

Recalibrated Monetary Policy Instruments to Address the Economic Fallout from COVID-19

Compilation of papers



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This document was requested by the European Parliament's committee on Economic and Monetary Affairs.

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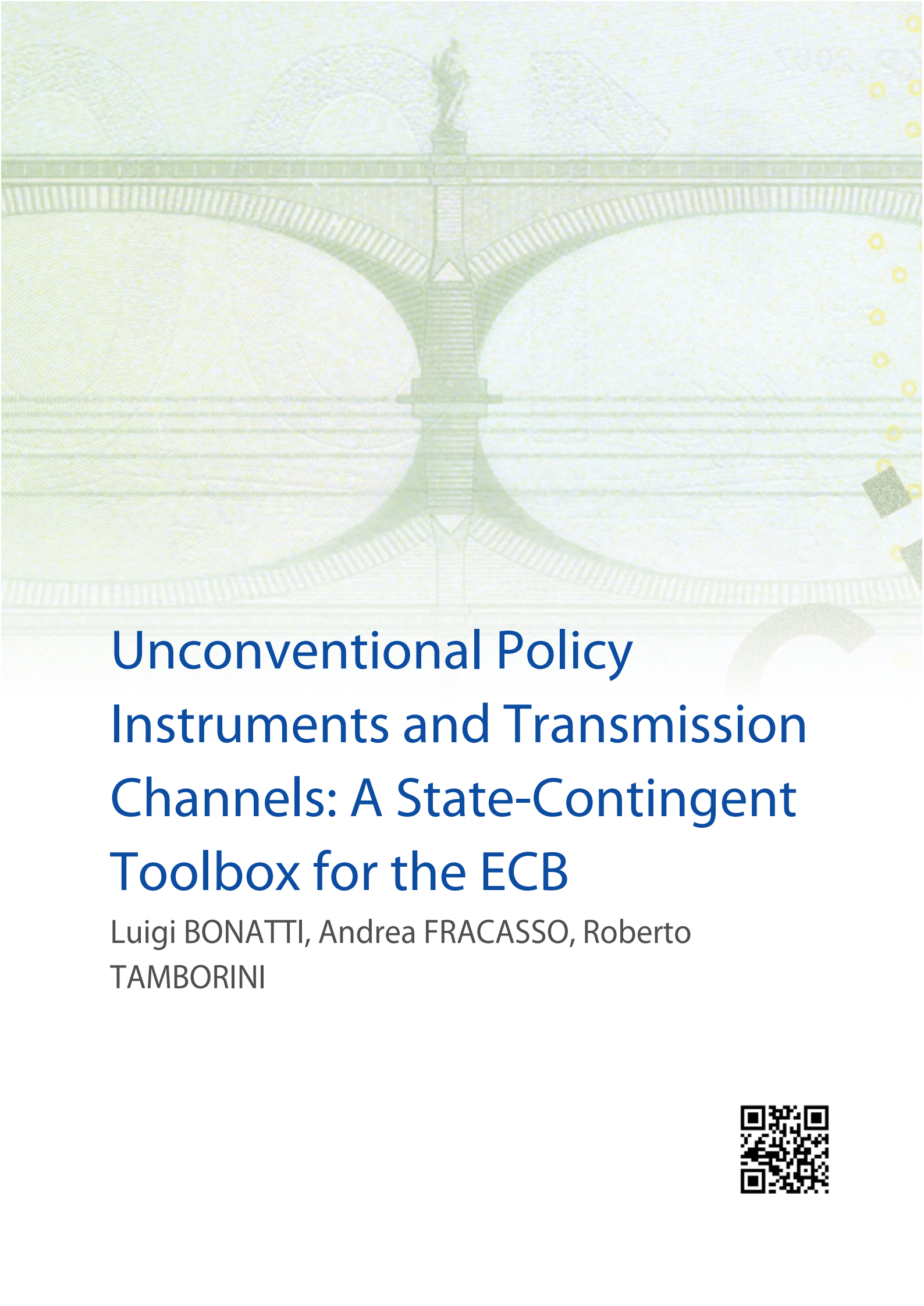
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Unconventional Policy Instruments and Transmission Channels: A State-Contingent Toolbox for the ECB

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Abstract

We present a general framework apt to explain why central banks care about the co-existence of different transmission channels of monetary policy, and hence they endow themselves with different policy instruments. Within this framework, we then review and examine the key instruments adopted by the ECB to tackle the post-pandemic challenges, with a view to their consistency and efficacy. Finally, we make a few considerations about the future perspectives of monetary policy.

This paper was provided by the Policy Department for Economic, Scientific and Quality of Life Policies at the request of the committee on Economic and Monetary Affairs (ECON) ahead of the Monetary Dialogue with the ECB President on 18 March 2021.

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LIST OF ABBREVIATIONS

APP	Asset purchase programme
ECB	European Central Bank
DF	Deposit facility
ELB	Effective lower bound
FG	Forward guidance
GDP	Gross domestic product
HICP	Harmonised index of consumer prices
LTRO	Longer-term refinancing operations
MLR	Marginal lending facility
MRO	Main refinancing operations
NIRP	Negative interest rate policy
PEPP	Pandemic emergency purchase programme
TLTRO	Targeted longer-term refinancing operations
TTER	Two-tier system for remunerating excess reserve

EXECUTIVE SUMMARY

- **The ECB adopted a two-pronged contingent approach:** it expanded its policy toolbox with a view to targeting the transmission channels of monetary policy working better, and it designed new, aggressive measures capable of limiting the problems impairing the various transmission channels. This twofold, contingent, approach required a large dose of judgment, with the ECB recalibrating its measures in consideration of their actual impact and the reaction of financial markets.
- The interaction between negative policy rates, abundant liquidity, massive purchases of financial assets, two-tier reserve requirements and security lending facilities should be understood **considering the segmentation in the money and bond markets** of the euro area across national borders and intermediaries.
- With policy rates at their effective lower bound, a crucial role was played by **quantitative extensions of liquidity and more targeted measures** of balance sheet support. ECB interventions in various segments of the financial markets were also motivated by the attempt to prevent (or stop) self-enforcing negative circles of asset fire-sales, worsening of banks' balance sheets, credit contraction and displacement of non-financial firms.
- Large amounts of liquidity injected through non-standard monetary measures **created downward pressures on interest rates and banks' profitability**. The introduction of a two-tier system for remunerating excess reserve (TTERR) holdings gave relief to banks and brought about a less uneven distribution of liquidity across jurisdictions. Moreover, the combination of TTERR and targeted lending at rates below the deposit facility rate allowed the ECB to set lending rates independently from deposit rates, so as to simultaneously raise the income of both borrowers and lenders.
- **The ECB has more difficulty than other central banks to raise market inflationary expectations** because of its peculiar policy framework. An explicit official statement by the ECB about the tolerance of transitory periods of inflation above 2% could help to lower the expected long-term real interest rates, thus sustaining consumption and investment. This is even more important by considering that a surge of inflation may not appear likely in the medium run, but—given the heightened uncertainty surrounding the post-pandemic outlook—it still remains a possibility.
- The ECB should **ponder and communicate its policy conduct** in compliance with its nature of monetary authority of a collection of sovereigns and its mandate recommending respect for free market principles. On the other hand, we are now in **unchartered waters**, where the economies withstand their weaknesses thanks to the fiscal-monetary scaffolding. This may well remain as the **"new normal" for quite a long time**. Removing the scaffolding will not simply uncover the system in its original state. Great care, prudence, and flexibility will be necessary.

1. INTRODUCTION

While 2018 and 2019 saw early attempts by the ECB at unwinding the unconventional measures taken in response to the persistent consequences of the crisis erupted at the beginning of the decade, the outbreak of the COVID-19 pandemic urged the ECB to redeploy a wide array of emergency measures, notably a relaunch of the earlier asset purchases programme (APP) coupled with the new special-purpose pandemic emergency purchases programme (PEPP). Other pre-existing measures, like the targeted longer-term refinancing operation (TLTRO) have been enhanced. Moreover, the measures in the package have been recalibrated (upwards) in the course of 2020 *vis-à-vis* the unfolding of the pandemic effects, the deterioration of the economic outlook, the persistent weakness of price expectations, threats to public and private financial stability (Lane 2020b, Panetta 2020).

A first sight at the tool box created by the ECB – asset purchases, (negative) money market interest rates, reserve tiering, longer-term refinancing operations, collateral easing – may raise legitimate questions about, if not their necessity, their mutual consistency and efficacy as well as compliance with the principle of adequacy to end. Why are all these different instruments deemed necessary? Are they all well targeted (one instrument for one goal is the time-honoured principle). May it be the case that some instruments interfere with others? Is the ECB in a position to deliver timely and transparent information to its institutional counterparties, and the public opinion at large, about the observable conditions under which there will be (gradual) return to normality?

Our aim with this paper is to address these issues in three steps. In the first (Section 2) we shall provide the readers with a general framework apt to explain the reasons why, even in normal times, central banks care about the co-existence of different transmission channels of monetary policy and hence they endow themselves with different policy instruments. Within this general framework, the next step (Section 3) will review and examine the key policy instruments adopted by the ECB to tackle the post-pandemic challenges, with a view to the problem of their consistency and efficacy. Finally (Section 4), presents a few considerations about the future perspectives of normalisation of monetary policy. Section 5 summarises and concludes.

2. THE TRANSMISSION OF MONETARY POLICY: DIFFERENT CHANNELS, DIFFERENT INSTRUMENTS

Central banks operate in view of achieving determinate final objectives (targets) by means of a set of tools and operations. The steps leading from tools and operations to the final objective(s) form the so-called **transmission mechanism** of monetary policy. This mechanism is generally marked by some intermediate objectives (targets) that central banks perceive as being more directly under their direct control. In the case of the ECB, the final objective is defined by its single mandate of price stability, translated into an inflation target below but close to 2% over the medium term; other objectives, such as smoothing business, employment or financial fluctuations are subordinate.

2.1. The money market

The theatre of monetary policy operations is the money market, i.e. where the central bank interacts with chartered banks, and these among themselves, in the daily demand and supply of liquidity. Like all major central banks, the ordinary *modus operandi* of the ECB hinges on the control of key money market interest rates that regulate interbank demand and supply of liquidity (e.g. EONIA, Euro Over Night Index Average, recently substituted by the euro short-term rate or €STR, and EURIBOR, Euro Inter Bank Offered Rate, in the euro area). The desired level of these rates by the central bank, which can be regarded as the closest intermediate target, may be pursued with different techniques. The one adopted by the ECB is the **corridor** formed by three interest rates applied to operations with banks (see below, Section 3). The "floor" is the rate on the **deposit facility** (DF), i.e. the remuneration on overnight deposits held with the ECB, the "ceiling" is the rate on the **marginal lending facility** (MLF), i.e. the rate charged onto overnight funds on demand, and the central rate is the rate on **main refinancing operations** (MRO), which is charged on funds allotted weekly on a regular basis on the ECB's initiative. As will be seen in detail below, in normal times the corridor works remarkably well as a means to keeping the interbank rates aligned with the desired level of the money market interest rate.

It is also useful to clarify the relationship between these operations and the final monetary aggregates that form **money supply**, the stock of means of payments available in the economy. Clarification is opportune because of entrenched "textbook views" of monetary policy that have become detached from reality (McLeay et al., 2014; Disyatat, 2008).

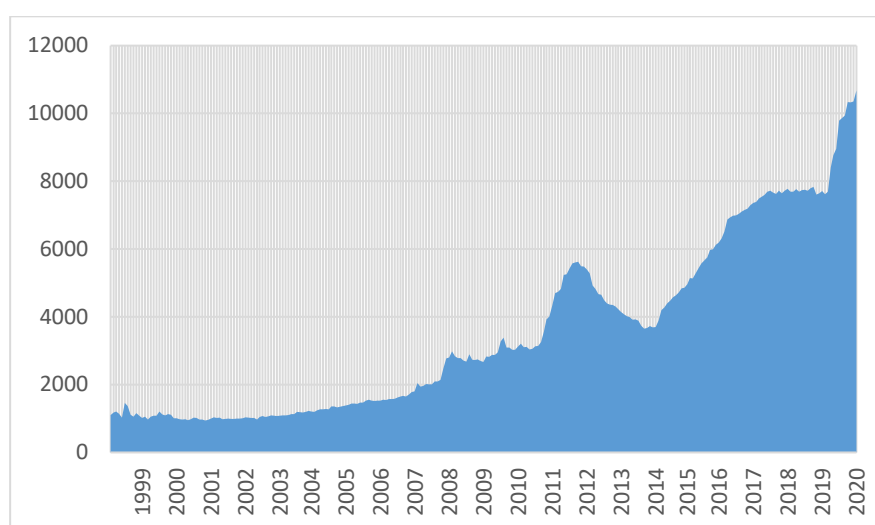
In the first place, central banks do not have direct control of final monetary aggregates, for instance the so-called M3 which is officially monitored by the ECB.¹ The monetary aggregate under closest control of central banks is the **monetary base**, i.e. the sum of currency held by the public and of bank reserves, accounted for in the liability side of the central bank's balance sheet. Generally, the final monetary aggregates are a multiple of the monetary base; the multiplication results from banks' policies regarding credit supply and reserve holdings, and from the public's decisions between holding cash or bank deposits. The monetary base is increased (or decreased) whenever money market operations with the central bank increase (or decrease) bank reserves. Yet, contrary to another "textbook view", banks need not have an impulse of reserve creation in order to increase credit supply. A normal loan operation is backed by the creation of an equivalent deposit; since deposits are the basis of monetary aggregates,

¹ "Monetary aggregates comprise monetary liabilities of MFIs and central government (post office, treasury, etc.) vis-à-vis non-MFI euro area residents excluding central government: M1 is the sum of currency in circulation and overnight deposits; M2 is the sum of M1, deposits with an agreed maturity of up to two years and deposits redeemable at notice of up to three months; and M3 is the sum of M2, repurchase agreements, money market fund shares/units and debt securities with a maturity of up to two years" (Source: ECB, [Monetary Aggregates](#)).

this means that banks have the power to create money, though not without limit.² The reserve policy of banks, and of the central bank, is part of their risk management, but it does not constitute a direct constraint on the capacity of credit (and money) creation.

In the second place, as a matter of fact, in normal times the bulk of liquidity transactions takes place among banks themselves at the interbank rates. Indeed, central banks, and the ECB as well, stand in the money market as the "lender of last resort" to banks in need of overnight liquidity, and the policy rate (the MRO rate) acts as the gravitation centre of interbank rates in force of the simple mechanism of arbitrage. Suppose that a bank needs a short-term loan: its liquidity manager will compare the interbank rate with the MRO rate and will choose the cheapest window. Hence whenever the interbank rate is below the MRO rate, excess demand for funds will push it upwards, and vice versa when it is above. It is simply the certainty of the central bank's open window that allows the system to work smoothly and precisely, with little, if any, direct liquidity creation by the central bank.³ This is witnessed by the ECB's balance sheet (Figure 1), which remained fairly constant until the global bank turmoil erupted in 2008, and, subsequently, the ECB engaged in extraordinary lending operations and eventually in outright **quantitative easing**.

Figure 1: The ECB's balance sheet, 1999-2020 (EUR billion)



Source: ECB, Statistical Warehouse.

In fact, quantitative easing, which is now regarded as an *extra-ordinary* monetary policy technique, consists of direct purchases of assets, i.e. creation of monetary base. Central banks announce the amount of assets to be purchased, instead of the interest rate they charge on loans (which is in fact stuck to zero or in negative territory). In basic stylised models of monetary policy, quantitative policy is equivalent to interest rate policy since the central bank can achieve the desired level of the interest rate either ways, by setting it directly or by placing in the market the amount of monetary base such that it is absorbed at the desired level of interest rate (knowing the demand function on the banks' side). Yet, in practice, the two techniques may differ depending on specific conditions, as will be seen below. As

² This view has long been matter of controversies going back to Bullionists vs. Chartalists in the 19th century, but has become less controversial now after major central banks have abandoned official targeting of monetary aggregates (McLeay et al., 2014; Disyatat, 2008).

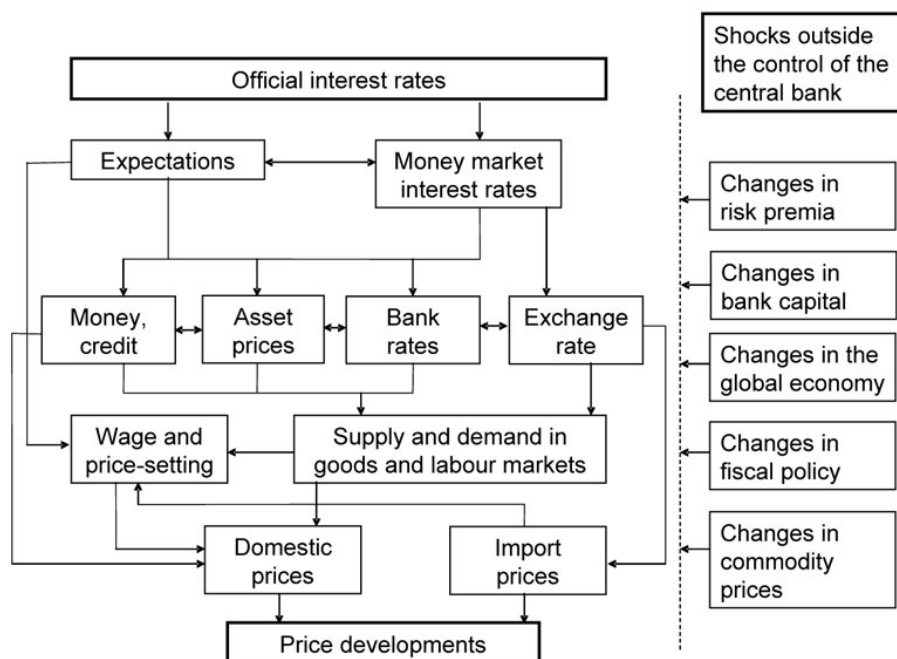
³ Moreover, the MRO or other liquidity operations with the ECB have very short duration, so that the liquidity created by granting a loan to a bank is reabsorbed automatically.

a matter of fact, central banks have resorted to quantitative policies when their policy rates have reached the zero lower bound, and a different channel of monetary stimulus was necessary.

2.2. The transmission channels

It is therefore from the money market that monetary policy transmits the impulses that are supposed to reach its final objective(s). However, the idea of a clear, linear, single-headed impulse-response mechanism is quite remote from reality. The transmission of monetary policy may take **different channels**, some of which operate in parallel, some are more conducive than others, depending on institutional and structural features of the economy, or may break down altogether under adverse circumstances. Therefore, sound monetary policy requires accurate knowledge and monitoring of the different transmission channels, of their complementarities and possible interferences, as well as the availability of a portfolio of **different instruments**. Last but not least, monetary policy is also shaped by the "state of the art", or the "state of science" (Clarida et al., 1999), transmitted to central bankers.

Figure 2: The transmission channels of monetary policy



Source: ECB, <https://www.ecb.europa.eu/mopo/intro/transmission/html/index.en.html>.

Figure 2, produced by the ECB, portrays the transmission channels of monetary policy as they are understood in Frankfurt. We shall now briefly review the main points on transmission channels in order to set the stage for the subsequent parts of the paper devoted to the current phase of monetary policy in the euro area.

2.2.1. The interest rate channel

The control of the money market interest rate(s) described above is fully consistent with what is today considered the basic transmission channel, i.e. the chain from short- to long-term interest rates relevant to the private sector's expenditure decisions (e.g. Schnabel, 2020). Note, in the first place, that this channel entails another intermediate target, namely the private sector's expenditure decisions, and

through it the final objective, namely the inflation target (Clarida et al., 1999; Woodford, 2003). In the second place, theoretically, this transmission channel requires three conditions.

One is, broadly speaking, **financial efficiency**. That is to say, the chain connecting the very short-term money-market rates to longer-term rates relevant to private consumption (saving) and investment decisions, e.g. the yield curve, is stable and predictable. Most importantly, in spite of the existence of different sources of loanable funds, households and firms have unconstrained access to financial markets, and eventually face a single market-clearing interest rate (that is why macroeconomic textbooks refer to "the" interest rate). Another is that monetary policy has some leverage on the **real interest rate**, i.e. the nominal rate net of (expected) inflation, which is supposed to be the key variable driving expenditure decisions (also known as the absence of money illusion). To this end, some price stickiness is thought to be necessary, which is in fact documented not only in the markets of goods and services, but also in the financial markets, where non-indexed contracts are largely prevalent. Finally, expenditure decisions should actually be **responsive to changes** in the (real) interest rate to the extent required to achieve the final objective.

Complementary to the relationship between interest rate and expenditure is the one with the **exchange rate**⁴. The value of exchange rates is in fact highly sensitive to the worldwide comparison between interest rates in different countries. When the interest rate falls (or rises) in one country, its exchange rate tends to depreciate (or appreciate). Thus, also the foreign trade component of aggregate demand is activated in addition to the domestic one. The external value of the euro is not an objective by itself for the ECB, yet in recent years some episodes when the euro exchange rate appreciated in spite of an accommodating monetary stance or depreciated in association with quantitative easing operations, did not go unnoticed.

