–35 trillion yen in January 2004, a level that was maintained until the end of QE policy in March 2006. In order to achieve this reserve target, BOJ provided short-term funds (maturities of one year or less), expanding excess reserves. Second, BOJ provided a formal commitment to maintaining QE policy until the core CPI registered "stably zero percent on a year-on-year increase". This commitment was clarified further in October 2003 by the introduction of two QE exit conditions: (i) Most recently published core CPI registered zero percent or above, and this level needed to be maintained for several months; (ii) Projected core CPI would be no lower than zero percent. This was *state-contingent forward* guidance, based on the actual and expected performance of core CPI, thus more explicit than the earlier ZIRP commitment. Third, it was decided to increase government bond purchases if it was found necessary to facilitate meeting the reserve target.

Observing economic developments after the implementation of QE, authors as Shirai (2018) point out that, after reaching a trough in January 2002, Japan's economy was able to enter a moderate recovery phase. The main engines of this recovery were exports and domestic manufacturing activities associated with them, supported by favorable global growth and depreciation of yen's effective exchange rate. Yen's depreciation, especially against euro and U.S. dollar, occurred due to interest rate differentials and risk-taking behavior of investors, which engaged in carry trade activities (selling yen and buying foreign currencies without hedge). Regarding the core CPI index, after remaining in slightly negative territory in the early 2000s, it finally turned positive in late 2005, followed by higher levels from early 2006 onwards.

Considering these developments, at the March 2006 BOJ meeting, the institution concluded that the conditions laid out in its previous commitments had been fulfilled. More specifically, the Board presented the following reasons: (i) Positive core CPI from end-2005 until January 2006 (the latest data available then); (ii) Projections of further improvements in GDP growth; (iii) Expected wage increases and tighter labor market conditions, partly as a result of growing economic activity; (iv) Rising inflation expectations of firms and households, also boosted by yen's depreciation and increase in international commodity prices. By then, BOJ's estimates were that core CPI would stay within the range of 0% to 1% in the fiscal year 2006, and slightly below 1% in the fiscal year 2007.

Therefore, BOJ proposed to end QE policy at the March 2006 meeting. Instead of the outstanding balance of current accounts at BOJ, the uncollateralized overnight call rate would be reintroduced as the main monetary policy instrument, with the level set at zero percent. Furthermore, at this policy meeting, the BOJ introduced a longer-run inflation outlook, named "*understanding of medium-to-long-term price stability*". This understanding was not an official inflation target, but a level of CPI inflation recognized as price stability by BOJ Board. This long-run outlook was initially implemented in the range of 0% and 2%, with a median of 1%, and it could be revised on an annual basis. BOJ acknowledged that this long-run outlook was below average inflation targets in other advanced economies (2%). However, it preferred to take into account Japan's experience of very low inflation during the last decades, considering the inflation range which agents would perceive prices to be stable would also be lower.

After March 2006, BOJ voted in favor of two interest rate hikes: in July 2006 (from 0% to 0.25%) and in February 2007 (from 0.25% to 0.5%). This policy rate was maintained until October 2008.

The decision to exit QE policy in March 2006 was controversial, as it was the decision to lift the Zero Interest Rate Policy in August 2000. Criticism gained strength in the middle of 2006, after the release of a revision in CPI data. According to the Japanese Statistics Bureau, this revision resulted in an average decline of 0.5% from January to July 2006. So the actual number for core CPI in January 2006 was -0.1%. This meant that one of BOJ's exit conditions - most recently published core CPI is zero percent or higher for several months - was not satisfied. Furthermore, year-on-year changes in core-core CPI remained negative during 2005 and 2006. Nevertheless, BOJ's long-term inflation expectations projections remained positive and around 1%, revealing some upward bias in the institution's inflation expectations forecasts. For those reasons, Shirai (2018) argued that BOJ's decision to abandon QE in March 2006 was premature.

Koo (2011) considered that, once Japan had faced a prolonged balance sheet recession, it was found in a liquidity trap with a deflationary nature. Hence, in such context indebted agents do not spend, but try to pay off debts; banks do not lend, due to lack of demand from new borrowers; consumption and investment are postponed and do not recover by themselves. In those situations, expansionary monetary policies are inefficient, and what would be really needed was proactive fiscal policy. In Koo (2011) view, the collapse was not worse because of two mitigating elements. First, despite government efforts to cut the fiscal deficit at some occasions (i.e., 1997 and 2001, following IMF and OECD recommendations), this deficit increased, with a parallel increase of government borrowing. In fact, fiscal deficit allowed some periods of temporary economic growth, avoiding a deeper recession. Second, the government provided capital injections in banking sector twice after 1997 to avoid a more broad-based financial crisis. This is in accordance with the view that, under balance sheet recessions, liquidity injections are not enough to solve insolvency problems.