The conditions on which the viability of the interest rate channel rests may be impaired owing to either structural factors present in the economy or adverse shocks with more or less extended and prolonged effects. To begin with the latter, a large production of documents and research papers testify how the euro area financial crisis of the early 2010s first, and the consequences of the pandemic now, have crippled the ECB ordinary policy tools almost completely; they also explain the rationale of the unconventional tools adopted along the way (e.g. European Parliament, 2016, 2020; Lane 2020a). Further elements can be found in the next Section.

Schnabel (2020) provides a useful account of the specific problems that arose in the interest rate channel. A first one is that the financial efficiency hypothesis (which is questionable even in normal times, see below) is no longer tenable. Most of the rings in the chain from the MRO rate to the long-term interest rate(s) and unconstrained expenditure decision are broken, those dependent on banks' credit policy in the first place. Recent experience suggests that extremely low, or even negative, policy rates may fail to be transmitted by banks to the public or are even **reversed into a restrictive credit policy** (Brunnermeier and Koby, 2018). Some classes of households and firms lose access to borrowing altogether. A second pathology uncovered by recent research is that at very low levels of the interest rate its **effect on aggregate demand weakens** (the slope of the IS curve in the standard macro-models becomes flatter: Borio and Hoffmann, 2017; Van den End et al., 2020). At the same time, the attempt to operate on the agents' projection of future lower real interest rates by way of **forward guidance** (FG) along the path of future low nominal interest rates and higher inflation, as suggested by theoretical principles (Eggertsson and Woodford, 2004), has delivered mixed results, to say the least (Nakamura

⁴ The exchange rate channel is often treated as an independent channel, but here it can conveniently be seen as a complement.

and Steinson, 2016), possibly because "individuals are far from being as rational and forward-looking as our canonic models assume" (Schnabel, 2020, p. 9).

Beyond the extreme events that hit our economies along the last decade, it is worth considering that critical limitations to the conditions underlying the interest rate channel as the failsafe way for successful monetary policy were already brought to the forefront as early as the 1980s by research on various sources of failure of the financial efficiency hypothesis (Stiglitz, 2014) – vindicating to some extent the long-standing practical wisdom of central bankers. As a consequence, other transmission channels have been considered by the ECB in difficult circumstances and will need to be considered also in the future.

2.2.2. The credit channel

As said above, the banking sector is the key counterparty of the central bank's operations. As long as the conditions of financial efficiency underlying the interest rate channel hold, the banking sector is seen as a passive pass-through mechanism of the policy rate signal. Yet various kinds of failures of such conditions make of the banking sector an *independent* "credit channel" of monetary policy.

One major reason is that different kinds of fund suppliers face different costs and capacity to **extract asymmetric information** about firms' profitability. Hence firms do not face a single cost of funds regardless of source, and some do not have access to all possible sources (Stiglitz, 1982; Greenwald et al., 1984). As a matter of fact, firms differentiate across different financial sources according to a well-defined hierarchy, dubbed "pecking order", starting from internal funds, then bank credit, and eventually bonds and equities (Fazzari et al., 1988). Ongoing research investigates the extent to which the credit channel is more or less prominent with respect to the others. Evidence accumulated pre- and post-creation of the euro area broadly supports the view that major European continental economies are distinctly "bank-based" economies (Angeloni et al., 2002, 2003; Ciccarelli et al., 2013).

While focus is generally on credit as a source of aggregate demand, credit also plays a prominent role in financing current production, e.g. down payments of wages, raw materials and circulating capital, opening the door to **supply-side effects** of monetary policy (Greenwald and Stiglitz, 1993). Unlike the hypothetical self-financed firm, firms depending on credit for production should take into account the cost of credit and the cost of defaulting on it. Changes in monetary policy and/or credit conditions may thus **affect aggregate demand and supply simultaneously**, with amplified real effects, and smaller price effects, not necessarily due to price stickiness. Passamani and Tamborini (2013) provide econometric evidence of this side of the credit channel in Italy and Germany before and after their euro area membership. The pandemic has vividly shown the disruptive supply-side effects of the breakdown of the payment circuits among firms, and among firms and banks (Baldwin and Weder di Mauro, eds. 2020; Bonatti et al., 2020), enlarging the scope of monetary stimuli to the direct support of productive activities.

In bank-based economies it is vital that the **credit channel works smoothly and effectively**, which not only means that banks are expected to transfer changes in the MRO rate onto the cost of credit swiftly, but also that they are in the condition to extend as much credit as dictated by allocative efficiency without undue constraints in order to reach segments and sectors of the economy with limited or precluded access to other financial funds. In this perspective, great attention is placed by central banks on threats of **credit rationing**, i.e. a discriminatory policy of banks to deny credit to borrowers willing to pay the market interest rate or more, which may have large macroeconomic repercussions (Stiglitz and Weiss, 1981, 1992).

This viability of the credit channel requires also specific attention to the **balance sheet of banks**, and eventually their "willingness to lend" (e.g. Woodford, 2010). A typical feature of a recession is a deterioration of bank assets and unbalanced capital account (this may also happen directly owing to financial mismanagement as was the case with the US crisis of the subprime mortgages). The consequence is both a larger wedge between the credit cost and the borrowers' willingness to pay, and the materialisation of a credit crunch.⁵ As in the case of credit rationing, the solution does not come from lowering the policy rate but from quantitative extension of liquidity as well as more targeted measures of balance sheet support. This has been understood by the ECB, whose interventions in various segments of the financial markets were also motivated by the attempt to prevent (or stop) a self-enforcing negative circle of asset fire-sales, worsening of banks' balance sheets, credit contraction and displacement of non-financial firms.

The existential threats to the euro area banking sectors experimented in the crises of the 2010s and with the pandemic have shown both the critical role of the credit channel for the survival of economic activity, and the necessity for the ECB to address the emergency with the kind of specific measures mentioned above (Ciccarelli et al., 2013; Lane, 2020a). In particular, as is well known, euro area banks' exposure to sovereign debt, and in particular of domestic sovereign debt, was contributing to the so-called "doom loops" in the euro area, whereby a crisis originating in the domestic banking system weakens the sovereign whose difficulties worsen the banking system, and vice versa (Farhi and Tirole, 2018).

2.2.3. The asset channel

Central banks should also be aware of more indirect effects of their policy decisions in a world of "financial frictions". A third channel, dubbed the "asset channel", may be regarded as the interaction between the previous two. It is a long-standing tenet in the Keynesian view of monetary policy re-elaborated by James Tobin (e.g. Tobin, 1969, 1980) that the interest rate channel mainly works through the substitution between money and risky assets (representative of firms' capital) in risk-averse agents' portfolios. Hence the **private sector's assets** are the crucial link. A monetary expansion induces the private sector to rebalance portfolios towards risky assets, their prices rise, the implied cost of raising funds falls and investment is boosted.⁶ In a similar vein, a monetary expansion is the necessary reaction to a financial shock that disrupts asset values and impairs firms' ability to finance investments.⁷ It may thus be noted that this view supports the idea that central banks should also take into account financial market developments, a view later reverted and that remains controversial.

Interestingly, in the earlier Tobinian view quantitative policy was believed to be the standard *modus operandi* of the central banks of the time.⁸ Hence the portfolio effect described above would be activated by direct injection of liquidity in the money market. Today, this effect is in fact regarded, and monitored, as one of the key mechanisms behind the current wave of quantitative easing around the world (Borio and Disyatat, 2010). This approach also offers a rationale for the central banks' switch to quantitative policies. When policy rates are at zero, it is not necessarily true that all other interest rates relevant to expenditure decisions are at zero too. To a greater extent, this is the case in the euro area, where countries with different financial structures and contingent risk conditions coexists under the same monetary umbrella (e.g. Saraceno and Tamborini, 2020). Consequently, targeted asset purchases,

⁵ Woodford speaks about "macroeconomics with two interest rates".

⁶ Note that this process involves higher risk-taking, an issue that has recently drawn attention as a by-product of ongoing monetary easing conditions (e.g. Maddaloni and Peydró, 2011; Bonfim and Soares, 2018). In Tobin's view, however, higher risk-taking is not a problem (indeed is part of the solution) provided that portfolios are optimised.

⁷ Households' consumption decisions may also be affected according to role of wealth in standard life-cycle models of consumption.

⁸ A belief shared with Monetarists, but contested by other scholars of Keynesian inspiration (e.g. Kaldor, 1982).

like the APP or the PEPP, are conducive to portfolio adjustments that sustain segments of the economy penalised by adverse financing conditions. ECB officials have made explicitly reference to “the risk of fragmentation across countries and market segments”: while segmentation across jurisdictions can be easily associated with the effect of heterogeneous perceived risks of default across countries, market segmentation along other dimensions might have to do with shocks that decrease the (limited) substitutability of private assets.

In the earlier version of the asset channel, as in the basic version of the interest rate channel sketched above, there is no explicit role for the banking sector. Though it can easily be included in the picture (Hart and Jaffee, 1974), it remained in an ancillary position. This is no longer the case, if the conditions giving prominence to the credit channel are taken into account. As a matter of fact, borrowers' assets play a key role as **collateral in banks' credit policy** aimed at controlling asymmetric information and moral hazard. The problem is that collateral values follow the booms and busts of financial cycles, thus making credit supply procyclical, expanding in booms and contracting in busts (Bernanke and Gertler, 1989, 1990). This is a major factor that turns financial cycles into real cycles with a typical amplification effect (Borio, 2012). The credit-asset channels interplay reinforces the message that central banks should pay attention to financial developments, and if a financial collapse strikes, they should stand ready to intervene with measures targeted to sustaining collateral values.

3. NEGATIVE INTEREST RATES, MONETARY POLICY INSTRUMENTS AND THE TRANSMISSION CHANNELS

In this Section we shall illustrate the intertwined relationship between standard and extraordinary monetary policy instruments in a world characterised by **negative interest rates**, serious **market segmentation** (across financial intermediaries and across sovereigns), and **excess liquidity**.

We shall discuss, in particular, the relationship between the observed changes in the various ECB policy rates and the several extraordinary measures (from the provision of central bank liquidity to the changes in collateral eligibility for liquidity transactions with the Eurosystem, from the establishment of security lending facilities to the creation of a two-tier reserve system) implemented by the authorities.

As will be explained, the persistent segmentation in the money market and in the sovereign bond market across the euro area, the presence of excess central bank liquidity and the adoption of negative monetary policy rates have profoundly affected the transmission channels, forcing the ECB to adapt progressively its tools to the circumstances. A better understanding of the timeline, of the logical connections, and of the causal relationships between the several instruments is of outmost importance not only to appreciate the rationale of the decisions, but also to envisage all the necessary steps in the process of monetary policy normalisation.

3.1. Monetary policy in normal times: the corridor of policy rates further explained

As explained in Section 2, the ordinary monetary policy operations of the ECB are engineered within "**the corridor**" of policy rates, whose main aim is to steer the amount of bank reserves and the short-term interest rates. To understand the mechanisms at play in normal times, a further description of the framework used by the Eurosystem is in order.

In the first place it should be recalled that **central bank liquidity** is important for the banking system because credit institutions established in the euro area are required to hold minimum compulsory reserves, calculated on the basis of their balance sheets. Reserves ensure that banks are capable to settle their transactions in central bank money, when needed. More importantly, setting a minimum amount of reserves to be held with the Eurosystem helps the ECB to manage the overall supply of credit in the economy. The overall demand for liquidity in the euro area, indeed, depends both on the evolution of the commercial banks' balance sheet and of the associated required reserves, and on a number of autonomous factors (ranging from government deposits to the amount of cash circulating in the economy) that absorb liquidity.

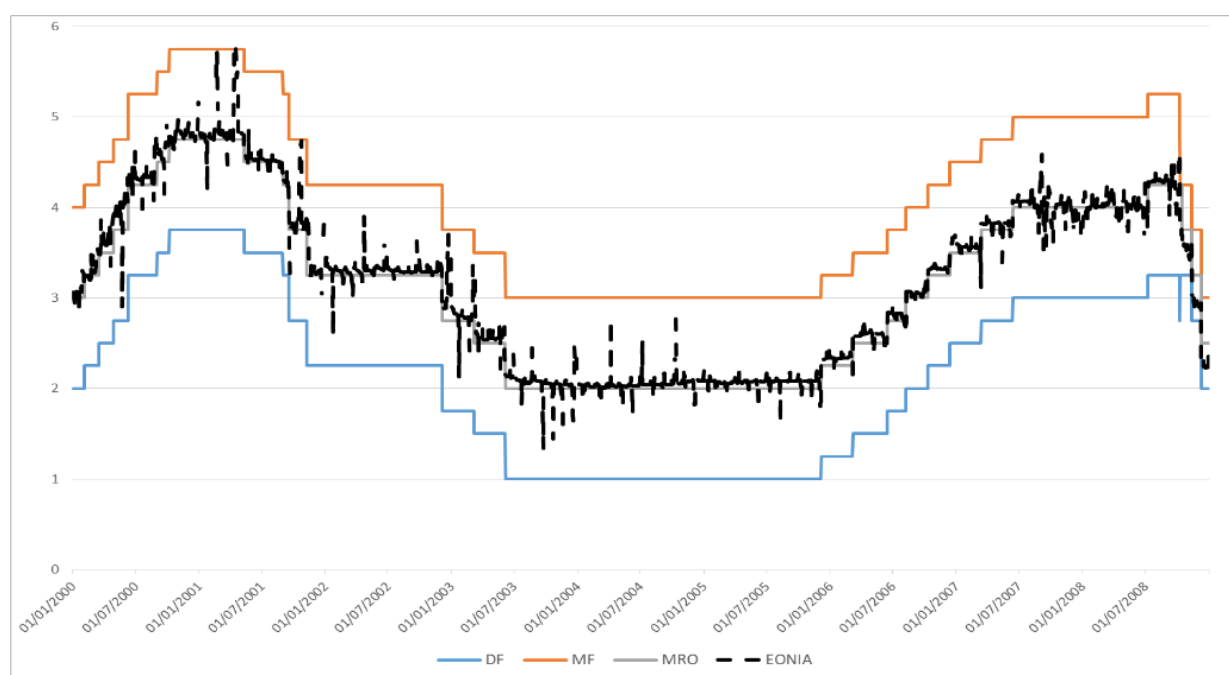
In order to match their liquidity needs, banks participate in the MRO - one-week liquidity-providing operations – and longer-term refinancing operations (LTRO) - three-month liquidity-providing operations in euro. These tenders are designed purposefully to steer the short-term interest rates towards the target rate, and to regulate the overall liquidity in the system, since the MRO rate represents a reference value for all money market transactions, such as the unsecured overnight lending transactions and the secured (i.e. collateralised) repurchase agreements (Repo).

The banks in the euro area can also take the initiative and engage on an individual basis with the Eurosystem to receive additional central bank liquidity through the MLF against the presentation of eligible assets (i.e. collateral). Conversely, they can deposit in the Eurosystem any overnight liquidity that they are unwilling to or incapable of lending to other banks (through the DF). These standing facilities contribute to redistribute and modify the level of overnight liquidity in the system.

When the ECB injects liquidity in the system through its main operations, it creates downward pressures on the interbank rate and on other money market rates. In normal times, the DF rate represents a floor for the interbank rates as banks with excess liquidity in the system would rather make use of the DF than lending privately with lower returns. Conversely, when the ECB absorbs liquidity from the system, there is an upward pressure on the interbank interest rates that move closer to the marginal lending facility rate. Accordingly, the DF rate and the MLF rate create a corridor for the unsecured overnight interbank interest rates (see Bech and Monnet, 2016, for a search-based model of the interbank rate).

Figure 3 illustrates that the unsecured overnight interbank rate (the EONIA rate, until October 2019) has always remained in the corridor and close to the main rate, i.e. close to the ECB target rate, between 2000 and 2008.

Figure 3: Euro area money market rates and ECB policy rates, 2000 – 2008



Source: Authors' elaborations based on ECB, Statistical Warehouse.

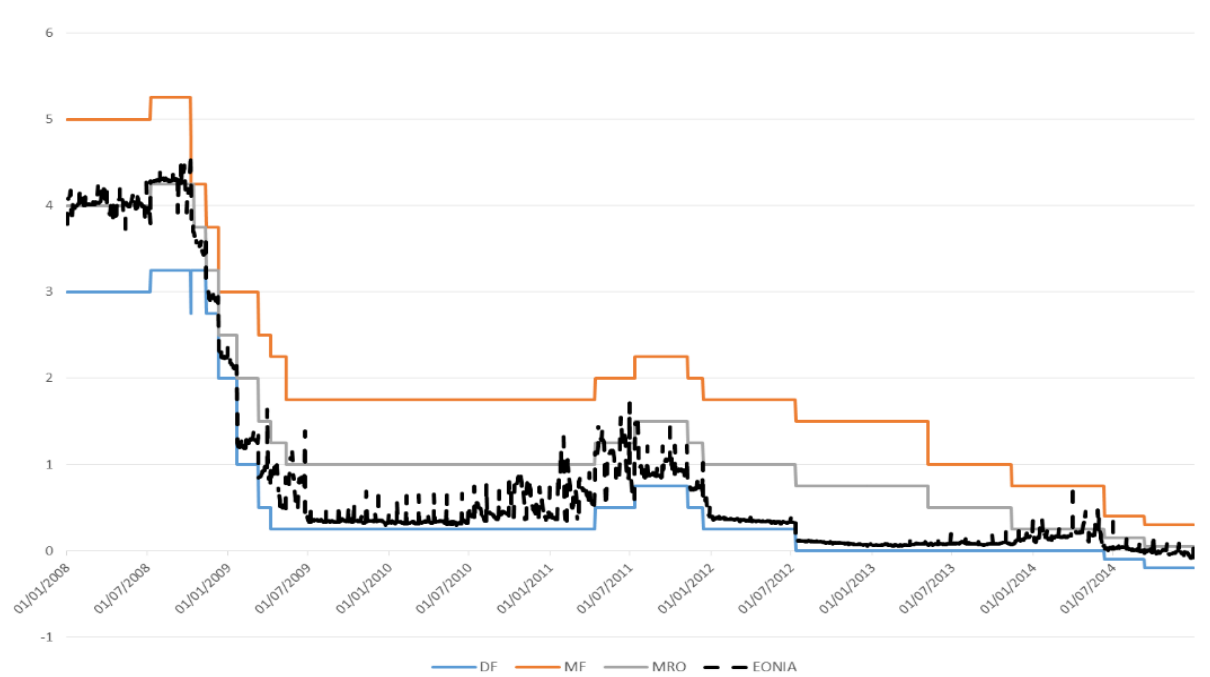
3.1.1. Facing new challenges: 2008-2014

With the onset of the global financial crisis and during the European debt crisis, the unsecured interbank rate in the euro area started **moving away from the MRO rate** and towards the DF rate, as shown in Figure 4. These changes were reflected also in other short-term interest rates, such as secured interbank transactions and unsecured transaction involving non-banks and banks outside the euro area. This outcome is the result of the large injection of liquidity in the system operated through extraordinary measures to enhance credit support, such as the three-year LTROs and the TLTROs. Absent this provision of central bank liquidity, the money market rates would have risen significantly above the MRO rate and some banks would have encountered problems in accessing to the interbank market, thereby impairing the monetary policy transmission mechanism.

It is indeed normal that, in an **environment characterised by excess reserves**, the overnight market rate moves from the middle of the corridor towards its floor (Boutros and Witmer, 2020). Yet, in the euro area, specific forces have been at play.

As shown by Vari (2020), the rate for the unsecured overnight interbank transactions fell close to the DF rate also because of the serious fragmentation between the banks in the so-called “core” countries and those in the peripheral countries of the euro area. The banks located in the distressed countries, in particular, could borrow in the market only at a high premium due to the widespread concerns for their (or their countries’) **risk of default and for the possible breakup of the euro area**, whereas the banks in the core countries did not need to borrow in the market as they were already holding excess reserves.⁹

Figure 4: Euro area money market rates and ECB policy rates, 2008 – 2014



Source: Authors' elaborations based on ECB, Statistical Warehouse.

As the ECB could not discriminate between credit institutions on the basis of their nationality, it had to expand the liquidity provision to the entire euro area. The Eurosystem amended its approach to manage liquidity and introduced procedures to allocate unlimited amount of credit to banks at a fixed interest rate (fixed-rate full allotment), often for relatively long periods of time and against an enlarged range of eligible assets. Yet, only the banks in the periphery turned progressively more and more to the ECB for liquidity, and started to rely less and less on the market (reducing their demand for liquidity in the money market); Conversely, the banks located in less vulnerable countries stopped borrowing from the ECB and started hoarding liquidity in the form of excess reserves and deposits with the Eurosystem.

The model developed by Vari (2020) shows that, in such a policy setting and in the presence of large imbalances in the net external financial positions of the different countries, a) excess liquidity arises

⁹ Secured and unsecured loans to the peripheral banks started being considered as similar because banks tend to hold (Saka 2020) and use as collateral domestic assets that share their same country risk; hence, the market rates on unsecured overnight interbank transactions did not differ much from those for secured exchanges (Vari, 2020).

endogenously in the system, and b) unsecured interbank rates depend on the few unsecured transactions carried out by the banks in the core. These forces contribute to drive the market rates far from the MRO rate and very close to the DF rate.¹⁰ Moreover, as capital flights associated with portfolio reallocations across sovereign bonds increase the funding needs for the banks in the periphery, the segmentation between banks in the euro area eventually mapped, *ceteris paribus*, into large TARGET2 imbalances.

Notably, such asymmetric conditions in the core and peripheral banks contributed to create two intertwined phenomena negatively affecting the traditional monetary policy transmission: the interbank rate tracked more closely the DF rate than the MRO rate, and the Eurosystem's balance sheet increased with the growing liquidity provision to the peripheral banks. When the liquidity and the interbank interest rates fluctuate according to the demand and supply forces associated with the risks of financial fragmentation along the national borders, the monetary transmission in the euro area is impaired: the ECB loses the ability to "control" the overall liquidity and to steer effectively the short-term interest rates towards the target rate.

This account of the problems affecting the money market and the monetary policy transmission during the period contributes to explain why reducing the concerns for sovereign defaults and a breakup of the euro and interrupting flight-to-safety dynamics in the area was necessary for the ECB to preserve the normal functioning of the transmission mechanism. The ECB could not simply continue to increase central bank liquidity: it had to tackle the self-fulfilling expectations of disordered sovereign defaults and a breakup of the euro. The ECB had to give its contribution to **preserve financial stability** and a **smooth functioning in all segments** of the financial markets in order to be able to pursue price stability. This understanding, together with other considerations, led the Eurosystem to undertake the massive APP. Moving to quantitative policies, factors typical of the asset channel introduced in Section 1, such as portfolio effects, become prominent.

Quantitative easing programmes, in fact, tend to saturate banks with liquidity and reduce their need to borrow both from the ECB and in the interbank market; this, in turn, contributes to push and anchor the interbank rate closer to the DF rate (Vari, 2020). With an interbank market rate steadily close to the DF rate and below the MRO rate, the ECB could not operate as usual by setting the main MRO rate close to the target rate, as central banks using the corridor do. The ECB, as well as other central banks, had to adapt and started manoeuvring the DF rate so as to steer the interbank rate closer to the target rate.

But when the system is washed with liquidity, central banks may also need to **reduce liquidity hoarding**: the ECB started charging banks for holding excess reserves so as to encourage them to expand their lending, and set a negative rate on the excess reserves held with the Eurosystem.

Negative policy rates help the central bank to lower the market interest rates below zero along the entire yield curve, thereby boosting the monetary accommodation. Indeed, investors tend to demand more longer-dated assets when short-term rates are negative. Accordingly, the ECB introduced a negative interest rate policy (NIRP) in mid-2014.

As mentioned above, when the policy rates enter into negative territory, the ability of the central bank to work with the corridor and with the traditional policy rates is severely affected. Although they manage to bring nominal and real short-term rates below the zero lower bound, they still face an effective lower bound associated with the possibility for individual and financial intermediaries to turn to cash (Boutros and Witmer, 2020). While banks can charge negative rates on wholesale deposits

¹⁰ In a perfectly integrated banking system, the model shows, a fixed-rate full allotment would be conducive to the same level of liquidity and the same interbank rate that one would observed in a system where the central bank controls the overall liquidity. It is the fragmentation that, in the model, magnifies the impact of the countries' net external financial positions.

(Altavilla et al., 2019, show that, in 2018, euro area banks charged negative rates on 20% of the deposits of non-financial institutions), there is indeed a limit to the banks' ability to pass-through negative rates to their depositors. It follows that the policy rates can be negative but, short of banning cash, they cannot be too negative. And there remains the risk that they remain above the target rate, that is the rate bringing the economy to a price stability path.

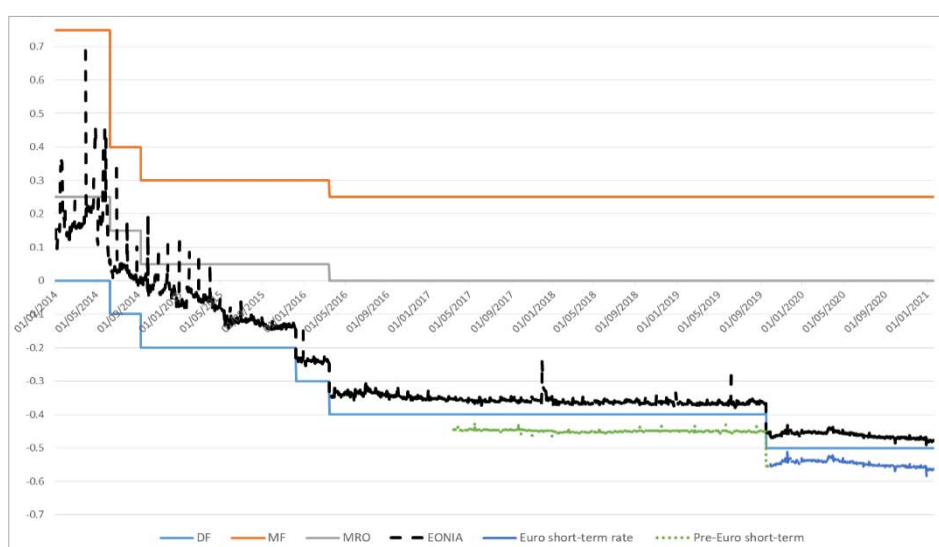
All these considerations show that there exists an effective lower bound for the central bank on its policy rates, even when it decides to establish a NIRP. Moreover, as we shall illustrate in what follows, the realisation of a NIRP that is compatible with the smooth functioning of the transmission framework requires the adoption of several collateral policy measures and other adjustments.

3.1.2. Money market rates after 2015

As said, negative policy rates were adopted by the ECB since mid-2014 as part of its renewed strategy to address worrying disinflationary forces. Once the DF rate and the **interbank rates turned into negative territory**, a number of unusual phenomena emerged.

To start, the interest rates on the unsecured transactions between banks and non-banks, mapped in the €STR rate since 2017, moved far below the EONIA and the DF rate (Figure 5). This phenomenon can be explained by referring to the **institutional differences between banks and non-banks in the euro area**. As only banks have access to the DF with the Eurosystem, they started acting as intermediaries for the non-banks. In doing so, they exploited the privileged access to the central bank and their market power, and started charging (very) negative rates to accept to absorb non-banks' excess liquidity (Arrata et al., 2020).¹¹ The difference between the EONIA and the €STR, thus, is due to a segmentation driven by the differentiated institutional position of the financial intermediaries with and without access to the Eurosystem's facilities. This segmentation differs from, and adds up to, the segmentation across banks in peripheral and in core countries discussed above.

Figure 5: Euro area money market rates and ECB policy rates, 2014 – 2021



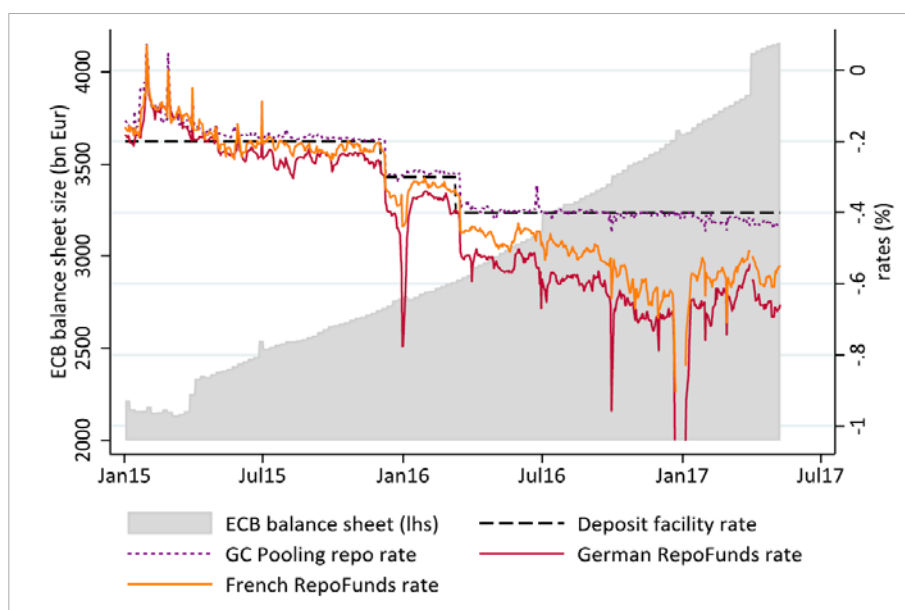
Source: ECB Statistical Warehouse.

¹¹ This segmentation-related phenomenon has been present also in the US, as shown by Bech and Klee (2011).

A second unusual phenomenon in the money market occurred since 2015. The secured repurchase transactions backed by sovereign bonds quoted at rates below the DF rate in negative territory, and the rates on the repos backed by German and French government bonds (among others) reached levels far lower than those of the repos backed by a pool of bonds and of repos covered by distressed sovereign bonds (Figure 6).

As repos represent the largest segment of the euro area money market and a key component of the monetary transmission channel, this situation is as much bizarre as it is important to understand. The first bizarre aspect to consider is that secured transactions in the money market were traded at rates below the unsecured transactions and the DF rate. The second surprising aspect to mention is that the dispersion across repo rates started growing at the very same time when the Eurosystem was implementing a massive programme of asset purchases to reduce the (abnormal) dispersion in the long-term rates.

Figure 6: Selected money market rates in the euro area



Source: Arrata et al. (2020), p. 838.

In fact, the situation was not bizarre. Rather it was the by-product of unusual circumstances (negative policy interest rates, euro area banking and financial market segmentation along national borders) and of the extraordinary expansionary interventions by the Eurosystem.

To understand this, it is worth recalling that **financial institutions may need certain specific assets** for a number of purposes (e.g., high-value collateral in secured transactions, short sales, regulatory reasons, portfolio rebalancing, ...). From this it follows that credit and financial institutions may enter a repo transaction with the goal of borrowing the asset, against cash, rather than obtaining cash, against the asset. When the interest of the lenders is in receiving the collateral, rather than in providing the cash, they may be willing to accept a lower rate in the transactions: this is the source of a *premium* on the asset used as collateral and it creates a phenomenon that, after the work of Duffie (1996), is known as the *specialness* of an asset.

As maintained by Arrata et al. (2020), with its massive APP, the Eurosystem has decreased the net supply of safe/special bonds, and this has **increased their specialness premia**. This implies that the ECB's

attempt to lower the long end of the yield curve has contributed to lower the very short end, altering the money market rates and the monetary transmission framework.

The concept of specialness does not only help to explain why repo rates declined in the euro area below the DF rate, but also why the Repo rates backed by different sovereign bonds were quoted at different rates. This is the effect of the wide variation in the specialness *premia* associated with diverse long-term bonds in the euro area that is in turn a manifestation of the concerns for the sustainability of Member States' public finances and the integrity of the euro area. Accordingly, the divergence in repo rates backed by different sovereign bonds represents another channel through which the perceived risks of sovereign defaults and of a euro area breakup contributed to segment the money market in the euro area.

As pointed out by Isabel Schnabel at the ECB Conference on Money Markets (on 23 November 2020), *"increases in dispersion indicate that money market rates do not move in tandem, which can signal impairments in the pass-through of the monetary policy stance to private market rates."* Even in an environment washed with liquidity and with negative policy rates (and with limited concerns for the euro area collapse), substantial differences in the perceived safety of sovereign bonds across Member States has continued to alter the monetary policy transmission. It should then not surprise that preserving financial stability and a smooth functioning of all segments of the financial market is an implicit intermediate objective of a central bank that has price stability as main goal: without achieving the former, it is impaired to achieving the latter.

3.1.3. The short circuit of policy measures

As argued above, the **impact of asset specialness is particularly strong** when there is a (perceived) shortage of the desired asset. This shortage did not depend exclusively on variations in demand due to precautionary motives and flight-to-safety pressures. Two additional factors contributed to the growing scarcity of safe collateral in the euro area: the massive purchases of sovereign bonds by the Eurosystem under the APP, and the modifications of various regulatory norms, pushing banks and other institutions to increase their holdings of the safest securities.

The (inevitable) **short circuit in the implementation of monetary policy** is thus apparent. On the one hand, the Eurosystem intervenes on the sovereign bond markets to reduce the concerns about a breakup of the euro area and to ensure that the monetary stimulus is transmitted effectively across jurisdictions and intermediaries. On the other hand, the quotas of assets to purchase have to respect the ECB capital key, and hence the Eurosystem withdraws from the money market large amounts of special assets in high demand (i.e. German bonds), thus increasing their specialness premia and expanding the dispersion in the short-term rates across the euro area.

The recognition of the problems associated with such paradoxical outcome led the ECB to establish a **securities lending programme** with a view to lending the holdings under the APP and the PEPP. The aim of this programme was indeed "to support bond and repo market liquidity without unduly curtailing normal repo market activity". Over time, this instrument has been revisited several times and in late 2016, for instance, the Eurosystem allowed the national central banks (NCBs) to accept cash as collateral for their public securities lending facilities.

But this is not the only part of the monetary framework that had to be adjusted. The Eurosystem had to **revise various rules regarding the eligibility** of marketable and non-marketable financial securities that can be used as collateral in secured transactions with the ECB and the NCBs. Although in normal times the Eurosystem collateral framework is meant to limiting banks' excessive borrowing and to protecting the Eurosystem from losses associated with its loans, the expansion of the range of

eligible assets was part and parcel of the ECB's attempt to prevent fire sales of assets, reduce the segmentation in financial markets, and support banks' balance sheets. In the face of increasing credit risk heterogeneity among euro area, the ECB has to improve both the functioning of certain segments of the financial markets and the overall monetary transmission mechanism.

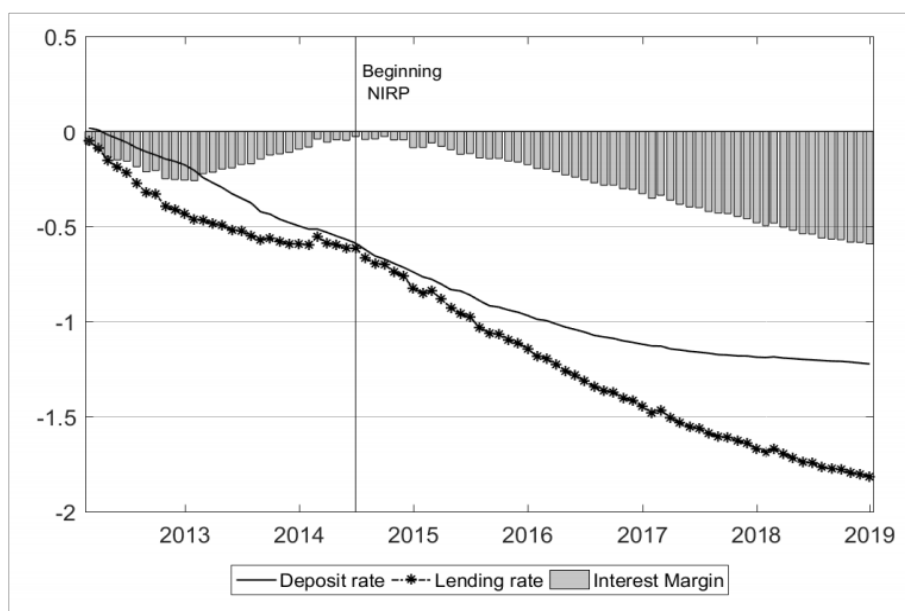
3.2. NIRP, remuneration on excess reserves and banks' profitability

As the pass-through of negative interest rates differs across banks, **the impact of NIRP on the profitability of banks** is diversified. Some banks manage to reduce their cost of funding and can expand loans, whereas others may suffer a large contraction in the interest rate margin and in the net interest income, and reduce lending altogether.

As European banks earn most of their total profits from interest-bearing assets and liabilities (see Figure 7), many have been concerned about the low bank profitability and a reduction in banks' lending capacity despite the negative rates and the abundant liquidity available.

Although the research on this aspect is still ongoing, European banks seem to have adapted fast their business practices, expanded new lending and **exploited other opportunities to raise profits** (Klein 2020). For instance, core banks exploited the positive differential between the DF rate and their repos rates (see the Sections above) to intermediate, with a positive return, the excess liquidity of non-banks. Bubeck et al. (2020) show that systemic banks were also induced to reach-for-yield by investing in assets.

Figure 7: Cumulative changes in the lending rate and deposit rate for euro area banks



Source: Klein (2020), p. 6.

Yet, the effects are very diversified and **small banks may have been hit the hardest**. Evidence from the euro area bank lending survey suggests that bank profitability was indeed negatively affected by the extraordinary measures, and in particular low capitalised banks suffered the most. All in all, however, the banks' balance sheets expanded as expected (Klein, 2020).

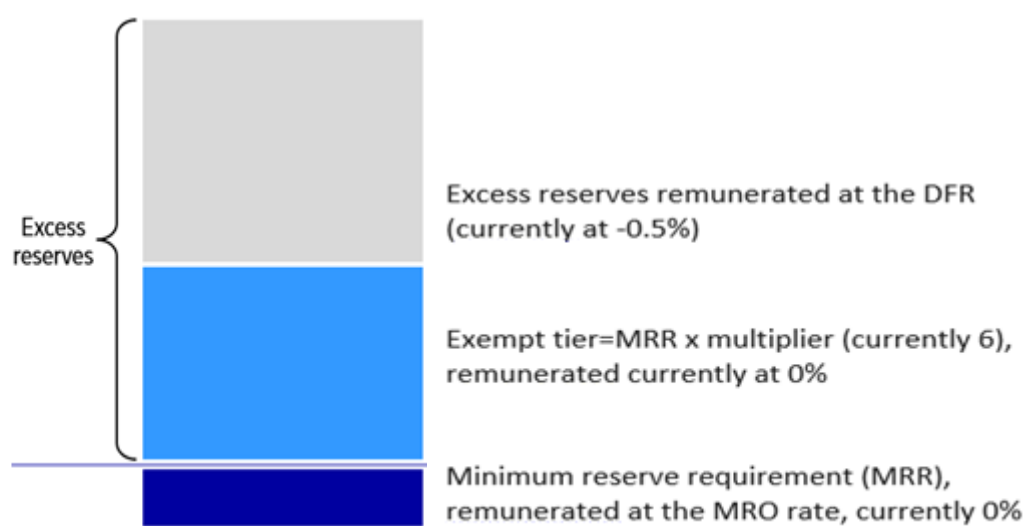
It remains also true that any unpleasant direct impact of the NIRP on the profitability of small banks has to be weighed against a realistic counterfactual scenario of no-NIRP, that is an economy contracting

even more and with more non-financial companies exiting the market (ECB, 2020). It follows that the actual implications of NIRP and of negative money market rates on banks are not straightforward, and an assessment would require a dedicated analysis.

Being as it may, there is wide consensus that the large amount of liquidity injected in the euro area through non-standard monetary policy measures (at least those not directed to stimulate bank lending to the real economy) created strong pressures on market interest rates and on banks' usual business practices. The ECB decision to establish a **two-tier system for remunerating excess reserve** holdings can be reasonably related to these concerns.

In fact, the new remuneration scheme adopted by the ECB starting on 30 October 2019 has two distinct rates, which are applicable to different parts of the excess reserves held by the euro area banks, i.e., balances held in reserve accounts with the Eurosystem in excess of the minimum reserve requirement (that is remunerated at the average MRO rate, currently at 0%). According to this scheme, the fraction of the excess reserve holdings up to the "allowance" is exempted from the rate at which excess reserve holdings are normally remunerated, that is either at 0% or at the DF rate (currently at -0.5%), whichever is lower (Figure 8). The allowance is calculated as a multiple (currently six times) of the minimum reserve requirement, that is mainly dependent on banks' customers' deposits, thus making the two-tier scheme particularly calibrated on banks relying on deposit funding, which are typically the main lenders to the real economy in the euro area. Both the multiplier whereby the allowance is calculated and the rate at which the excess reserves up to the allowance are remunerated (currently 0%) may be adjusted by the ECB's Governing Council over time.

Figure 8: Reserve remuneration in the Eurosystem



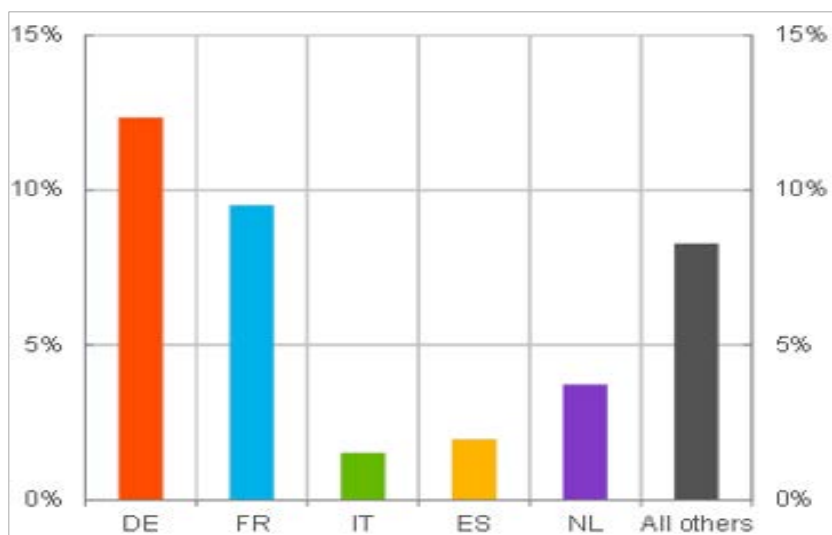
Source: ECB, Nordea.