3 The Evolution of ECB Framework since 2008

The Euro area faced huge economic and financial challenges in recent years: in 2008, liquidity problems after Lehman Brothers' bankruptcy in September; in 2011, aggravation of the banking and sovereign debt crisis, notably in periphery countries; in 2014, threat of deflation, especially after the collapse of energy and industrial commodity prices. Due to these challenges, the ECB had to implement numerous conventional and unconventional measures.

Our aim in this section is not to describe in detail all the measures implemented by the ECB since 2008. Conversely, our focus is to show how the ECB framework evolved, with the institution trying to improve more recent programs based on shortcomings of its own previous measures (i.e., seniority problem in SMP; liquidity not being destined to the real economy in three-year LTROs), and based on other central banks' experiences.

3.1 The seniority problem: SMP versus OMT and PSPP

The Securities Markets Programme (SMP) was implemented in May 2010, the same month when the first Greek aid package was agreed, but markets priced high spreads between German's and periphery countries' bonds. In order to reduce financial fragmentation in the Euro area and improve monetary policy transmission, the ECB engaged in purchasing periphery countries' securities in secondary markets, in an attempt to prevent their yields from rising. The program focus was not to make monetary policy more expansionary or to finance member countries. As a consequence, the ECB conducted weekly open market operations to provide fixed-term deposits (with a weekly duration), to sterilize the liquidity injected through its purchases.

At the beginning (May 2010 to February 2011), purchases were limited to Greece, Ireland, and Portugal bonds. After a pause between February and July 2011, the ECB resumed its purchases in August 2011, including also bonds of Spain and Italy. The program has officially ended in September 2012, although purchases have actually occurred until February 2012. According to ECB data, the program has acquired bonds with an average maturity of 4.3 years and a nominal amount of € 218 billion, of which almost half belonged to Italy.

There are several studies evaluating the effectiveness of SMP. In general, most authors agree that interventions succeeded in reducing sovereign yields of periphery countries, but the effect was usually only temporary: a few weeks (Pattipeilohy *et al.*, 2013), or only one day (Doran *et al.*, 2013). According to Doran *et al.* (2013), although after an ECB intervention yields fell on the same day, with adverse macroeconomic events and a possible lag for a new intervention, yields resumed rising up to pre-intervention levels in the next day. From the point of view of private investors, the issue which concerned the most was that the ECB had legal *seniority* over them. ECB seniority implied that private investors would be the first to bear the losses of any default in these bonds, and the ECB could only be charged after all private investors had been wiped out. This fact was one of the reasons why SMP interventions had only very short-term effects, with yields soon returning to rise.

Indeed, the great controversy both in public opinion and among ECB members themselves were factors that led interventions to be discontinued in time and actually interrupted seven months before the

official end of the program. The disagreement within the ECB was such that it was pointed as a reason for the resignation of Bundesbank President Axel Weber and ECB's German Chief Economist Jurgen Stark. Helm (2012) noted that ECB core countries (notably Germany) considered that the program did not respect the ECB mandate to keep price stability. According to them, SMP would have just tried to disguise monetary financing (debt monetization) of periphery governments. Although the ECB did not purchase government securities in primary markets under the SMP, this program would have allowed periphery countries to delay the "necessary" fiscal adjustment.

With periphery countries bond yields rising to unsustainable levels and sovereign contagion threatening to reach even core countries (e.g., France), the ECB introduced a different communication approach. From July 2012 onwards, it started a "verbal intervention" strategy, trying to contain negative expectations on markets and aiming to increase monetary policy credibility. At a speech on July 26, 2012, Draghi stated the ECB would do "whatever it takes to save the euro".

This change in the communication strategy continued in the following months. In August 2012 ECB meeting, it was mentioned the possibility of undertaking "outright open market operations", to address seniority concerns by investors. The main features of the Outright Monetary Transactions (OMT) program were actually announced in September 2012. This new program intended to restore the transmission mechanisms of monetary policy, which were notoriously disrupted. It opened the door for the ECB to buy sovereign debt of specific countries in secondary markets, to stabilize their yields, once they signed a Memorandum of Understanding with fiscal and reform conditionalities attached.