The introduction of the two-tier excess reserve remuneration (TTERR) system creates **incentives for trading liquidity among banks in the money market**, at rates currently ranging between -0.5% (DF rate) and 0.0% (the rate paid on the exempted fraction of excess reserves). Banks with excess reserves above exemption allowances are willing to lend on the interbank market at rates higher than the DF rate; those with unused allowances to borrow at rates lower than the zero remuneration rate on the exempted fraction. To find a satisfactory trade-off between maintaining short-term money market rates at very low levels on the one hand, and reducing money market fragmentation and banks' costs on the

other hand, the ECB has to calibrate carefully both the multiplier and the rate at which exempted excess reserves are remunerated. In particular, the amount of un-exempted reserves should be kept at a level large enough to prevent the short-term money market rates from rising too much above the DF rate (see Secchi, 2019).

In general, the presence of abundant central bank liquidity, which has been further increased since March 2020 in response to the COVID-19 crisis, lowers banks' incentives to transact with each other. In this context, one should expect that the TTERR can contribute to bring about a **less uneven distribution of liquidity across jurisdictions** than that emerged since the Great Recession and the European debt crisis. When the TTERR was introduced, indeed, excess liquidity holdings in the euro area were highly concentrated in the core countries (Figure 9). As Cœuré (2019) rightly remarked, *"Such concentration levels are, in principle, of little concern to policymakers in the presence of a deep and active money market across the euro area – that is, as long as banks with excess liquidity holdings are willing and able to smooth liquidity shortages elsewhere in the system. If there is fragmentation, however, then temporary spikes in interest rates are also possible in the euro area, despite the remarkable excess liquidity levels we are currently seeing."*

Figure 9: Excess liquidity across euro area countries as a share of total Eurosystem assets, (September 2019)



Source: ECB.

Following the implementation of the two-tier system, banks holding less excess liquidity than their exemption allowance increased their excess liquidity holdings by borrowing from banks exceeding their exemption allowances, with some redistribution of excess liquidity away from Belgium, Germany and the Netherlands and towards countries with unused allowances, such as Italy (Baldo et al., 2019; Cœuré, 2019). However, this redistribution occurred, by and large, in the secured market, where the use of collateral and central clearing can reduce counterparty risk, while unsecured interbank lending remained overwhelmingly domestic, especially in countries with high excess reserves. Thus, it appears that the TTERR stimulates cross-border lending as far as banks have sufficient collateral, but its introduction suggests that *"we may still be facing a situation in which banks in some parts of the euro area may hold on to excess liquidity while those in other parts of the currency union may face a liquidity shortage"* (Cœuré, 2019).

In addition, the TTERR is meant to provide the euro area banks with some cost relief by allowing them to reduce the negative interest rates that they have to pay because of their excess liquidity.¹² In general, policy-rate cuts have ambiguous effects on bank profitability, since they reduce intermediation margins by flattening the yield curve and lowering term and risk premia, while at the same time they stimulate aggregate demand, improve the creditworthiness of borrowers and lower provisioning needs. But once policy rates turn very negative, banks may find increasingly difficult to support their profitability through commissions and fees, since their cheaper wholesale funding may become insufficient to offset the impossibility to lower their deposit rates much below zero (IMF, 2017).

It was noticed (Loneragan and Greene, 2020) that the combination of TTERR and targeted lending at interest rate below the DF rate (the interest rate applied on all TLTRO III operations is currently 50 basis points below the DF rate) imply that the ECB can set lending rates independently from deposit rates, thus allowing it to simultaneously raise (or lower) the income of both borrowers and lenders. Loneragan and Greene (2020) rightly emphasize that this is a very important departure from conventional monetary policy that typically leaves the net interest income of the private sector unchanged and works only either through inter-temporal substitution of consumption (a price effect) or through the differential marginal propensities to consume for borrowers and lenders. Hence, this unconventional monetary policy is quasi-fiscal in its implications, as it becomes apparent by considering that the Eurosystem's foregone profits due to its implementation translate into foregone revenues for the euro area governments.

¹² Before the introduction of the TTERR, the annual gross cost of the excess liquidity for euro area banks (at the DFR of -0.40%) was estimated to be around EUR 7.5bn, which has to be compared to the annual profits for the banking sector as a whole that in 2017 was approximately EUR 100bn, with some small countries – such as Finland and Luxembourg – bearing a much larger share of the excess reserves relative to the size of their economies (von Gerich and Størup Nielsen, 2019).

4. LOOKING AHEAD: FORWARD GUIDANCE IN THE EURO AREA

In this final Section we wish to address the issue of "normalisation" of monetary policy from the specific point of view of different instruments for different channels developed in our paper. In this perspective, a central bank should ideally be able, and willing, to communicate to the public the observable conditions under which the various extraordinary programmes and tools will be (gradually) turned off. This is, indeed, the basic principle behind FG, the role of which among the ECB instruments has been introduced in Section 2 (Lane, 2020a). However, the implementation of this principle, in the complex multi-task scenario describe above, is fraught with difficulties.

Although the possibility of lending to commercial banks at rates below the rates at which the central bank remunerates their reserves pushes the effective lower bound (ELB) to the central bank's policy rates further into negative territory, the ECB—as other central banks—is still **using FG to amplify the expansionary effects** of its policy in an environment where short-term interest rates are close to their ELB. As mentioned above, the capacity of central banks to lower real expected interest rates by convincing market participants about their determination to keep future policy rates low enough, and for a period sufficiently long, so as to raise the inflation rate close to their targets, is limited by people's (including professional forecasters') bounded rationality and myopia (Levin and Sinha, 2020; Gabaix, 2020). However, one could argue that the **ECB has more difficulty than other central banks** to raise market inflationary expectations close to its target because of its peculiar policy framework.

Before discussing what is at the origin of this difficulty, one can observe that after that in July 2013 the ECB began using FG, the euro area annual inflation has systematically undershot the target ("below, but close to, 2 percent"). Since the COVID-19 pandemic hit Europe, the members of the Executive Board have reiterated the ECB commitment to **preserve favourable financing conditions well into the future**, in order to counter the negative pandemic shock to the inflation process and secure convergence towards the inflation aim over the medium term (e.g. Lane, 2020b; Panetta, 2020; Lagarde, 2021). Hence, the ECB's FG is currently linking the expectations on the future policy rates to the projected path of inflation, which the ECB itself provides to the public: the baseline scenario of the December 2020 Eurosystem staff macroeconomic projections foresees annual inflation at 0.2% in 2020, 1.0% in 2021, 1.1% in 2022 and 1.4% in 2023 (even the Eurosystem staff's most optimistic scenario foresees annual inflation quite below 2% over the medium run: at 1.1% in 2021, 1.3% in 2022 and 1.5% in 2023).

Some lessons from the recent literature about the effectiveness of FG can be relevant for the euro area. This literature emphasized that, when the central bank informs the public that its future policy rate will be pegged for a certain period at—or close to—its ELB, households, firms and investors could interpret this FG as the central bank's commitment to keeping its policy rate anchored at its ELB over that lapse of time, or alternatively they could interpret it as the central bank's announcement of its most appropriate future policy rates conditional on its projection of the future path of inflation and output gap (Janson and Jia, 2020). **These interpretations can have opposite effects.** The former induces the public to believe that even if there will be an unexpected burst of inflation, or the recovery may arrive sooner or be stronger than predicted, the central bank will stick to its pegging, thus increasing their expectations of future inflation and output growth, with a boosting effect on current real demand and inflation. The latter induces the public to believe that the bank's policy will remain expansionary only so far as the inflation will stay well below the bank's target and the economy will stagnate, thus decreasing their expectations of future inflation and output growth, with a depressing effect on current real demand and inflation. In other words, if the central bank's FG is interpreted as providing insights about the bank's policies contingent on its predictions of the future economic trajectory, it could unintentionally reinforce the public's pessimism about the future economic outlook, which may lead

consumers, firms and investors to behave in the present in such a way that the economy remains depressed and their pessimism about the future will be validated. In contrast, interpreting the FG as a policy commitment not contingent on future events may clash with a problem of credibility, since it implies the central bank's promise to setting future policy rates at levels that could be lower than those optimal at a later date for achieving the bank's inflation target ("Odyssean" FG).¹³

Hence, it is not only people's bounded rationality which may prevent promises to keeping policy rates low in the future from having full effect on price setting, demand and output today (Gabaix, 2020), but also the people's perception that the **central bank's announced policy is time inconsistent** and that it could renege on its promise and raise its policy rates sooner than promised (Coenen et al., 2017). However, this is not necessarily the case whenever the central bank is concerned about its reputation and is aware that, if it were to renege on its promise of overheating the economy in the aftermath of a crisis, the public would not believe similar promises in the next crisis, thus causing larger declines in inflation and output (Nakata, 2018). Thus, **concern for maintaining its reputation** can provide the central bank with an incentive to keep the promise of not raising its policy rates immediately after the end of a crisis. Obviously, such promises make sense and are credible only if they are consistent with a mild and transitory overshoot of inflation above the central bank's target (Coenen et al., 2017).

It was noticed that the Federal Reserve is attempting to address the problem of time inconsistency outlined above by switching since August 2020 to a policy of "flexible average inflation targeting" (Janson and Jia, 2020), according to which—following periods of inflation running persistently below 2 percent—it is expected to promote inflation "moderately above 2 percent for some time" (so that inflation averages 2 percent over time). A similar explicit official statement by the ECB about the tolerance of transitory periods of inflation above the 2 percent threshold could help in a context of policy rates close to their ELB to lower the expected long-term real interest rates in the midst of the COVID-19 pandemic, thus sustaining consumption and investment in the euro area. This is even more important if one considers that nowadays a surge of inflation may not appear a likely event in the medium run, but—given the heightened uncertainty surrounding the post-pandemic economic outlook—it still remains a possibility.

¹³ According to the distinction between "Odyssean" and "Delphic" FG, an Odyssean FG implies that the central bank commits to stay the course, just as Odysseus resisted the sirens' calls by having himself bound to the mast of his ship, while with Delphic FG, the central bank only communicates its forecast, preserving the right to re-optimize its plan in every future period (hence, it need not follow the predicted path of interest rates should circumstances change) (Campbell et al., 2012; Coenen, 2017). According to Angeletos and Sastry (2018), the optimal Odyssean strategy should shift from instrument-based to target-based FG, that is, instead of focusing on future policy rates, FG communications should focus on the macroeconomic variables targeted by the central bank.

5. CONCLUSION

Throughout our review of different instruments for **different channels of the transmission of monetary policy**, we have shown how the ECB has sought to target and calibrate its interventions in an extremely complex situation where some transmission channels broke down and others need to be enhanced. We have also highlighted the necessity that due attention should be paid to the mutual consistency and overall efficacy of the various interventions.

While central banks care about the co-existence of different transmission channels of monetary policy at all times, as they need to take into account how their policy measures are mediated by and interact with financial intermediaries, investors, households, firms and fiscal authorities, it is worth noticing that **the design, the coordination and the (re-)calibration of the various policy instruments** adopted to tackle the post-pandemic challenges represent a fundamental issue for the ECB.

To start, the euro area authorities need to determine the most effective and efficient interventions given that the actual economic and financial environment in which they operate differs remarkably both from usual conditions and from the ideal representation of the economy in the sophisticated macroeconomic and financial models underpinning their quantitative analyses. In particular, the extreme events that hit the euro area in the last decade, together with numerous market failures and fundamental asymmetries across the jurisdictions, contributed to impair most channels of transmission.

This has forced the ECB to adopt, *de facto*, **a two-pronged contingent approach**. On the one hand, the ECB had to expand its policy toolbox with a view to targeting the transmission channels working better at each moment in time. On the other hand, it had to design new, aggressive measures capable of limiting, if not redressing, the problems impairing the monetary transmission along the various channels. This approach to policy has required a large dose of judgment, with the ECB designing and re-calibrating its measures in consideration of their actual impact, as well as of the reaction of the financial markets. To a certain extent, under the current exceptional circumstances, it has become very difficult to distinguish the measures directed to support the real economy, inflation and inflation expectations, on the one hand, from those necessary to preserve a smooth payment system and to alleviate the serious market segmentation across financial intermediaries and sovereigns, on the other hand. To achieve its price stability mandate over the medium term, in other words, the ECB had to intervene repeatedly to preserve the integrity of the transmission channels, before being able to use them to affect the euro area with its stimuli.

In this paper, in particular, we have shown that the interaction between negative official interest rates, abundant central bank liquidity, massive purchases of financial assets, two-tier reserve requirements and security lending facilities cannot be properly understood without considering the **remarkable segmentation in the money and bond markets** along the national borders and across intermediaries. Such segmentation has been one of the most distinctive factors impairing the smooth functioning of the transmission channels: the ECB could not simply choose to operate on those channels (if any) allowing to dodge such hurdles, but it had to intervene to tackle them. As we shall discuss below, this has required and will continue to demand the adoption of a contingent, realistic and experimental approach to policy.

The ECB has publicly addressed most of these issues, thereby contributing to the understanding of its decisions. Much of the research on these aspects has been done by the economists at the Bank and the members of the Executive Board have regularly communicated with the general public and market operators so as to ensure that the rationale behind their choices was well understood. As pointed out in the paper, however, there is a **potential tension in the communication of such a contingent**

approach. In particular, to be highly effective, forward guidance would require an unconditional commitment to perform an accommodative course of action in the future, whereas a contingent approach paying attention to the status of the transmission channels and to the evolution of inflation would require at most a conditional commitment to preserve accommodative conditions. We believe that, once the economic and financial conditions will start to normalise, this tension will become stronger and the ECB will have to make a choice.

Moreover, to be effective, a contingent approach that is sensitive to the status of the transmission channels requires much elasticity. Given the institutional framework characterising the euro area, this could be viewed as problematic by some, because this kind of operational flexibility requires the **exercise of judgement** about the nature of the distortionary forces marring the transmission. The policy debate characterising the sovereign debt crisis period has shown that the ECB measures can be questioned on a number of (more or less legitimate) political grounds. The severe market segmentation across jurisdictions observed during the sovereign debt crisis was fully addressed only when the authorities started making reference to the notion of non-fundamental volatility in the sovereign credit spreads, in turn connected with the concepts of multiple equilibria and self-fulfilling expectations. For the quantitative easing measures to be politically palatable, the ECB had first to convince its interlocutors that, given the economic and financial context, it could not operate without addressing this fundamental problem. It is possible that, when the economic and financial conditions will start to normalise, similar tensions about the legitimate policy space of the ECB will emerge again.

Let us conclude with a note more on normative grounds. The transmission channels work in interaction with markets: the money and interbank market, and financial markets more broadly. Concerns may arise that interaction becomes **interference with "market discipline"**, an allocation meaning the unfettered work of market forces determining the value and creditworthiness of assets and their issuers. Indeed, the red line between interaction and interference may be thin. Central banks should carefully ponder the nature and extent of their interventions, especially the ECB in compliance with its nature of monetary authority of a collection of sovereigns, and with its mandate that explicitly recommends respect for free market principles.

On the other hand, **the idea of an immaculate "neutral" monetary policy is a chimera** with potentially dangerous implications. Monetary policy is *policy*, that is decisions entrusted to a public agency pursuing goals of common interest that are supposed not be served by unfettered market forces. As explained above, it does matter for the transmission of monetary policy that financial markets are prone to wide deviations from perfection, to "indiscipline" rather than "discipline", which not only damage welfare but also the functionality of the instruments that are supposed to assist the monetary authority in accomplishing its duties.

These general considerations extend to the path ahead towards normalisation. If the ECB should communicate this path as clearly as possible, the idea of a simple end-of-alarm ring would be naïve and misleading. We are now in **unchartered waters** in which the economies withstand their weaknesses, "frictions" and "failures" thanks to the scaffolding erected by policy authorities. This may well remain as the "new normal" for quite a long time. Removing the scaffolding will not simply uncover the system in its original state. Something unexpected or unintended may emerge. Great care, prudence, and flexibility will be necessary.

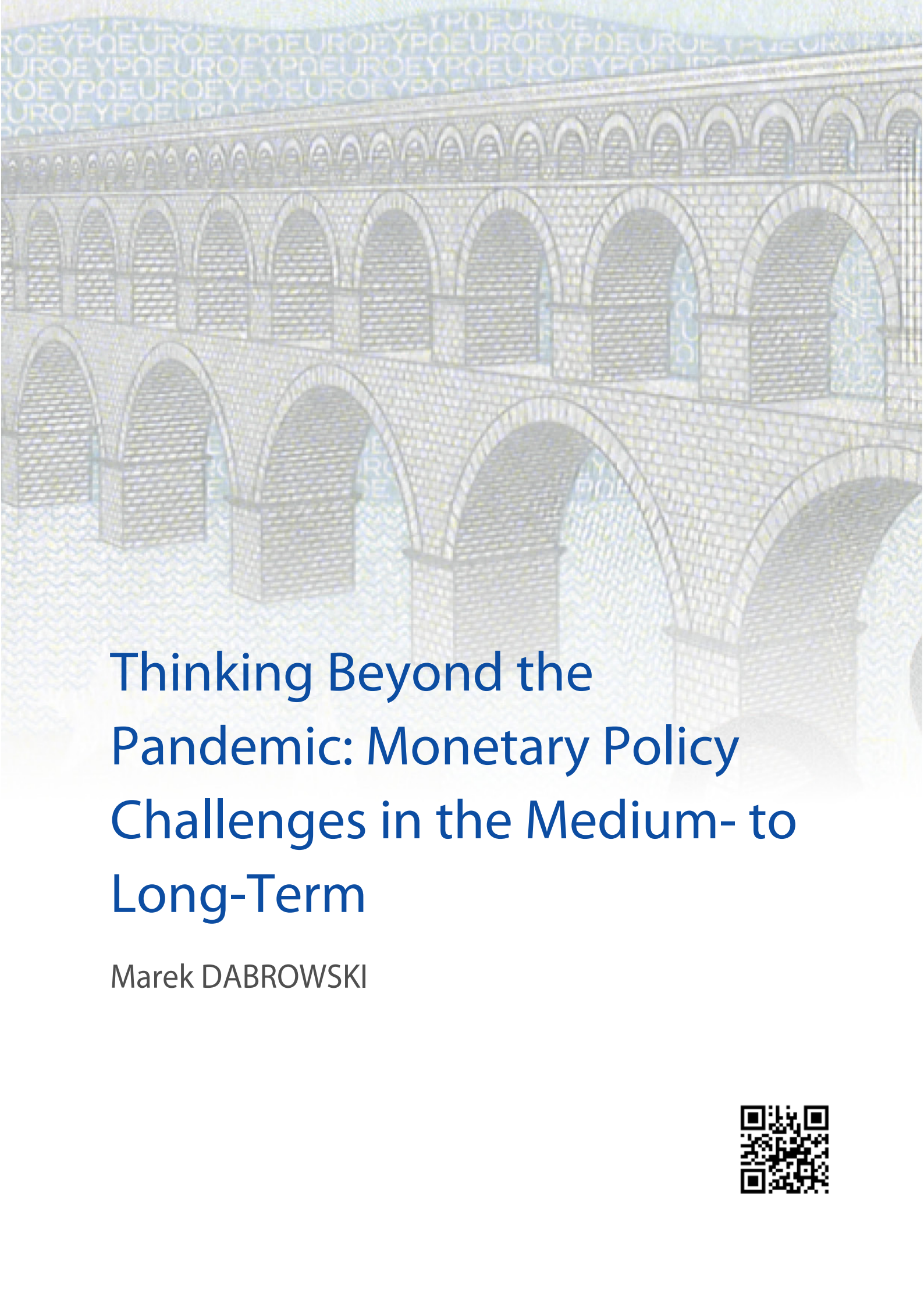
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Thinking Beyond the Pandemic: Monetary Policy Challenges in the Medium- to Long-Term

Marek DABROWSKI



Abstract

The economic characteristics of the COVID-19 crisis differ from those of previous crises. It is a combination of demand- and supply-side constraints which led to the formation of a monetary overhang that will be unfrozen once the pandemic ends. Monetary policy must take this effect into consideration, along with other pro-inflationary factors, in the post-pandemic era. It must also think in advance about how to avoid a policy trap coming from fiscal dominance.

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LIST OF ABBREVIATIONS

ABSPP	Asset-backed securities purchase programme
AEs	Advanced economies
APP	Asset purchase programme
BoJ	Bank of Japan
CARES	Coronavirus Aid, Relief, and Economic Security (Act)
CB	Central bank
CBPP3	Third covered bond purchase programme,
CDSs	Collateral default swaps
COVID-19	Coronavirus Disease 2019
CPI	Consumer Price Index
CSPP	Corporate sector purchase programme
DFR	Deposit facility rate
EA	Euro area
ECB	European Central Bank
EM	Emerging market
ETFs	Exchange-traded funds (in Japan)
EU	European Union
EUR	Euro
Fed	Federal Reserve Board (of the United States)
FFR	Federal Fund Rate
FOMC	Federal Open Market Committee
GDP	Gross domestic product
GFC	Global financial crisis

HICP	Harmonised index of consumer prices
IMF	International Monetary Fund
JPY	Japanese yen
J-REITS	Japanese real estate investment trusts
MLFR	Marginal lending facility rate
MM	Money multiplier
MRO	Main refinancing operations (rate)
NFCs	Non-financial corporations
PSPP	Public Sector Purchase Programme, ,
PSBR	Public sector borrowing requirement
PELTRO	Pandemic Emergency Longer-Term Refinancing Operations
PEPP	Pandemic Emergency Purchase Programme
QE	Quantitative easing
TLTRO	Targeted Longer-Term Refinancing Operations
UPMs	Unconventional policy measures
USD	United States dollar
VAT	Value Added Tax

EXECUTIVE SUMMARY

- In February 2021, one year after the outbreak of the COVID-19 pandemic, **it is hard to see its quick end**, despite the development of vaccines and the beginning of a mass vaccination programme. Fighting the pandemic may take longer and cost more (in terms of number of deaths; GDP; and fiscal, job, and personal income losses, among others) than originally expected. Worse, the **knowledge on the ways and speed of the spread of coronavirus remains limited**, which forces governments to rely on **trial and error** in adopting containment measures. Obviously, this increases economic **uncertainty**.
- **The economic characteristics of the COVID-19 crisis differ from the global financial crisis of 2007-2009** and other past financial crises and business cycle downturns. It is a combination of demand- and supply-side shocks that led to the formation of **forced saving** and **monetary overhang**. Despite this difference, governments and central banks reacted with a massive fiscal and monetary relaxation (as they did in 2007-2009), which was costly and not sufficiently targeted.
- **The intensification of asset purchasing programmes was the main policy tool that could be used by central banks to further ease their monetary policies.** However, they only partly achieved their declared goal, that is, increasing the liquidity of economic agents. Part of the additional monetary base returned to central banks in the form of voluntary deposits from commercial banks, repeating the experience of quantitative easing in the 2010s. This confirms that asset purchasing programmes are an imperfect monetary policy tool that weakens financial intermediation and impairs the monetary policy transmission mechanism.
- **Quantitative easing also increases the stock of government securities in central bank books (*de facto* debt monetisation), leading to fiscal dominance and narrowing the room for manoeuvre of monetary policy when the latter needs to be tightened.** Eventually, this may compromise central bank independence and make them tolerant of higher inflation.
- **Monetary tightening may become necessary once the pandemic ends and the accumulated monetary overhang is unfrozen.** Higher inflationary pressures can also be generated by other factors such as overshooting stimulus packages, supply bottlenecks, the expiring deflationary impact of tighter financial regulations, demographic changes, deglobalisation, and the deterioration of fiscal balances.
- **Governments and central banks should think ahead about how to avoid a policy trap caused by rapidly growing public debt and its *de facto* monetary financing, especially in the context of the potential return of inflationary pressures.** They should carefully balance the short-term needs of fighting the pandemic and its adverse socio-economic consequences and the long-term constraints and challenges.

1. INTRODUCTION

In the first quarter of 2020, the COVID-19 pandemic hit the entire world economy in an unexpected way. A year later (February 2021), it is hard to see its quick end, despite having developed vaccines and begun a mass vaccination programme in several advanced economies (AEs).

Most governments responded to the outbreak of the pandemic with strict lockdown measures to protect peoples' lives and to limit the contagion effect. Clearly, the pandemic itself and the accompanying lockdown measures heavily damaged economic activity. Governments had to offer financial relief both to suffering businesses and the population at large. Together with the costs of fighting pandemics, foregone revenue (the effect of the pandemic-related recession) and attempts to boost aggregate demand, it has led to a huge expansion of both fiscal deficit and public debt.

Major central banks (CBs), on their own, responded to the crisis with a new round of monetary relaxation. In fact, it had already started in 2019, well before the pandemic. The pandemic only accelerated and magnified an easing response. Because CB interest rates remained either low (the Federal Reserve Board of the United States, henceforth the Fed), zero, or even negative (the European Central Bank [ECB] and the Bank of Japan [BoJ]), monetary relaxation has had to rely largely on asset purchasing programmes (APPs), popularly called quantitative easing (QE). Its declared intention has been to provide additional liquidity to pandemic-stressed businesses and consumers and meet the declared annual inflation target of 2 or close to 2%, depending on the currency area. A less declared or undeclared policy goal, especially in the case of the ECB, has been to help governments to finance their fresh deficits and rollover the existing stocks of public debt, in some cases a challenging task long before the pandemic (think about Japan and some euro area countries).

What could be seen as a relatively short-term distress in the early 2020s now looks like a longer crisis episode. While the strict lockdown measures were relaxed in most countries of the Northern Hemisphere at the end of the second and beginning of the third quarter of 2020, the next waves of the pandemic created the necessity to reintroduce them, although in a more selective and targeted way. Due to difficulties in predicting the length of the pandemic and its probable end date, economic decisions on both the macro and micro levels are burdened with a high degree of uncertainty.

Against this background, CBs continue their expansionary monetary policies by extending the period of unconventional policy measures (UPMs) and expanding the size of APPs. For example, on 10 December 2020, the ECB Governing Council approved a package of decisions extending their anti-crisis measures taken in 2020 for most of 2021 (ECB, 2020). The huge increase of CB balance sheets is one of major results of these expansionary policies. It may lead to an inflationary pressure in the post-pandemic period (once the lockdown measures end) even if the current consumer price inflation (CPI) remains very low, as in the case of the euro area. There are also other risks associated with the continuation of extra-loose monetary policies, such as building asset bubbles, the engagement of financial institutions in less prudent transactions, distorting a financial sector business model, increasing income and wealth inequalities, and others.

In the current circumstances, CBs do not seem to put sufficient attention to these side effects and remain rather unprepared to respond to the risk of inflationary pressure quickly enough. Furthermore, their *de facto* increasing engagement in public debt financing (even if carried out via secondary market purchases with only monetary policy considerations in mind) can make them hostages of quickly expanding fiscal imbalances. In such circumstances, shrinking their balance sheets can be politically difficult.

The purpose of this briefing paper is twofold: (i) to assess the anti-crisis monetary policy measures taken by the ECB in 2019-2020, including their last package of December 2020, and (ii) to look beyond an immediate COVID-19-related policy horizon by analysing monetary policy challenges in the medium- to long-term.

Our working hypothesis is that the anti-crisis measures of the ECB and other major CBs are only partly effective in achieving the declared goals. On the other hand, they may produce various unintended negative side effects – in particular, the increasing monetary policy dependence on fiscal imbalances and rapidly growing public debt. This may compromise both the independence of CBs as well as their ability to effectively resist post-pandemic inflationary pressures.

The structure of the paper is subordinated to its declared analytical purpose. Chapter 2 deals with the economic characteristics of the COVID-19 pandemic and its impact on the effectiveness of the monetary policy response measures undertaken. In Chapter 3, we analyse the monetary policy decisions of the ECB (and other major CBs for comparison) and their effectiveness in achieving the declared policy goals in the short term. Chapter 4 is devoted to an analysis of the policy challenges which may be faced by the ECB and other major CBs once the pandemic emergency comes to its end. Chapter 5 contains a summary and the conclusions of our analysis.

In our analysis, we use the data sources of the International Monetary Fund (IMF), Eurostat, the ECB, the Fed, Worldometer, Our World in Data, and those collected by other researchers.

2. THE ECONOMIC CHARACTERISTICS OF THE COVID-19 PANDEMIC

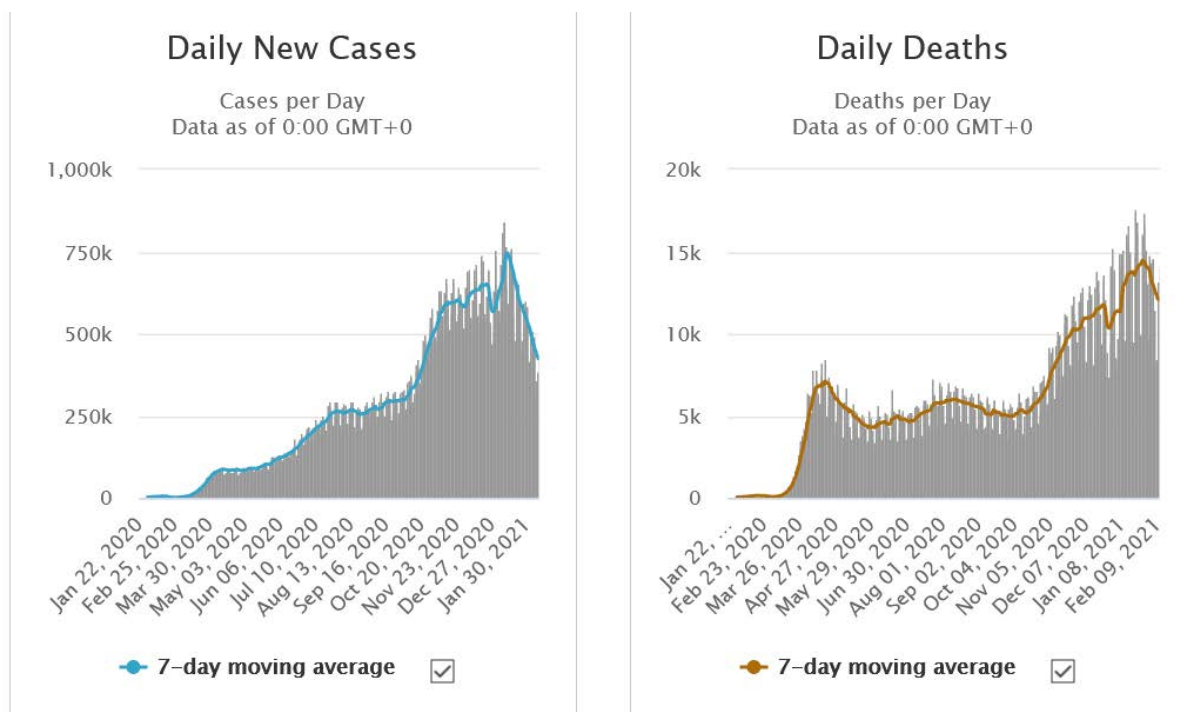
In this chapter, we analyse the dynamics of the COVID-19 pandemic and its prospects (Section 2.1); the state of knowledge on the pandemic, its management, and its economic repercussions (Section 2.2); the nature of the economic crisis caused by the pandemic and how it differs from previous crises, in particular, the global financial crisis (GFC) of 2007-2009 (Section 2.3); and its implications for monetary and fiscal policies (Section 2.4).

2.1. The dynamics of the COVID-19 pandemic and its prospects

To understand the economic impact of the pandemic in the short and medium- to long-term, we must first analyse its actual and future dynamics.

The first cases of the new COVID-19 infection were registered in the Chinese city of Wuhan in December 2019. In late February and early March 2020, it spread to Europe and the United States. A year later, at the time of writing this paper (February 2021), the figures for daily new cases and deaths worldwide (Figure 1) remain high. The figures were increasing rapidly until January 2021. As of 11 February 2021, the total number of identified COVID-19 cases exceeded 108 million and total number of COVID-19-related deaths – 2.3 million¹.

Figure 1: COVID-19 pandemic: daily new cases (left panel) and daily deaths (right panel) in the world, in thousands, 2020-2021



Source: Worldometers, <https://www.worldometers.info/coronavirus/>.

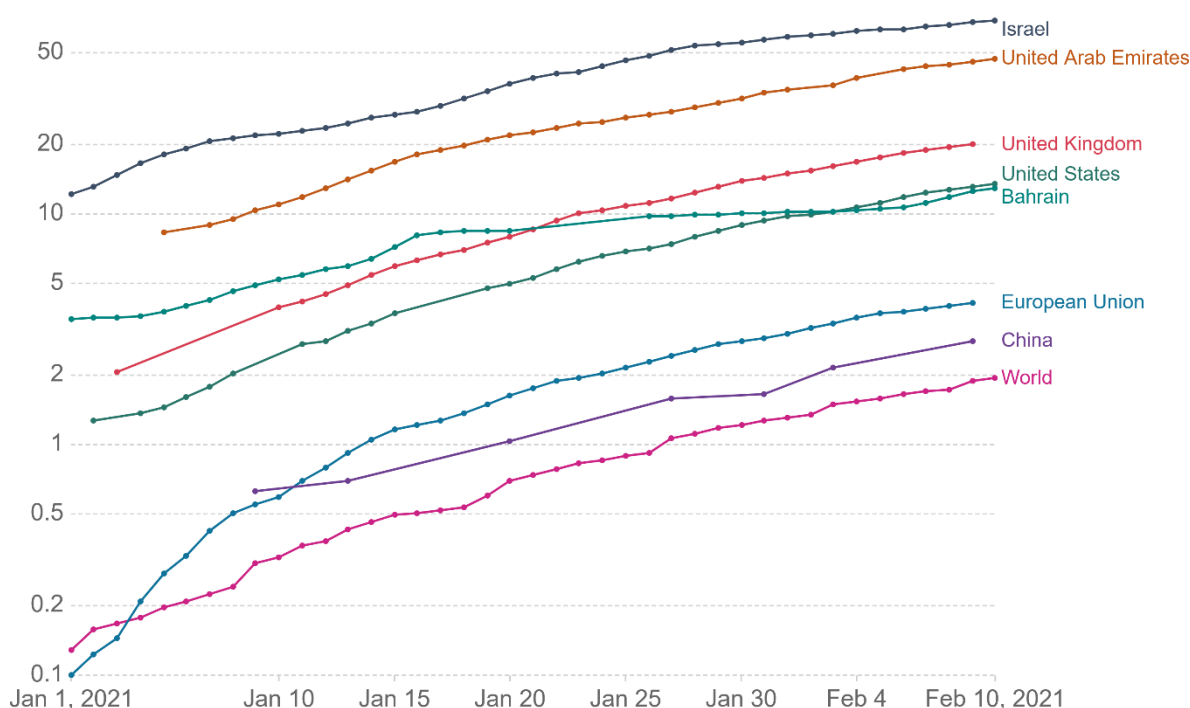
¹ See Worldometers, Coronavirus cases, <https://www.worldometers.info/coronavirus/>.

Predicting the pandemic's dynamic towards the end of 2021 is a risky and highly speculative task, especially given the new mutations of COVID-19 (the so-called British, South African, Brazilian, and Californian ones – see Lancet COVID-19 Commission, 2021), which were identified at the end of 2020 and in early 2021. In such a situation, one cannot rule out new waves of high-intensity infections in 2021 and perhaps beyond.

Throughout 2020, the availability of a vaccine was seen as the potential turning point in fighting coronavirus. When several vaccines became available at the end 2020, it turned out that their production and distribution, as well as the vaccination process itself, would take a few years to cover the entire world population. According to the EIU (2021) forecast, only the EU, the United States, and a few smaller countries (Israel, United Arab Emirates, Bahrain, Singapore, Hong Kong, and Taiwan) have the chance to complete mass vaccination towards the end of 2021. In other regions of the world, vaccination will take more time, until 2023 and beyond (most of Africa). In such a situation, thinking about achieving herd immunity against COVID-19 is unrealistic (Dadush, 2021; Krueger, 2021), especially when the coronavirus is mutating.

The available statistics confirm that the vaccination campaign is rolling out slowly, except from a few small countries (Israel, United Arab Emirates, and Bahrain) and the United Kingdom (which outperforms both the United States and the EU) – see Figure 2.

Figure 2: Cumulative COVID-19 vaccination doses administered per 100 people (logarithmic scale), 01.01.2021 – 11.02.2021



Note: Counted as the number of single doses, which may not be equal to the vaccinated individuals.

Source: Our World in Data, Coronavirus vaccinations, <https://ourworldindata.org/covid-vaccinations>.

The above overview suggests that the pandemic may not end quickly, and the world economy may have to operate in extraordinary circumstances for a longer period of time.

2.2. The limited state of knowledge on the COVID-19 pandemic, its impact on pandemic management, and economic activity

Despite more than a year of experience in fighting the pandemic, the state of knowledge on its actual size, geographical spread, mechanisms of transmission, and effective containment measures remains limited. In this section, we concentrate on those aspects of anti-pandemic management which have an explicit economic impact, leaving aside purely medical and public health problems.

The uncertainty starts with the actual number of infections and even the number of COVID-19-related fatalities. The reason for this is related not only to the imperfections of reporting systems in individual countries but also to difficulties in accurately diagnosing cases without a broad-based testing system, which is present in only a few countries. There is also a large number of asymptomatic cases, especially in younger cohorts of the population, which are difficult to identify even with the help of broad-based testing systems. Therefore, one can speculate that the actual number of infections is a few times larger than what is officially recorded.

An even more limited knowledge concerns the exact channels of disease contagion. While it was clear from the very beginning that keeping physical distance between people, limiting direct person-to-person contact, and using face masks can slow down the proliferation of the pandemic, these actions had to be translated into concrete protection measures aimed at prohibiting or limiting various types of activities. In choosing concrete containment measures, knowledge on the factors facilitating the spread of coronavirus (for example, indoor versus outdoor activities, weather conditions, the seasonality of infections, and the role of schools, among others) plays a decisive role. However, such knowledge is either lacking or very limited and uncertain. Furthermore, there are difficulties explaining cross-country differences in the number of infections and deaths, which could help understand the factors responsible for the contagion and evaluate the effectiveness of various anti-pandemic strategies.

The limited state of knowledge determines the policy responses to the crisis, which are based, in most cases, on trial and error. This approach is reflected in the stop-go policy carried out in most countries.

The policy response began with far-reaching and rather untargeted containment measures in most of Europe and the United States² at the end of the first quarter and beginning of the second quarter of 2020 with the hope that they would stop the spread of coronavirus and stop the pandemic in a relatively short period of time. When the huge economic costs of mass lockdowns became evident (GDP decline was positively correlated with stringency of containment measures – see IMF, 2020; Marcus et al., 2021) and the first wave of pandemic seemed to be over in several AEs (but not globally as seen in Figure 1), governments began relaxing the lockdown measures at the end of the second and in the third quarter of 2020. Economic activity started to recover at a quite rapid pace in the third quarter of 2020 (IMF, 2021a).

However, the return of the pandemic in the autumn of 2020 forced most governments to reintroduce lockdown measures, although in a more targeted way than in the spring of 2020. Since then, and until the time of writing this paper, the stringency of anti-pandemic measures fluctuates in most of AEs (see Hale et al., 2020) depending on the most recent infection and death statistics, pressure from sectoral lobbies, and the political controversies around anti-pandemic policies. One can say it is driven by

² In some East Asian countries (Japan, Taiwan, South Korea, Hong Kong, and Singapore) that had earlier experience with the SARS epidemic, authorities managed to launch a system of mass testing and tracking infection chains with the use of IT technologies early on, avoiding more severe lockdown measures (Stancati and Yoon, 2020).

attempting to balance socio-economic considerations and the capacity of national healthcare systems to deal with the pandemic (Dabrowski, 2020).

While in the first half of 2020 most countries enjoyed broad social and political consensus on the necessity to take tough containment measures, support began to wane at the end of 2020 and in early 2021 when the social and economic costs of the pandemic and lockdown continued to increase and doubts with respect to the effectiveness of concrete anti-pandemic policies and measures intensified. It was seen, among others, in the course of the US presidential election campaign and in the series of anti-lockdown protests held in various countries. The most recent cases (mid-February) of political controversy on anti-pandemic measures include tension in the newly formed government of Italy (Amante, 2021) and the failure of the Czech parliament to prolong the state of emergency to fight the pandemic (Euronews, 2021).

The limited state of pandemic-related knowledge additionally increases the already high degree of uncertainty in respect of the short- and medium-term economic prospects and the unpredictability of government decisions. Uncertainty and unpredictability dampen both private consumption (beyond basic necessities) and even more – investment.