ECB purchases would be of bonds with maturities between 1 to 3 years, in unlimited amounts. The OMT focus was not on countries which were already receiving assistance from the Troika (Greece, Portugal or Ireland). Instead, it aimed to avoid spreading contagion to countries which had their debt trading on markets, but at high yields (e.g., Spain, Italy). Most importantly, the ECB would be treated *pari passu* with other sovereign bond creditors, eliminating the problem of ECB seniority. Evidence of significant drops in sovereign yields of Italy and Spain, related to the announcement of the *pari passu* clause in OMT in September 2012, is provided by Steinkamp and Westermann (2014).

The OMT also received a number of legal challenges in the German Constitutional Court (GCC) and the European Court of Justice (ECJ), related to accusations such as monetary financing of government debt. Both courts dismissed OMT's charges and gave a final ruling of "approval with conditions". Nonetheless, the OMT was never activated in practice, only remaining in the lines of verbal intervention.

In addition, the main unconventional program announced (in January 2015) and implemented (in March 2015) by the ECB – the Public Sector Purchase Program (PSPP) – also contained important improvements when compared with the SMP. In the PSPP, the ECB/national central banks purchased bonds issued by governments, national agencies and EU's supranational institutions. Differently from the SMP, the ECB received *pari passu* (not senior) treatment with private creditors. Furthermore, bond purchases were not sterilized, there was an injection of new liquidity. In addition, due to the much larger amount of securities bought by the ECB during the PSPP (around € 2.1 trillion, according to ECB data), there is strong evidence that it lowered borrowing costs of almost all nations in the Euro area and reduced sovereign spreads between periphery and core countries (Altavilla *et al.*, 2015 and Breckenfelder *et al.*, 2016).

3.2 Incentive to lend for the real economy: LTRO versus TLTROs

Before 2008, the ECB usually offered Long Term Refinancing Operations (LTROs) monthly, to be repaid in 3 months. In 2008, it also began to offer operations to be repaid in 6 months. In June 2009, it added to its tender procedures operations with repayment in 12 months too. In November 2011, when the ECB noticed the sovereign crisis had worsened, and the liquidity available for banks and the economy as a whole had shrunk, the institution announced two major three-year LTROs, which were held in December 2011 and February 2012. On those occasions, the ECB lent to banks amounts to be paid over three years, charging only the main refinancing rate (then at a level of 1.0%). The first operation amounted € 489.2 billion and the second operation € 529.5 billion, thus totaling a liquidity injection of € 1018.7 billion within three months.

Despite some authors argued that three-year LTROs reduced some of the most acute liquidity constraints in the Euro area financial markets (Darracq Paries and De Santis, 2015 and Andrade *et al.*, 2017), several other studies showed that due to the scenario of high uncertainty prevailing in 2011-2012 in the Euro area, a large amount of liquidity provided by three-year LTROs had two undesired destinations: i) Speculative operations ; ii) Bank holdings as excess reserves in ECB's current account or deposit facility. Furthermore, even if three-year LTROs allowed a modest increase in lending, corporations did not use these new funds for productive purposes (Carpinelli and Crosignani, 2017; Crosignani *et al.*, 2017, and Daetz *et al.*, 2017). Overall, the evidence suggested that, although three-year LTROs have avoided a massive bank deleveraging and relaxed liquidity constraints, those operations did not achieve their goal of restore credit market dynamics and stimulate lending to productive purposes on a broader basis.

To address the problems above, the ECB decided to change its strategy in the following long term refinancing operations. Between September 2014 and June 2016, the institution implemented eight quarterly *Targeted Long Term Refinancing Operations*, TLTRO I. The idea was that banks could borrow funds respecting their initial limit (7% of their loan portfolio in the first two operations), which could be gradually expanded in the following operations if their loan portfolio directed to non-financial companies and households (except for house purchases) increased. All operations matured in September 2018 (i.e., operations would last between two and four years). The fees charged over banks would be 0.15% in the first two operations, dropping to the main refinancing rate in the following six operations (0.05% until December 2015, and 0% in March and June 2016).