2.3. Characteristics of the COVID-19 economic crisis

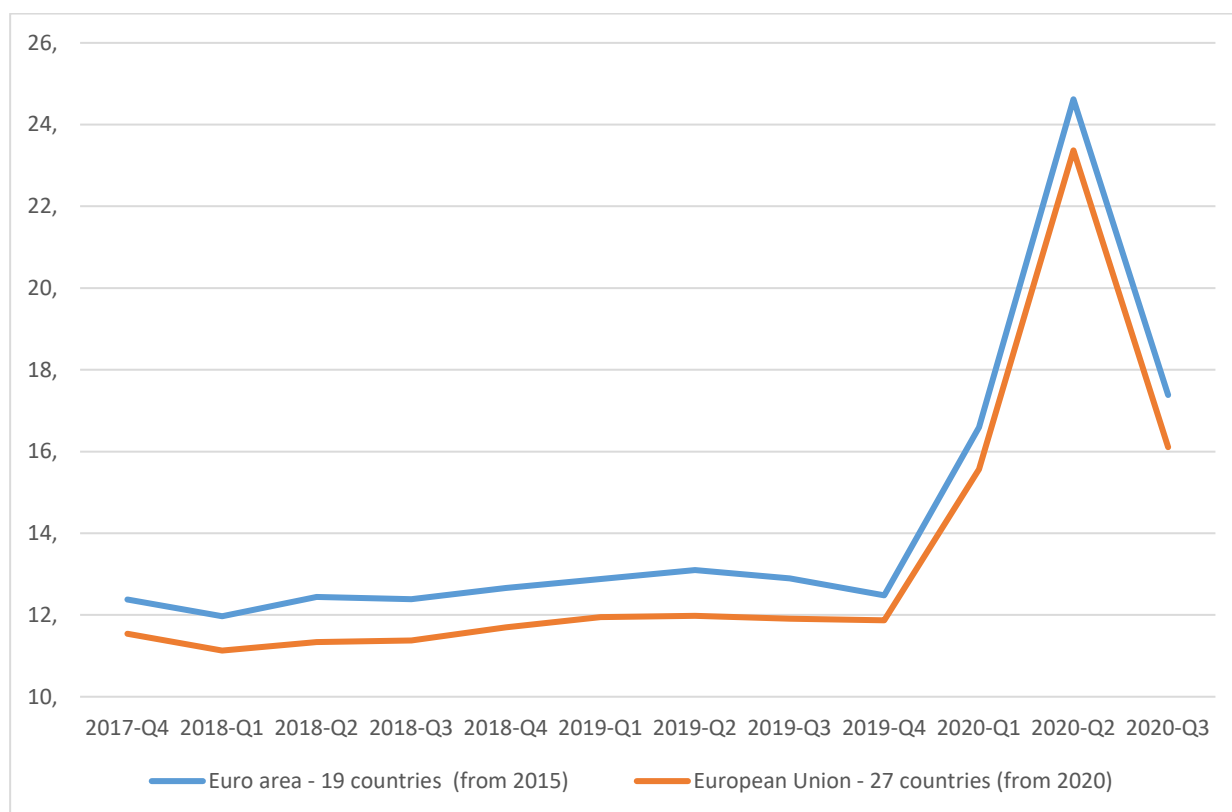
The economic characteristics of the COVID-19 crisis are very different from the GFC of 2007-2009 and other past financial crises or business-cycle downturns. The GFC caused a disruption in financial intermediation, which, by its nature, had a deflationary character. There were also other deflationary factors in play such as new, more stringent financial regulations, the effects of globalisation, and others (Dabrowski, 2019).

The current crisis is a combination of demand-side and supply-side shocks. They result not only from depressed aggregate demand caused by the self-restrained behaviour of both consumers and investors but also from administrative lockdown measures such as the prohibition of certain types of activities, restrictions on the movement of people, or closed borders and the resulting disruption of supply chains. In such circumstances, private spending decreases and private saving increases (Figure 3), but these are forced (involuntary) savings.

One can make a historical analogy to centrally-planned economies where people and enterprises could not spend their money balances on the goods and services they wanted to buy because they were not available on the market (as a result of administrative price controls and the administrative distribution of goods and services) – the phenomenon of a shortage economy as described by Kornai (1980). This led to forced saving (flow) and monetary overhang (stock), which represented a repressed inflation (Cottarelli and Blejer, 1991).

Apart from temporarily frozen demand- and supply-side disruptions, the COVID-19 crisis, especially if prolonged, can lead to substantial structural changes such as the expansion of e-commerce and various e-services (including e-government ones), telework, teleconferencing, online education, and the contraction of business travel, traditional retailing, and, therefore, demand for office and commercial space. At the moment, it is difficult to predict which parts of the observed structural changes have a temporary character and will disappear after the pandemic and which have an irreversible character.

Figure 3: Gross household saving rate, in % of GDP, 2017-2020



Source: Marcus et al., 2021.

The right diagnosis of the ongoing structural changes is important not only for structural and institutional policies – for example, the respective adaptation of labour market regulations – but also for monetary and fiscal policies. First, they should facilitate such changes rather than conserving the existing supply side structure, which might mean support for “zombie” firms and industries. If one assumes far-reaching structural changes, estimating the output gap may become more complicated (i.e., due to the mismatch between the new demand structure and the old supply capacities).

2.4. Crisis implications for monetary and fiscal policies

The very nature of the GFC (see Section 2.3) required a bold monetary policy response to avoid a deflationary spiral of the kind observed during the Great Depression of 1929-1933. And because interest rates in major currency areas quickly hit the zero bound, CBs had to resort to UPMs, including large-scale APPs. While expansionary monetary policies achieved their strategic goal (deflation was avoided), the process of withdrawal from UPMs in the second half of the 2010s either went slow (the United States) or did not start at all (the euro area and Japan). The continuous fear of deflation and attempts to push inflation up to the declared 2% – or below but close to 2% – target were major reasons of this failure (Dabrowski, 2019).

As a result, CBs in major currency areas met the new COVID-19-related challenges with interest rates close to zero (the ECB and BoJ) or moderately positive (the Fed). Therefore, monetary relaxation required resorting to UPMs, mainly APPs.

There is also a more fundamental question on which kind of monetary policy response has been required, given the specific character of the COVID-19 crisis analysed in Section 2.3, which is quite different from both the GFC and standard business cycle downturns. Indeed, the surprise outbreak of

the pandemic and the far-reaching lockdown measures in the first half of 2020 caused a negative aggregate demand shock in parallel with a supply-side disruption. The increase in gross household saving (Figure 3) confirms the correctness of this diagnosis. CBs might also fear a potential disruption in financial intermediation as happened during the GFC, so providing additional liquidity seemed to be the right decision. However, once lockdown measures were relaxed in the third quarter of 2020 and then continued in a more selective way, the rationale behind the continued monetary expansion requires a closer analytical scrutiny. And this will be done in Chapter 3 of this paper.

Given the nature of the COVID-19 crisis, the main macroeconomic policy response should come from a fiscal policy side. Governments are confronted with the necessity to:

- finance the direct costs of fighting the pandemic (mostly related to public health measures);
- provide financial compensation to people and businesses directly affected by the economic consequences of the administrative lockdown measures; and
- accommodate for revenue losses and additional social spending resulting from the crisis-related recession (automatic fiscal stabilisers).

This is the minimum agenda of a fiscal response. On top of this, several governments developed various fiscal stimulus packages aimed at boosting aggregate demand or stimulating public investment programmes (Skidelsky, 2021). The design of these packages differs between countries (IMF, 2021b).

The basic constraint comes from the limited fiscal space in most AEs (Table 1). Their fiscal positions substantially deteriorated during the GFC and immediately after (Dabrowski, 2012) and only a few of them (Germany is the most prominent example) managed to use the post-GFC period to rebuild fiscal buffers.

Against the limited fiscal space, governments should use fiscal support measures wisely and carefully. In particular, they should assess whether they have enough fiscal space for a large-scale fiscal stimulus aimed to boost aggregate demand, if they can expect fiscal multipliers to be above one (only in such a situation can the stimulus be self-financing), and what will be the optimal timing of its launching (before the end of the pandemic when demand and supply constraints remain in force or after the termination of containment measures).

Table 1: Euro area, Japan, and the United States: general government gross debt, % of GDP, 2007-2019

Country	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Euro area	65.9	69.6	80.2	85.8	87.7	90.7	92.6	92.8	90.9	90.0	87.6	85.7	84.0
Austria	64.7	68.4	79.6	82.4	82.2	81.7	81.0	83.8	84.4	82.6	78.4	74.0	70.3
Belgium	87.3	93.2	100.2	100.3	103.5	104.8	105.5	107.0	105.2	104.9	101.8	99.9	98.7
Cyprus	53.2	44.1	52.8	55.5	65.0	79.4	102.9	109.2	107.5	103.4	93.9	100.6	95.5
Estonia	3.8	4.5	7.2	6.6	6.1	9.8	10.2	10.4	9.8	9.1	9.1	8.3	8.4
Finland	33.9	32.6	41.5	46.9	48.3	53.6	56.2	59.8	63.6	63.2	61.3	59.6	59.0
France	64.5	68.8	83.0	85.3	87.8	90.6	93.4	94.9	95.6	98.0	98.3	98.1	98.1
Germany	64.0	65.5	73.0	82.4	79.8	81.1	78.7	75.7	72.2	69.2	65.0	61.6	59.5
Greece	103.1	109.4	126.7	146.3	180.6	159.6	177.9	180.2	177.8	181.1	179.3	184.8	180.9
Ireland	23.9	42.4	61.7	86.0	111.1	120.0	120.1	104.3	76.7	74.2	67.4	62.9	57.3
Italy	103.9	106.2	116.6	119.2	119.7	126.5	132.5	135.4	135.3	134.8	134.1	134.8	134.8
Latvia	8.1	18.0	35.8	46.8	43.3	41.9	39.4	40.9	36.7	40.2	40.3	36.5	36.8
Lithuania	15.9	14.6	28.0	36.3	37.2	39.8	38.7	40.6	42.7	39.9	39.3	34.1	37.7
Luxembourg	8.2	15.4	16.1	20.2	19.0	22.0	23.7	22.7	22.0	20.1	22.3	21.0	22.1
Malta	61.9	61.8	66.3	65.3	69.3	65.9	65.8	61.6	55.9	54.5	48.8	45.2	42.6
Netherlands	42.0	53.8	55.8	59.4	61.8	66.4	67.8	68.0	64.6	61.9	56.9	52.4	48.4
Portugal	72.7	75.6	87.8	100.2	114.4	129.0	131.4	132.9	131.2	131.5	126.1	122.0	117.7

Country	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Slovakia	30.3	28.6	36.4	41.0	43.5	51.8	54.7	53.5	51.9	52.0	51.3	49.5	48.0
Slovenia	22.8	21.8	34.5	38.3	46.5	53.6	70.0	80.3	82.6	78.7	74.1	70.4	66.1
Spain	35.8	39.7	53.3	60.5	69.9	86.3	95.8	100.7	99.3	99.2	98.6	97.6	95.5
Japan	175.3	183.3	200.9	207.7	221.9	228.7	232.2	235.8	231.3	236.4	234.5	236.6	238.0
US	64.7	73.7	86.8	95.5	99.8	103.3	104.9	104.5	104.6	106.6	105.7	106.9	108.7

Source: IMF, World Economic Outlook database, October 2020.

Further deterioration of the fiscal situation (higher deficits and the rapid increase of public debt) also raises the expectation that monetary policy will provide a rescue by keeping interest rates low for a long period of time and by partial debt monetisation if necessary (Buiter, 2021). This creates the risk of compromising CB independence and the price stability goal of monetary policy. We will return to this question in Chapters 3 and 4.

3. MONETARY POLICY DECISIONS 2019-2021 AND THEIR SHORT-TERM IMPACT

Having characterised the economic impact of the pandemic (Chapter 2), we turn now to the monetary policy decisions of the ECB and other major CBs in the period of 2019-2021 – that is, immediately before the pandemic and after its outbreak. We also analyse their monetary and non-monetary effects in a short-term perspective. We start with the presentation of the monetary policy decisions of the ECB (Section 3.1), followed by an overview of the Fed and BoJ decisions (Section 3.2). The subsequent sections are devoted to the impact of these decisions on CB balance sheets and money supply (Section 3.3), monetary transmission mechanisms (Section 3.4), monetary conditions outside major currency areas (Section 3.5), CPI inflation and changes in asset prices (Section 3.6), and a monetary-fiscal nexus (Section 3.7).

3.1. Monetary policy decisions of the ECB

The ECB was the last among major CBs to launch a large-scale APP (Dabrowski, 2019). It happened only in March 2015, that is, when the Fed had already started to unwind its QE programmes. The ECB continued them until December 2018, although at a slower pace in 2018 (Figure 4). After a 10-month break, it returned to active net asset purchases in November 2019³. It was motivated, among others, by problems with pushing inflation up to the declared level of below, but close to, 2% over the medium term (Draghi, 2019). In our opinion (Dabrowski, 2019), it was a serious misconception because inflation between 0-2% involves no major policy risk (see Frankel, 2019; Gros, 2019; Leidy and Tokarick, 1998).

After the outbreak of the COVID-19 pandemic, the ECB intensified and eased the conditions of its APPs⁴ and targeted longer-term refinancing operations (TLTRO III)⁵. On the top of this, in March and April 2020, it launched new programmes – the pandemic emergency purchase programme (PEPP)⁶ and the pandemic emergency longer-term refinancing operations (PELTRO)⁷. The novelty of both programmes as compared to the APPs and TLTRO III consisted of their size, greater flexibility (PEPP), and more beneficial terms of lending (PELTRO).

As seen in Figure 4, the average size of total net asset purchases under the APPs throughout 2020 was substantially lower than in 2015-2017, with the peak recorded in March 2020. Figure 5 shows that total bimonthly net asset purchases under the PEPP represented a declining trend.

³ See ECB: asset purchase programmes <https://www.ecb.europa.eu/mopo/implement/omt/html/index.en.html>.

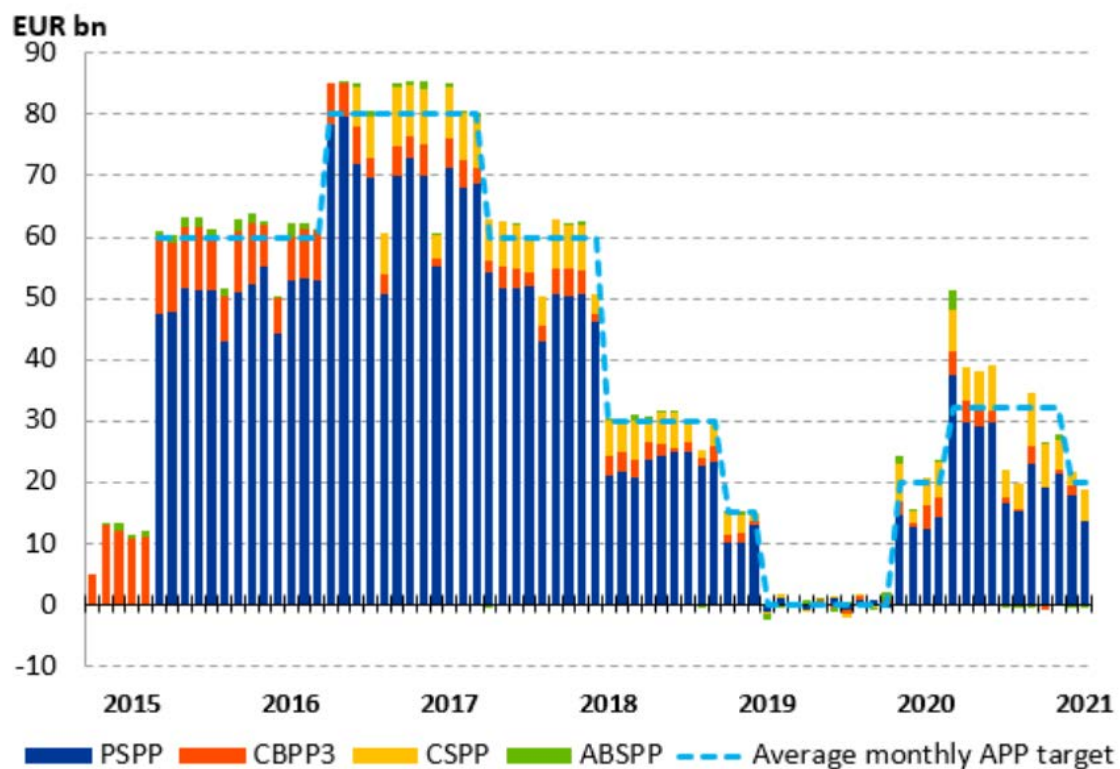
⁴ See ECB: Governing Council Meeting of 11-12 March 2020 <https://www.ecb.europa.eu/press/accounts/2020/html/ecb.mg200409~0026941ce4.en.html>.

⁵ See ECB press release, 12 March 2020: “ECB announces easing of conditions for targeted longer-term refinancing operations (TLTRO III)”, https://www.ecb.europa.eu/press/pr/date/2020/html/ecb.pr200312_1~39db50b717.en.html.

⁶ See ECB: Pandemic emergency purchase programme (PEPP) <https://www.ecb.europa.eu/mopo/implement/pepp/html/index.en.html>.

⁷ See ECB press release, 20 April 2020: “ECB announces new pandemic emergency longer-term refinancing operations” https://www.ecb.europa.eu/press/pr/date/2020/html/ecb.pr200430_1~477f400e39.en.html.

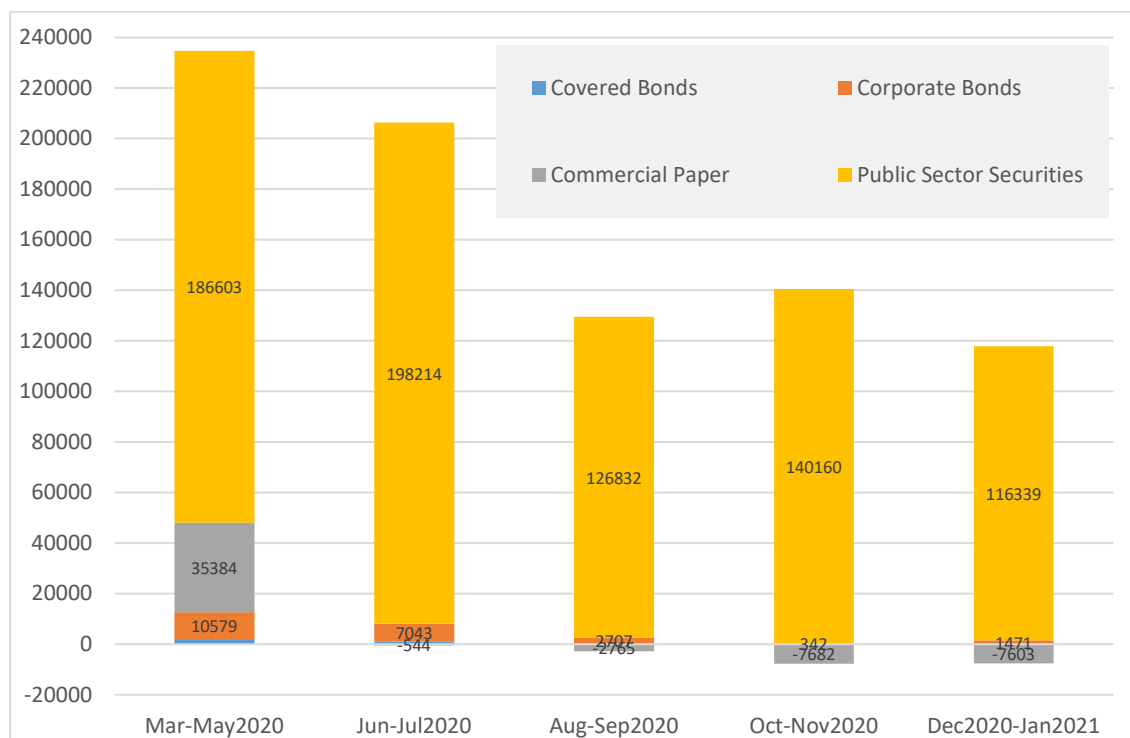
Figure 4: ECB net asset purchases in EUR billion, March 2015 – January 2021



Note: PSPP – public sector purchase programme, CBPP3 – third covered bond purchase programme, CSPP – corporate sector purchase programme, ABSPP – asset-backed securities purchase programme.

Source: ECB, Asset purchase programmes, <https://www.ecb.europa.eu/mopo/implement/omt/html/index.en.html>.

Figure 5: PEPP: total bimonthly net asset purchases, in EUR million, March 2020 – January 2021



Source: ECB, https://www.ecb.europa.eu/mopo/pdf/PEPP_breakdown_history.csv?4fccbac2ae5f38b8ae63b70d05d17fb0.

Since March 2016, the main refinancing operations (MRO) rate remained at zero and the marginal lending facility rate (MLFR) at the level of 0.25%, while the deposit facility rate (DFR) was cut from -0.40% to -0.50% in September 2019⁸.

On 10 December 2020, the ECB Governing Council took a series of decisions in which it:

- increased the envelope of the PEPP by EUR 500 billion to a total of EUR 1,850 billion and extended the horizon for net purchases under this programme to at least the end of March 2022 and the period of reinvestment of principal payments from maturing securities until at least the end of 2023;
- extended the period of more favourable terms of the TLTRO III by 12 months to June 2022; three additional operations will be conducted between June and December 2021;
- extended to June 2022 the duration of the set of collateral easing measures adopted in April 2020;
- offered four additional PELTROs in 2021;
- declared the continuation of APP net purchases at a monthly pace of EUR 20 billion and reinvesting, in full, the principal payments from maturing securities purchased under the APP for an extended period of time.

3.2. Monetary policy decisions of the Fed and BoJ

The Fed and BoJ also reacted to the COVID-19 emergency with a new round of monetary policy easing.

The Fed cut the Federal Fund Rate (FFR) by 1.50 percentage points (to the range 0.00-0.25) in two steps taken in March 2020. Before, between July and October 2019, the FFR was reduced in three steps by 0.75 percentage points.

In the second half of 2019, the Fed also returned to net purchases of securities, starting to again increase its balance sheet (after its reduction between October 2017 and August 2019⁹). On 15 March 2020, after the outbreak of the pandemic, it decided to increase its holdings of Treasury securities by at least USD 500 billion and mortgage-backed securities by at least USD 200 billion¹⁰. A week later, it eliminated upper limits of these operations¹¹. Within its regulatory and supervisory mandate, the Fed also launched several sector-targeted lending programmes¹². All these measures led to an increase of its asset holdings by approximately 75% in the period between March 2020 and February 2021 (Figure 6).