Between June 2016 and March 2017, the ECB introduced a new series of four quarterly *Targeted Long Term Refinancing Operations*, TLTRO II. Besides other differences from the TLTRO I, the main change was the price incentive mechanism to provide credit to the real economy, by offering lower interest rates to the banks that increased their credit operations to non-financial corporations and households (except for house purchases). For each operation, the interest rate would be the main refinancing operation prevailing at that time (i.e., 0%). Yet, for banks which achieved their loan benchmark to the real economy, the interest rate could be as low as the deposit rate (-0.4%).

Total amount of liquidity injected by the ECB on TLTRO I and TLTRO II from September 2014 until March 2017 was around € 793 billion, after deducting rollovers from previous operations (net amount), according to ECB data. Both TLTRO I and II received several common criticisms, of not being really “targeted” towards the real economy (Gros *et al.*, 2016).

One response from the ECB to these criticisms was presented at the May 2017 *Economic Bulletin*, which showed several positive aspects of TLTROs. In this publication (ECB 2017), the institution shows that TLTROs, together with other UMPs, were efficient mechanisms to ensure the transmission of lower policy rates into better borrowing conditions for the Euro area non-financial private sector. They support this argument based on the following information: i) The rates on loans to non-financial corporations declined considerably right after the announcement of TLTRO I. The declines were sharper in countries where lending rates to non-financial corporations had been more elevated, hence allowing a reduction in cross-country dispersion of lending rates; ii) In “vulnerable” countries, banks that borrowed under TLTRO I reduced their rates by more than banks that abstained from bidding; iii) According to ECB *Bank Lending Surveys* (ECB, 2018), banks have reported that the TLTROs have contributed to an easing of the terms and conditions on loans to enterprises and easier credit standards (albeit to a lesser extent); iv) While lending by banks that did not participate in TLTROs appears to have remained largely unchanged afterward, the ones which bid in TLTROs went through an important change in their lending profile. In more “vulnerable” countries, banks have significantly reduced the pace at which they had been cutting lending to non-financial corporations. In “less vulnerable” countries, bidders seem to have increased intermediation volumes.

Furthermore, one has to recognize that the price incentive in TLTRO II framework, when compared with TLTRO I - lower rates for banks that lend more towards the real economy - was one important factor to offset the compression of negative interest margins experienced by banks after the implementation of negative deposit rates. In fact, credit to households and firms recovered in the period those operations were implemented, although at modest rates. According to ECB data, loans to total private sector had declining annual rates of growth since the end of 2011, which became negative in 2012, and only returned to positive

territory in May 2015. This growth trend continued with some oscillation, up to 3.4% YoY in December 2018, but still below the average (4.8% YoY) in a longer period (1999-2018).

3.3 ECBs unconventional measures based on other Central Banks experiences

When it comes to the influence of other central banks' experiences on ECB measures, we could mention: i) ECB TLTROs in 2014-2017 were also inspired by BOE Funding for Lending Scheme (FLS), program that started in 2012 and had some similarities with TLTROs (allowed the central bank to offer more funding for banks which increased their loans to the real economy); ii) ECB Corporate Sector Purchase Program (CSPP) adopted in 2016 was inspired by Bank of Japan corporate bond purchases, which were part of BOJ's framework since 2010; iii) ECB forward guidance on low interest rates for an extended period in July 2013 was a sign to markets that Euro area monetary stance clearly differed from the USA, where the Fed had just announced in May 2013 that it intended to withdraw its monetary stimulus, surprising financial markets and generating adverse effects ("taper tantrum"). ECB forward guidance was also open-ended, which has proven to be a more flexible option than the date-based or the quantitative-based forward guidance previously introduced by the Fed and the BOE on certain occasions; iv) ECB PSPP in March 2015 followed other unsterilized public bond purchase programs implemented by the Fed, BOE, and BOJ. However, the ECB had to create its own rules, since it was purchasing bonds from all Euro area eligible countries, and not from a single Treasury, like other central banks.

Summing up, the ECB undertook several modifications during UMPs implementation, adapting measures based both on its own former programs ("learning by doing") and on other central banks experiences ("learning by observing") to improve its framework. In other words, some of the main features of ECB's measures after the 2008 crisis were pragmatism, flexibility, and capacity to innovate, as mentioned by Le Heron (2016).

4 Future Monetary Policy Frameworks

There is a lively debate on how will be shaped future monetary policy frameworks after the post-2008 UMP experience. More specifically, if central banks will broadly return to pre-2008 crisis monetary policy standards ("normalization"), or if other measures (such as UMPs) will be incorporated into central banks' toolkits under a new set of monetary policy practices ("new normal").