In March and April 2020, the BoJ adopted three kinds of easing measures (Kuroda, 2020): (i) a special programme to support financing non-financial firms, worth JPY 110 trillion (the purchase of corporate bonds and refinancing financial institutions which lend to non-financial firms); (ii) purchasing Japanese government bonds without limits and the provision of USD funds based on cooperation with other CBs; and (iii) purchases of certificates of exchange-traded funds (ETFs) and real estate investment trusts

⁸ See ECB: Key ECB interest rates
https://www.ecb.europa.eu/stats/policy_and_exchange_rates/key_ecb_interest_rates/html/index.en.html.

⁹ See Federal Reserve: History of the FOMC's Policy Normalization Discussions and Communications
<https://www.federalreserve.gov/monetarypolicy/policy-normalization-discussions-communications-history.htm>.

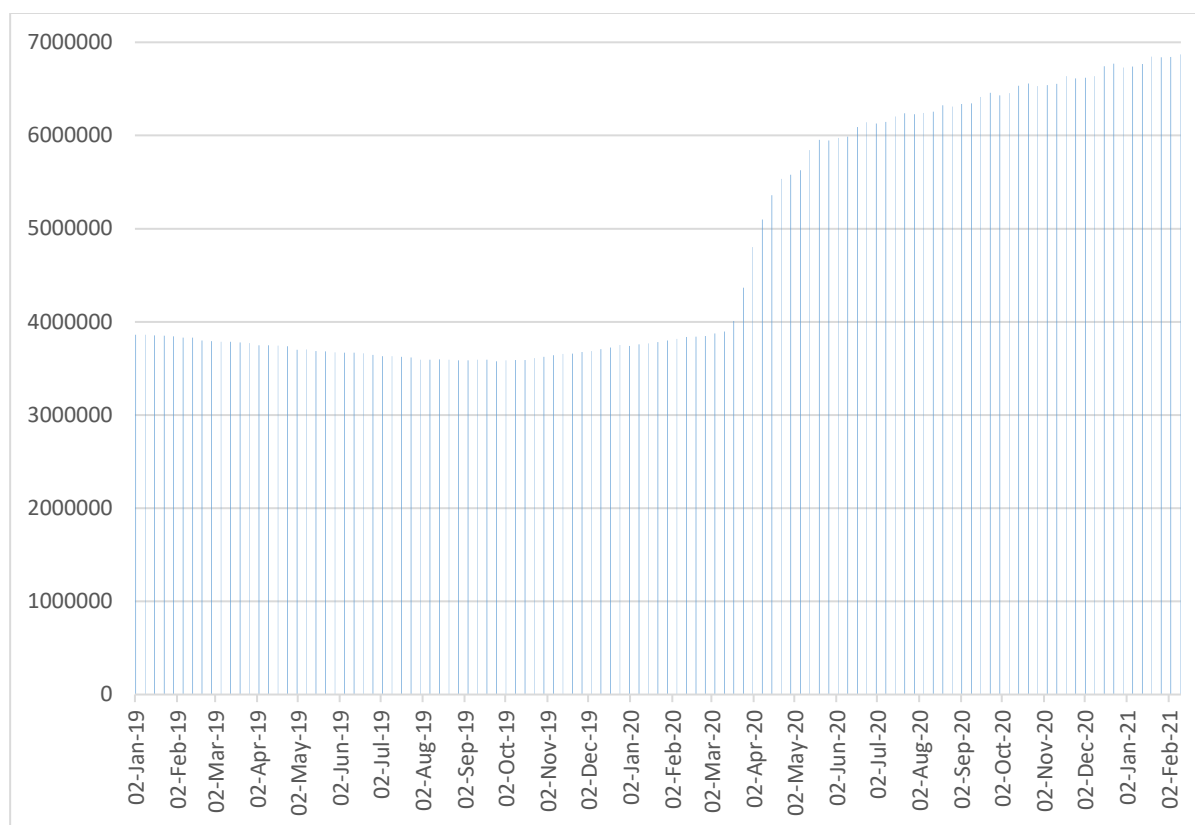
¹⁰ See Federal Reserve, FOMC statement, 15 March 2020
<https://www.federalreserve.gov/newsevents/pressreleases/monetary20200315a.htm>.

¹¹ See Federal Reserve, FOMC statement, 23 March 2020
<https://www.federalreserve.gov/newsevents/pressreleases/monetary20200323a.htm>.

¹² See Federal Reserve, Coronavirus Disease 2019 (COVID-19) - Funding, Credit, Liquidity, and Loan Facilities
<https://www.federalreserve.gov/funding-credit-liquidity-and-loan-facilities.htm>.

(J-REITS). In December 2020, it extended the period of all these programmes to at least September 2021 and enlarged their envelopes (Vogado, 2020).

Figure 6: Securities held outright by the Fed, in USD million, January 2019 – February 2021



Source: Federal Reserve, Total Assets of the Federal Reserve

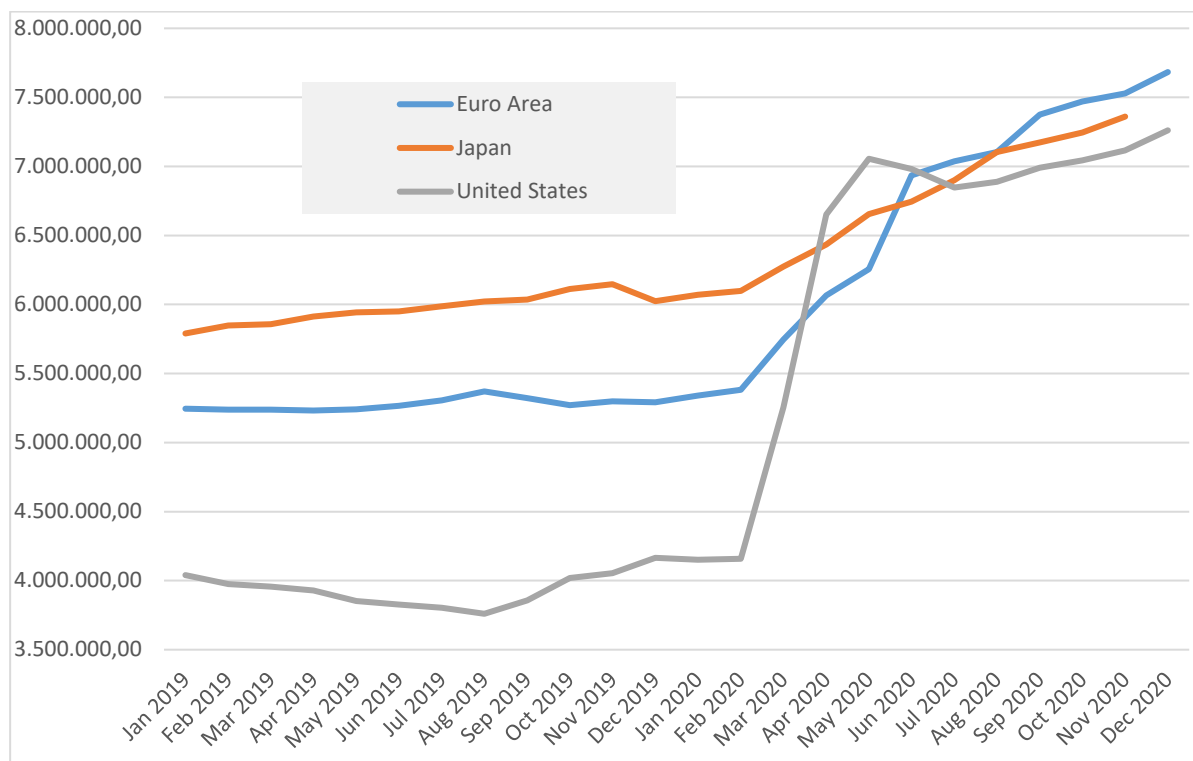
https://www.federalreserve.gov/monetarypolicy/bst_recenttrends_accessible.htm.

3.3. Impact of monetary policy decisions on CB balance sheets and money supply

The new round of monetary relaxation launched in 2019 but intensified in 2020 (see Sections 3.1 and 3.2), in particular, increasing the size of net asset purchases, has led to the further expansion of CB balance sheets both in nominal terms (Figure 7) and even more in relation to GDP (Figure 8), because GDP was shrinking in 2020 in all three analysed economies.

The BoJ has been rapidly expanding its total assets since 2013, so the year 2020 brought about only a modest acceleration. The ECB recorded a more visible change in the previous trend: after a period of a relatively stable stock of total assets (2018-2019), they started to grow rapidly from March 2020 (by 42.7% between the end of February and the end of December 2020). However, it was the Fed that made the most dramatic U-turn. After a period of shrinking its balance sheet (2017-2019), it recorded a rapid increase by 93.1% between the end of August 2019 and the end of December 2020, most of which occurred during the period from March to June 2020.

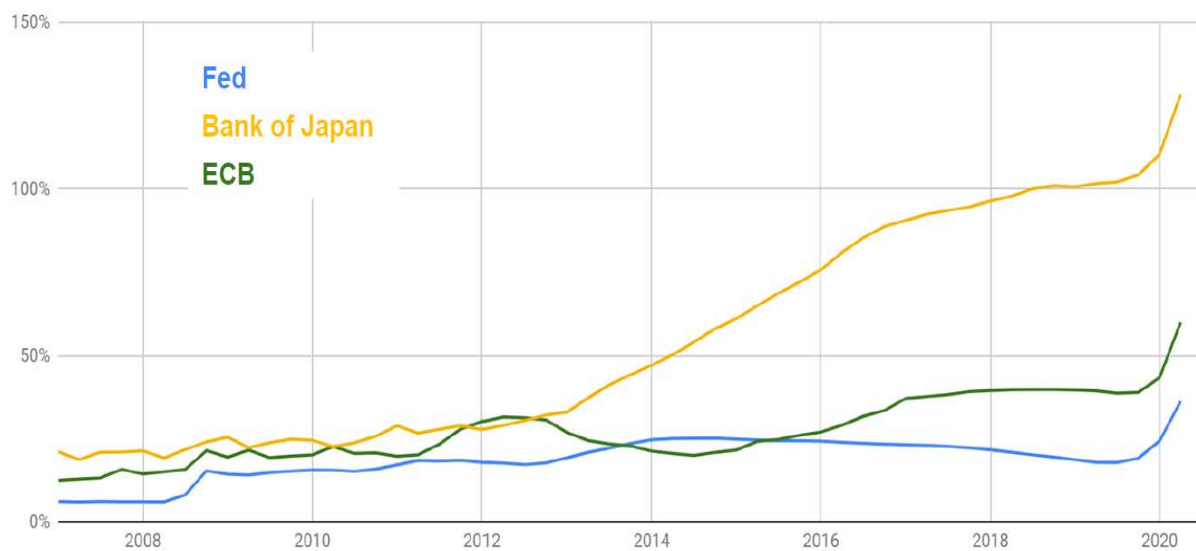
Figure 7: CB total assets, January 2019 – December 2020



Note: ECB in EUR million, BoJ in JPY hundred million, US Fed in USD million.

Source: IMF International Financial Statistics.

Figure 8: Major currency areas: CB balance sheets as % of nominal GDP

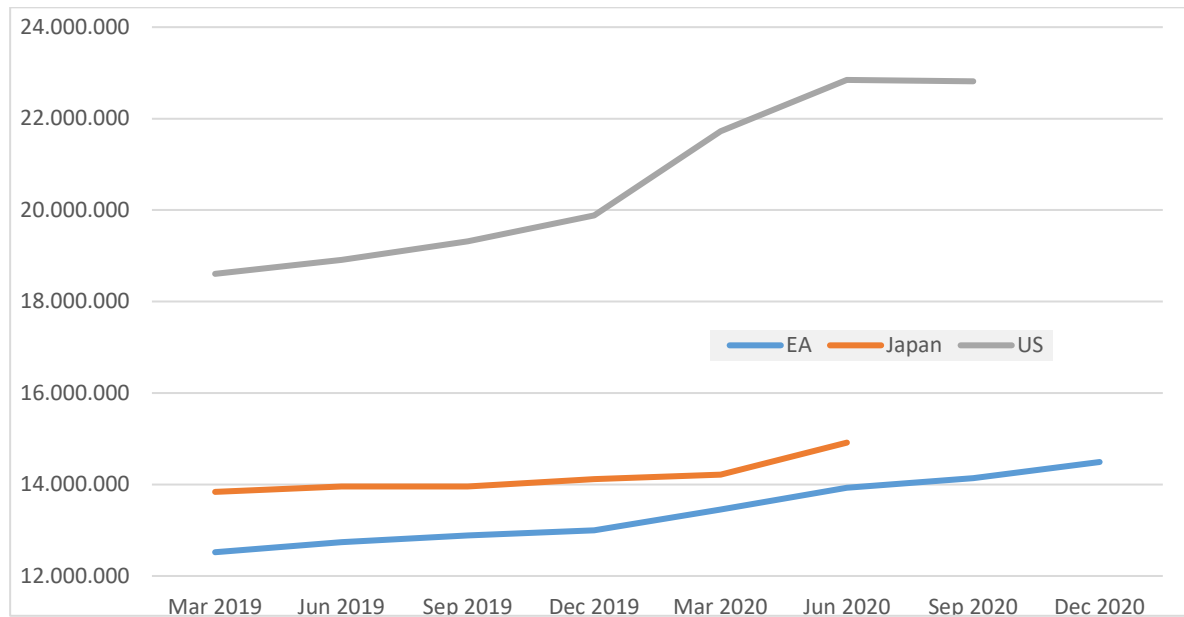


Source: Mosser, 2020.

The rapid growth of CB assets and the monetary base has led to an increase in broad money (Figure 9), although at a slower pace than the former. The annual growth of broad money amounted to 11.5% in

the euro area (December 2019 to December 2020), 14.7% in the United States (September 2019 to September 2020), and 6.9% in Japan (June 2019 to June 2020).

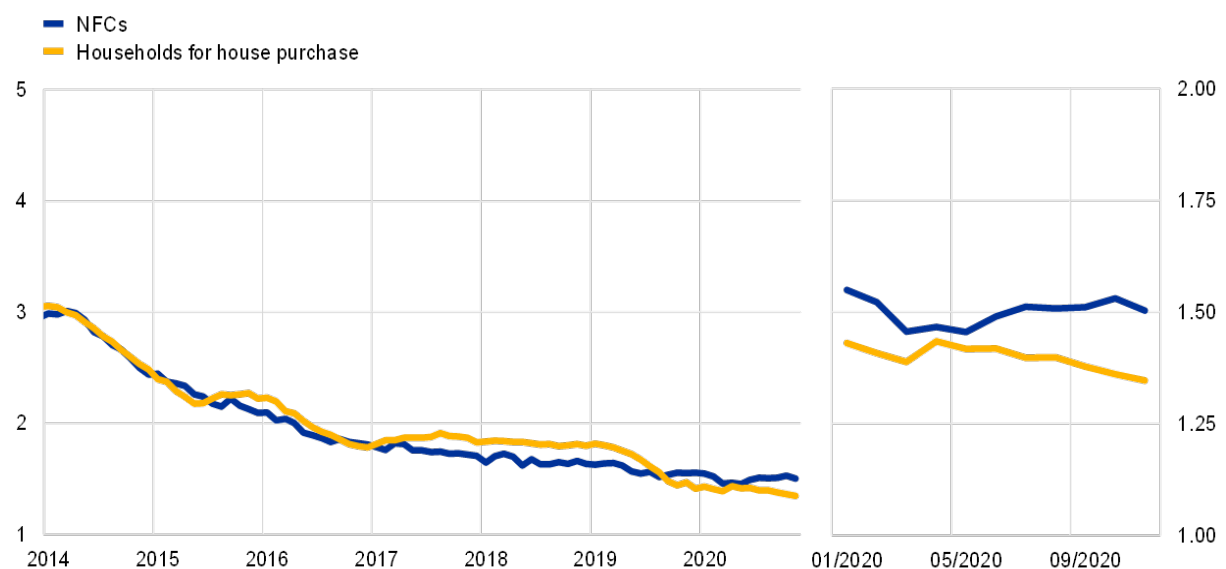
Figure 9: Major currency areas: broad money, March 2019 – December 2020 (quarterly data)



Note: ECB in EUR million, BoJ in JPY hundred million, US Fed in USD million.

Source: IMF International Financial Statistics.

Figure 10: Composite bank lending rates for NFCs and households in the euro area, annual in %, 2014-2020



Note: Composite bank lending rates are calculated by aggregating short- and long-term rates using a 24-month moving average of new business volumes. The latest observation is for November 2020. NFCs stands for non-financial corporations.

Source: ECB, 2021, Chart 13, p. 24.

However, the borrowing costs for the non-financial sector have improved only marginally, at least in the euro area. Figure 10 shows that while composite commercial bank lending rates for households for home purchases in the euro area continued to decrease in 2020, the similar rates for non-financial corporations (NFCs), that is, businesses, even increased slightly in the second half of 2020.

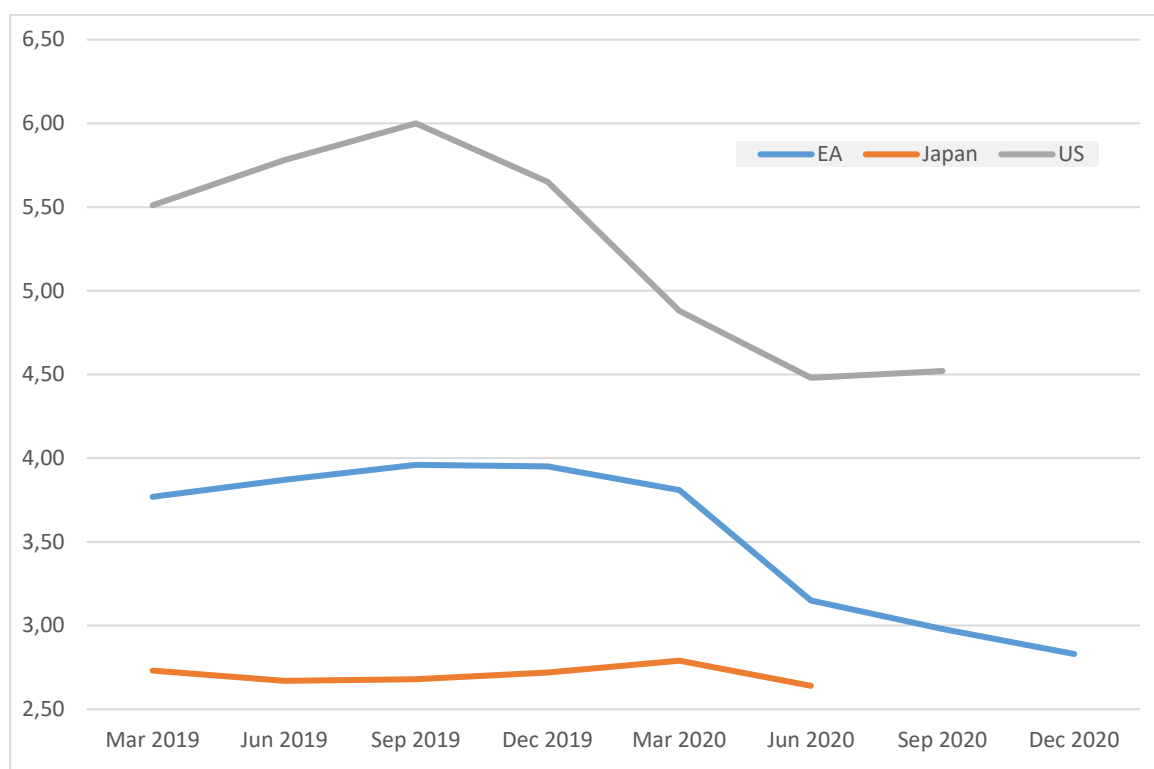
Both the slower growth of broad money and the stabilisation or even increase in lending rates for businesses suggest problems with the effective transmission of the bold monetary impulses provided by CBs, which we will analyse in Section 3.4.

3.4. QE and an impaired monetary transmission mechanism

In our previous analysis (Dabrowski, 2019), we diagnosed the unintended negative impact of QE on the depth of financial intermediation. When CBs increased their stock of assets, the money multiplier (MM), defined as the quotient of broad money to the monetary base, decreased. When CBs stop net purchases or decrease the stock of assets, the MM increased.