In 2011, Carré *et al.* (2013) performed a survey with 46 economists and central bankers, aiming to identify post-crisis consensual and dissensual aspects of central banking, and aspects of central banking that would (or would not) be able to be changed after 2008 financial crisis was over. Authors find that respondents agree in general terms on the "broader" view of central banking extended to financial stability. Nevertheless, several divergences emerge between economists and central bankers when it comes to implementation details of this "broader" view (e.g., institutions, instruments, goals). Authors find that economists are usually less conservative than central bankers when it comes to promoting changes in central bank practices. However, the overall result would be that the conservative bias would prevail, so respondents would prefer to remain within the pre-2008 monetary policy paradigm, instead of promoting a significant shift in this paradigm. For instance, the following elements in the paradigm would remain mostly unchanged: i) Price stability would continue to have priority among other policy objectives (although complemented by financial stability goals); ii) Price stability would be achieved under an inflation targeting framework, with an unchanged target level, despite some proposals for modification. Hence, even if central banks incorporate changes under their future monetary policy frameworks, these changes would not promote a complete shift in the previous monetary policy paradigm, once some core principles of pre-2008 monetary policy framework might remain unchanged.

In 2016, Blinder *et al.* (2017) organized a survey and compiled responses from 55 central bankers and 159 academics on their views of what would be the "new normal" for central banks. The main findings revealed by the survey are presented in sequence. On low interest rates, respondents acknowledge they could be used again in case they are needed, but negative interest rates would be used with more caution. On asset purchase programs, there were mixed views on their effectiveness: academics and central bankers who implemented asset purchase programs were usually more optimistic, while central bankers from jurisdictions that did not implement them were usually more doubtful about their results. On financial

stability, respondents foresaw the use of macroprudential instruments on a continuous basis, to safeguard sound financial conditions. On communication, answers showed that a more active communication from central banks towards the public will certainly have space. There was an agreement that forward guidance would remain in monetary authorities' toolkit. Nevertheless, it was found a divergence in preferred type of forward guidance: more specific (date-based) for academics, but less specific (qualitative) for central bankers. Another divergence occurred in the view on the relationship between central banks and their governments: while academics find that central banks have "crossed the line into politics" during the crisis and have some concern on central bank independence in future, this opinion was not detected among central bankers.

Indeed, when we observe the analysis of certain academics and central bankers that have produced reports disclosing their views on future monetary policy frameworks, they present diverging opinions.

In academia, according to Reis (2018), the main characteristics of "the New Conventional Central Bank" would be the following: i) Determination of interest rates by central banks not focused only on short-term rates, but also giving room to establish long-term rate targets; ii) Balance sheet policies remaining as an important policy option, with central banks targeting interest rates paid on reserves; iii) Focus more on composition of central banks' balance sheets, and less in amounts of assets/liabilities contained in them; iv) Need for more transparency in the interaction between fiscal and monetary policies, and a more careful approach with eventual losses in central banks' balance sheets; v) Main central banks offering liquidity facilities not only for domestic banks but also for global banks through swap lines; vi) Important role of macroprudential policies to safeguard financial stability, but considering they may generate adverse effects (e.g., financial repression) if not managed appropriately. A different view is presented by Lombardi *et al.* (2018), who are more skeptical about the regular use of unconventional measures in future monetary frameworks. For these authors, UMPs have prevented economic collapse but were not designed to promote adequate growth and have overburdened central banks. Hence, monetary authorities should return to their standard policies with a primary aim to ensure price stability, and thus prevent policymakers to request (or expect) too much from them in future. Another view is provided by Fontan *et al.* (2018), who predict three possible scenarios for future monetary policy frameworks: i) "Normalization" to pre-2008 standards, in which independent central banks would focus on inflation-targeting regimes by using short-term interest rates as main instruments; ii) Central banks as very powerful and depoliticized institutions, equipped with both monetary and macroprudential instruments, but little democratic accountability and strong links with financial sector interests; iii) Central banks incorporating unconventional policies under their policy toolkit. Still, due to distributive effects of such policies, political authorities would have increased influence on central banks' initiatives. Dow (2017) understands that this third scenario may happen without central banks being directly subordinated to governments' decisions. Under an appropriate institutional design, it would be possible for central banks to retain some degree of independence, by setting out explicitly in their mandates areas of cooperation between central bank and government, managing such cooperation with joint committees and adequate incentives.

When it comes to central bankers' views, on one side we have authors as Pfister and Valla (2018), who argued in favor of a "New Orthodox" framework for central banks. According to these authors, central banks in future should keep short-term interest rates as main policy instruments (eventually using negative interest rates to ensure price stability), and avoid asset purchases and large balance sheets, to keep monetary and fiscal policies separate. Central banks would also have a financial stability role, with support of macroprudential tools, but the lender of last resort role should be limited by strict liquidity rules (high interest rate, high-quality collateral, limited timeframe), to avoid monetary authorities lending to insolvent institutions. On another spectrum of central bankers' views, we would have for instance BOJ Deputy Governor Amamiya (2017). He argued in favor of future monetary policy frameworks in which central banks' balance sheets remain large, payment of interest on reserves acts as an important operational target, and transparency in central banks' reaction function (with clear communication and increased role for forward guidance) is a key element for those institutions to achieve their objectives. A third and intermediary view was presented by ECB Deputy Director-General Monetary Policy Natacha Valla (2018). According to her, when compared with the pre-2008 crisis, the banking system has suffered significant structural changes, which require additional liquidity needs (i.e., regulatory rules, such as liquidity

coverage ratios) that request systematic demand for central bank reserves. Hence, the decision if central banks should reduce their balance sheets and return to previous interest rate “corridor” system, or keep large balance sheets and remain with interest rate “floor” system, would depend on the ability of central banks to predict these additional liquidity needs. If these additional liquidity needs are relatively stable and forecastable, they could be satisfied by regular liquidity operations within the “corridor” system and central bank balance sheets could be reduced. However, if these additional liquidity needs are uncertain, remaining in a “floor” system with excess liquidity provision and large central bank balance sheets would be more robust, to provide a buffer against shocks in interbank markets.

Ultimately, we have seen that the discussion in the literature related to future monetary policy frameworks does not point to a single direction or “one size fits all” model. Nonetheless, most authors agree that central banks in future will have certain common elements, such as a more active communication than before 2008 crisis, broader mandates (including financial stability into their previous narrow goal of inflation stabilization), and use of macro-prudential tools on a wider basis, although with various differences in implementation of those elements. In particular, the inclusion of financial stability into central banks’ mandates is recognition (especially after the 2008 crisis) that financial systems’ cyclical behavior can lead to regular crises of endogenous nature. These crises have been previously described by authors as Keynes (1936) and Minsky (1982). More recently, the expression which represents this idea is the financial system works with a “financial cycle”, following researchers in IMF (Claessens *et al.*, 2011) and BIS (Borio, 2012). Because of these regular financial crises, central banks’ historical role of “elastic” liquidity providers and lenders of last resort (e.g., BOE in 1825, Fed creation in 1913) will be once again included in toolkits of future frameworks. Furthermore, this role will be supported by macroprudential measures and other regulatory initiatives of continuous implementation, aiming to increase financial systems’ resilience, and improve instruments to face new financial crises.

On future use of (what was called so far) unconventional monetary policies, even if there is not yet a broad agreement, it is likely that a significant share of them may remain in central banks’ toolkits. This situation might occur, since central banks which have already implemented them have learned with this experience, and could consider implementing again UMPs which they evaluate that had net positive effects according to their objectives.

5 Conclusions

This article analyzed important aspects related to past and recent experiences of monetary policy accommodation, with particular attention to unconventional monetary policies. We draw lessons from these experiences to discuss the design of future monetary policy frameworks.

First, we have analyzed past experiences of monetary policy accommodation. By reporting several historical experiences of BOE, Fed, and BOJ, we have observed that policies which after 2008 crisis were considered “unconventional” (i.e., broad liquidity provision operations, asset purchase programs, yield curve controls) were not new. Even if in some of those past experiences (e.g., BOE as lender of last resort in 1825, Fed asset purchases in 1932), central banks took considerable time to act, they ended up intervening to avoid broader deterioration of financial and macroeconomic conditions. Moreover, in the case of yield caps on bonds adopted by BOE and Fed in 1940s/1950s, those policies were not considered as “extraordinary” measures to face acute financial distress. Conversely, they were part of central banks’ toolkit at that time (to control long-term interest rates and rising public debts after World War II) and were implemented for some years. Therefore, while measures that today are known as “unconventional” were already adopted in past to deal with difficult situations in financial system and macroeconomic scenario, some of them were not considered as “extraordinary” alternatives to be implemented in a huge financial crisis, but as measures of the monetary framework prevailing at that time, as shown by yield caps on bonds in 1940s-1950s.

Second, on recent monetary policy accommodation experiences, we have analyzed the evolution of ECB's framework. During UMPs implementation, one can say that ECB's measures have been gradually enhanced, based on its own former programs and experiences from other central banks. Related to ECB's own former programs, we can mention the following experiences: i) Correction of previous problems in SMP (ECB senior when compared to other investors in case of default, and sterilized bond purchases) in

OMT (ECB *pari passu* with other investors in case of default) and in PSPP (ECB *pari passu* and unsterilized bond purchases); ii) Correction of previous problems in LTROs (large amount of liquidity lent to banks not generating new loans to real economy) with TLTROs (ECB liquidity operations started to offer incentive for banks to create new loans for firms and households, except for house purchases). The quantity incentive introduced in TLTRO I (banks which lent more than a certain threshold to real economy could borrow more liquidity from ECB) was extended in TLTRO II for a price incentive (banks which lent more than a certain threshold to the real economy could borrow cheaper from ECB, at the deposit rate instead of the main refinancing rate). When it comes to the influence of other central banks' experiences on ECB's measures, we could mention: i) ECB TLTROs in 2014-2017 were also inspired by BOE Funding for Lending Scheme (FLS), program that started in 2012 and had some similarities with TLTROs (allowed BOE to offer more funding for banks which increased their loans to the real economy); ii) ECB CSPP adopted in 2016 was inspired by Bank of Japan corporate bond purchases, which were part of BOJ's framework since 2010; iii) ECB forward guidance on low interest rates for an extended period in July 2013 was a sign to markets that Euro area monetary stance clearly differed from the USA, where Fed had just announced in May 2013 that it intended to withdraw its monetary stimulus, generating adverse effects ("taper tantrum"). ECB forward guidance was also open-ended, which has proven to be a more flexible option than the date-based or quantitative-based forward guidance previously introduced by Fed and BOE on certain occasions; iv) ECB PSPP in March 2015 followed other unsterilized public bond purchase programs implemented by Fed, BOE, and BOJ. However, ECB had to create its own rules, since it was purchasing bonds from all Euro area eligible countries, and not from a single Treasury, like other central banks. Therefore, one can say the ECB had to do several modifications during UMPs implementation, adapting measures according to its own former programs ("learning by doing") and to other central banks experiences ("learning by observing") to improve its framework.

Finally, we have centered our attention to the debate on future monetary policy frameworks. We have argued that central banks should not merely promote a complete return to pre-2008 standards ("normalization"). Instead, they need to take advantage of old and more recent experiences, to improve their future monetary policy and financial stability frameworks ("new normal"). Based on this, measures implemented in post-2008 crisis would have three possible destinations in new frameworks: i) Be discarded, due to their predominantly negative effects; ii) Not be regularly implemented, but be kept as tools if needed to achieve central banks' goals, especially under situations of crises; iii) Be incorporated as regular measures of monetary policy/financial stability frameworks. For instance, in the case of the Euro area (analyzed in more detail in section 3), we would have the following examples: i) Exclude SMP, once sterilized bond purchases during its course did not solve financial fragmentation in periphery countries, sometimes increasing these countries sovereign yields; ii) Do not implement TLTROs on a regular basis, but keep TLTROs (especially ones with price incentives) as alternative facilities to improve liquidity conditions, and foster targeting credit to real economy if needed; iii) Keep forward guidance as a permanent tool to clarify central bank's reaction function and improve communication, and macroprudential measures to expand the resilience of financial system against imbalances. In the case of small advanced open economies and emerging countries, central bank balance sheet policies (e.g., yield curve management, with monetary authorities selling/buying government bonds previously available/placed after on their balance sheets to cope with excessive inflows/outflows and foreign exchange appreciation/depreciation) could be added to other actions already applied to face destabilizing pressures or excessive volatility in asset and foreign exchange markets (e.g., macroprudential measures, capital flow management initiatives, foreign exchange interventions). In this sense, monetary and financial stability authorities in advanced and emerging economies will need to be institutions with an increasingly evolving profile, in a continuously adaptive and innovative process, to face challenges posed by markets that are each day more dynamic, innovative, complex, interconnected and globalized.

6 References

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