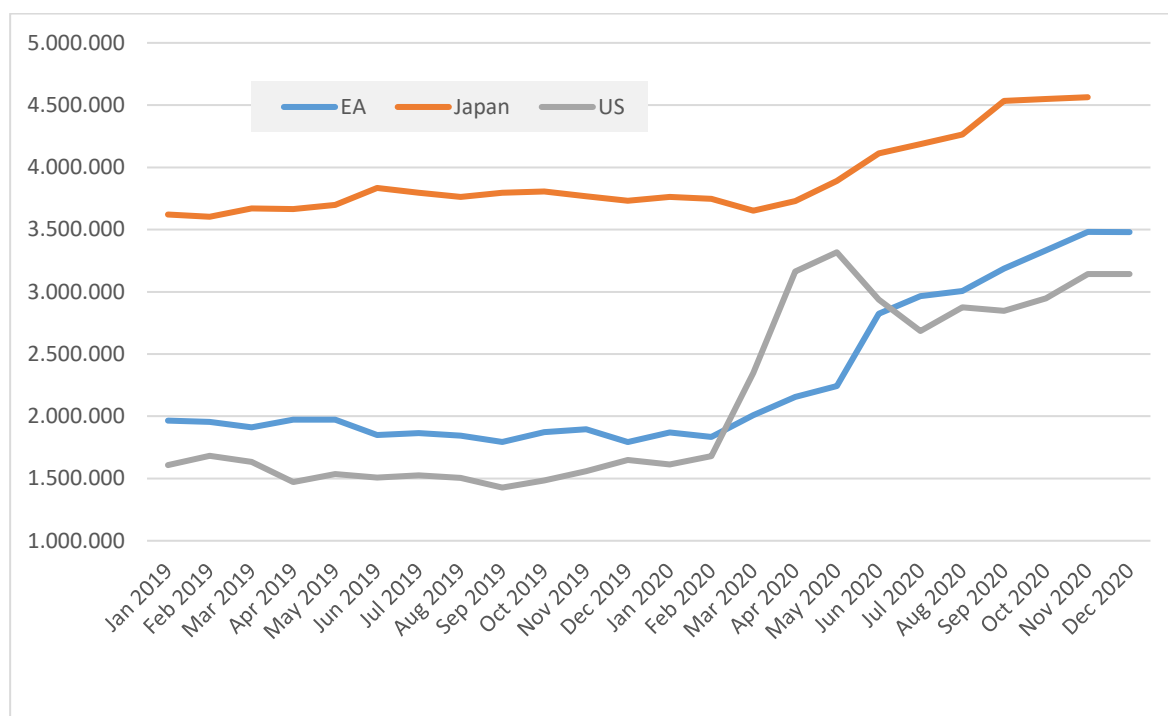
The negative impact of QE on the MM could be explained by the behaviour of commercial banks. When CBs intensified asset purchases, commercial banks increased their voluntary deposits with CBs despite negative deposit rates in the ECB and BoJ. When CBs stabilised or started to reduce their stocks of assets, commercial banks gradually reduced their deposits with CBs.

Figure 11: Money multiplier (broad money to monetary base) in major currency areas 2019-2020



Source: IMF International Financial Statistics.

Figure 12: CB liabilities to other depository corporations, major currency areas, 2019-2020



Note: ECB in EUR million, BoJ in JPY hundred million, US Fed in USD million.

Source: IMF International Financial Statistics.

Our hypothesis (Dabrowski, 2019) was that QE absorbed so many low-risk liquid securities from the financial market that commercial banks had to increase their voluntary deposits in CBs to be able to manage their liquidity according to prudential norms. The alternative but not radically different interpretation was that commercial banks were restricted in their lending activities by the limited demand for credit (despite low interest rates) or by the various regulatory limits imposed on them as result of the far-reaching tightening of financial market regulations after 2008.

Figures 11 and 12 suggest that a negative impact of QE on the MM was also present during the newest round of QE in 2019-2020, in particular, in the case of the Fed and the ECB. The additional factors that could prevent the full absorption of the growing monetary base by commercial banks are related to the economic characteristics of the current crisis. By this we mean the direct consequences of the lockdown measures and the crisis-related uncertainty, which negatively affect investment decisions in many sectors and industries and increase lending risk.

Overall, the above analysis points to an impaired transmission mechanism when monetary policy resorts to UPM, especially QE.

3.5. Monetary conditions outside major currency areas

In late February and early March 2020, emerging market (EM) economies suffered from large-scale capital outflows as result of the global financial market turmoil caused by the outbreak of the pandemic. Capital outflow led to a rapid increase in EM collateral default swaps (CDSs), spreads between EM bond yields and those in major currency areas, the depreciation of EM market currencies, and the collapse of their stock markets (Dabrowski and Dominguez-Jimenez, 2020).

Fortunately, in most EMs, the adverse shock lasted only a few weeks, except in countries that were macroeconomically fragile before the pandemic, like Argentina, Lebanon, or Turkey. The monetary

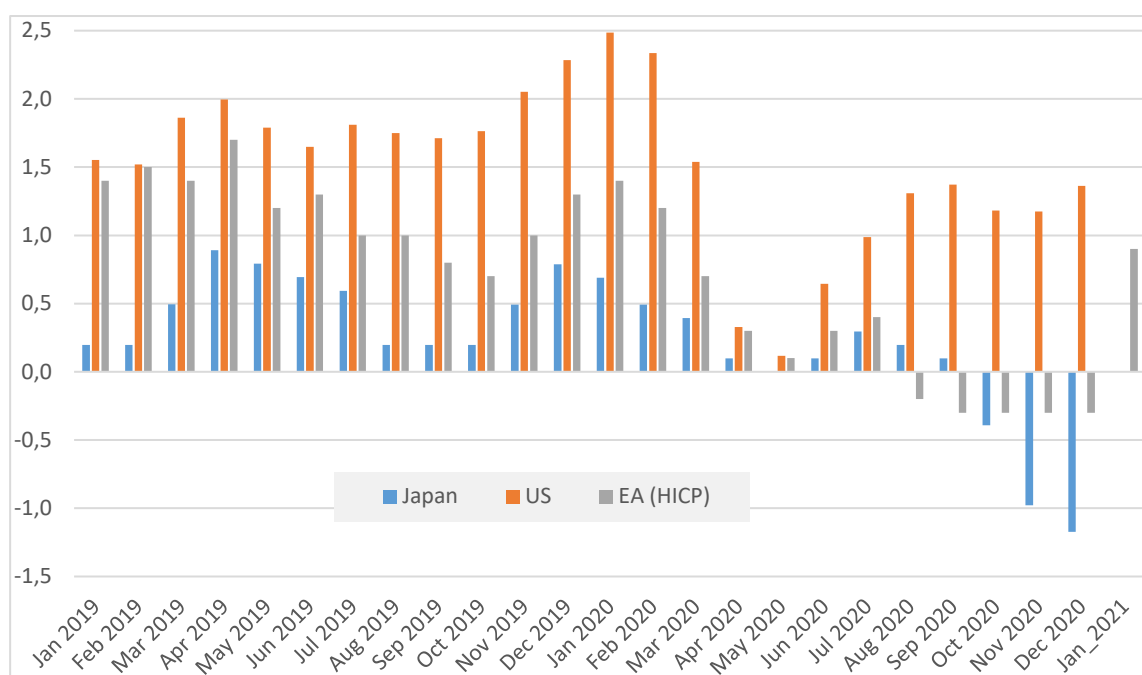
expansion in major currency areas (see Sections 3.1 and 3.2) has helped easing EM financial conditions since April 2020 (Kalemlı-Ozcan, 2020). Given the dominant role of the USD, the Fed's monetary policy has had the biggest positive impact on EM financial conditions and has helped in returning net capital inflows; the ECB and BoJ also contributed to this relief, especially in their neighbourhoods.

Apart from monetary easing, both the Fed and the ECB launched currency swaps with several EM CBs. The ECB also offered EUR repo lines to non-euro area CBs (Lane, 2020). On 10 December 2020, the ECB Governing Council extended the repo facility for CBs and all temporary swap and repo lines with non-euro area CBs until March 2022 (ECB, 2020).

3.6. CPI inflation and changes in asset prices

In 2019 and Q1 2020, the euro area recorded a 12-month inflation below 1.5% and Japan – below 1.0%. Inflation in the United States was higher – between 1.5-2.5% (Figure 13). After the outbreak of the COVID-19 pandemic, inflation decreased everywhere. In the second half of 2020, it became negative in the euro area and Japan. In the United States, it was in the range of 1.0-1.5%.

Figure 13: 12-month inflation in major currency areas, in %, 2019-2021



Note: CPI inflation for the US and Japan, HICP inflation for the EA.

Sources: IMF International Financial Statistics (the US and Japan), ECB (the EA).

As mentioned in Section 3.1, low inflation in the euro area served as the key justification for a return to QE in Q4 2019. After the pandemic outbreak, the weight of this argument in favour of continuous monetary expansion has been further strengthened in all major currency areas (see Buiter, 2021; Ranasinghe et al., 2020). However, one should be careful with drawing far-going conclusions from very low or even negative inflation figures (see O'Brien et al. [2021] for a comprehensive analysis of supply- and demand-side factors influencing inflation during the COVID-19 pandemic).

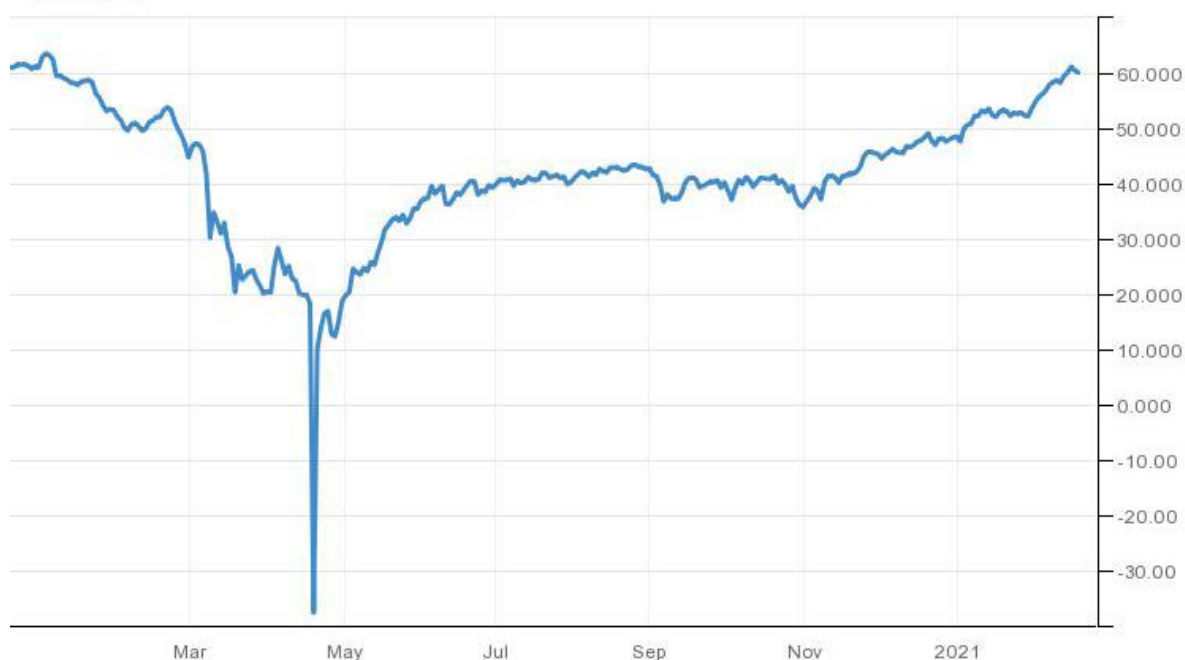
First, low inflation may result not only from the subdued aggregate demand or hypothetically insufficient money supply but also from lockdown measures that radically change the composition of

the consumer basket¹³ and distort sectoral and industry-specific balances between demand and supply.

Second, as analysed in Section 2.3, the subdued aggregate demand can have a temporary character, resulting from anti-pandemic containment measures. It can rebound once the pandemic and lockdown are over (unfreezing a monetary overhang resulting from forced saving).

Third, there were numerous supply-side shocks in 2020, the most notable of them being related to the collapse of oil and other commodity prices in March and April 2020 (Figure 14).

Figure 14: Price of crude oil WTI, in USD per 1 barrel, 2020-2021



Source: Trading Economics, <https://tradingeconomics.com/commodity/crude-oil>.

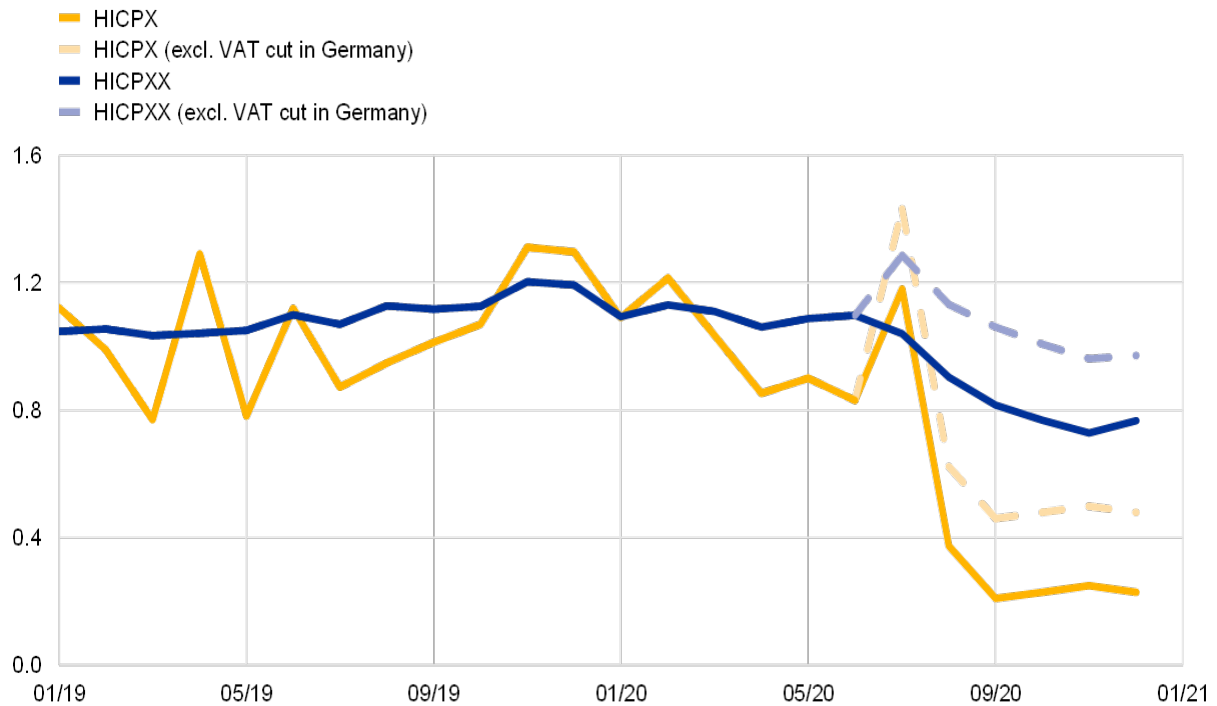
Fourth, temporary cuts in the value added tax (VAT) in some euro area countries (Austria, Cyprus, Germany, Greece, and Ireland) in the second half of 2020¹⁴ also had a downward impact on recorded inflation in this period. The most substantial reduction in VAT rates took place in Germany where the basic VAT rate was lowered from 19 to 16% and the reduced VAT rate – from 7 to 5% for all goods and services, for the period of 1 July to 31 December 2020 (Asquith, 2020). In other economies, VAT cuts concerned only selected goods and services.

Figure 15 shows the effects of excluding changes in energy, food, travel-related items, clothing and footwear prices, and VAT rates in Germany from the headline HICP indicator. Such an underlining inflation measure remains in positive territory and is more stable than the headline HICP. However, it also represents the declining trend in the second half of 2020.

¹³ Technically, changes in the composition of the consumer basket and the weights of individual items can be taken into consideration by CPI statistics ex-post in the subsequent year.

¹⁴ See 2021 European Union VAT rates, <https://www.avalara.com/vatlive/en/vat-rates/european-vat-rates.html>.

Figure 15: Measures of underlying inflation in the euro area, 12-month rate in %, 2019-2020

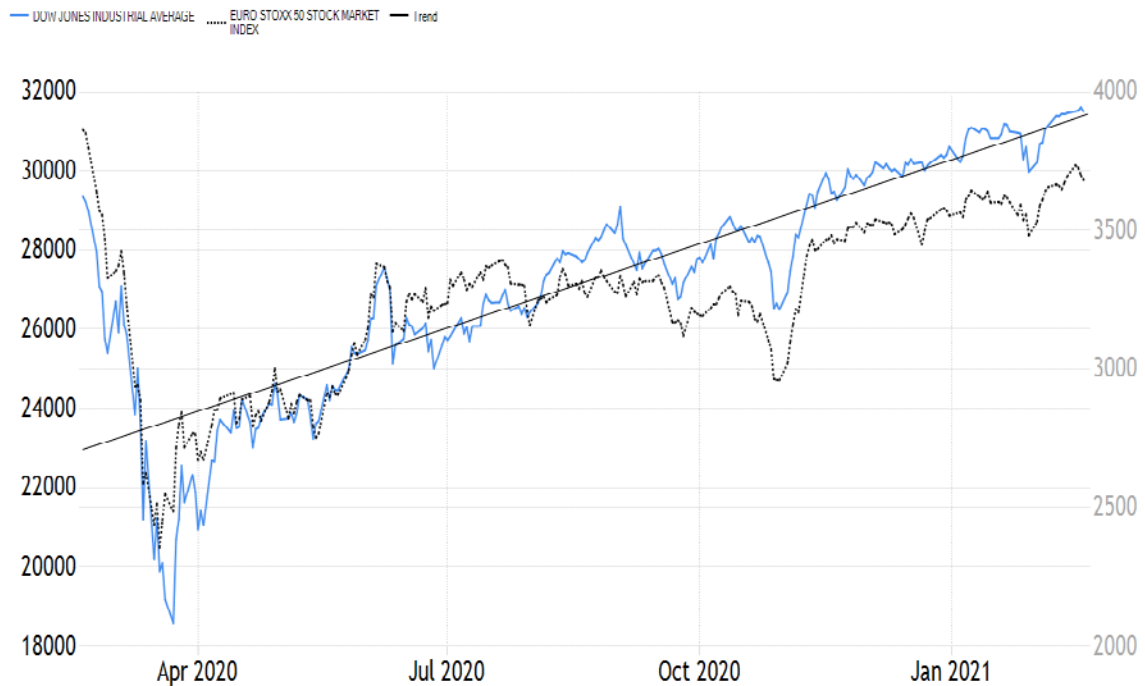


Notes: HICPX – HICP excluding food and energy; HICPXX – HICP excluding energy, food, travel-related items, clothing and footwear prices.

Source: ECB, 2021, Chart 8, p. 18.

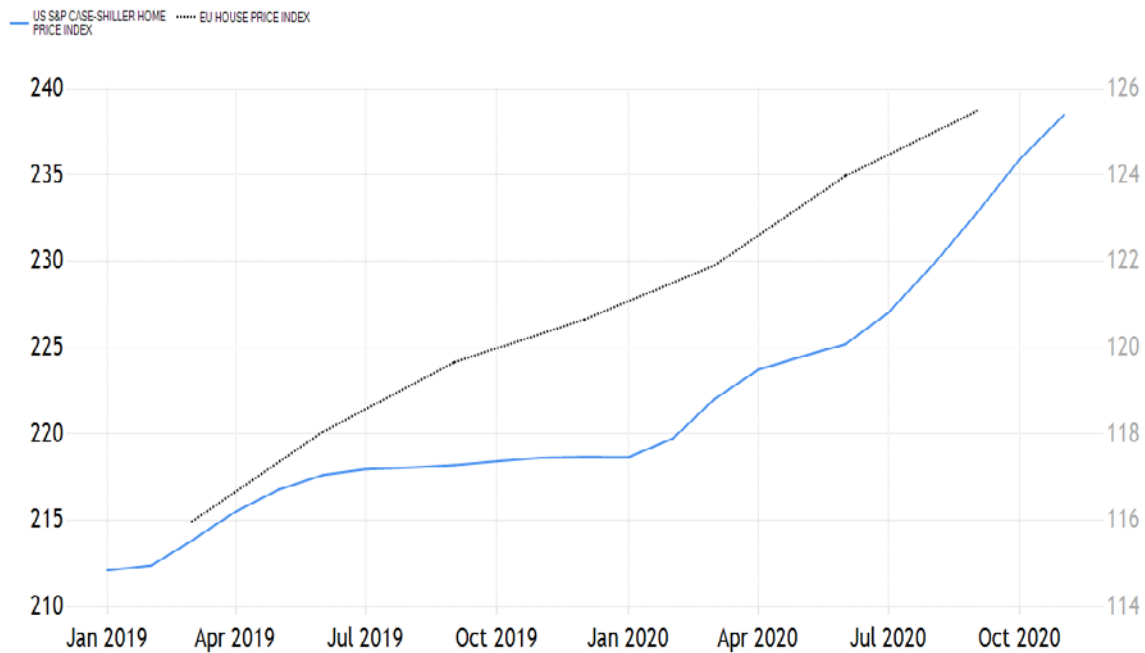
The measure of underlying inflation can help to predict potential changes in the headline HICP in the near future. By this we mean growing oil prices since November 2020 (Figure 14) and the expiration of most temporary VAT rate cuts in Germany at the end of 2020. Perhaps the euro area positive headline inflation of 0.8% in January 2021 reflects the impact of these changes and the beginning of a new trend.

Figure 16: US Dow Jones Industrial Average (left-hand scale, blue line) and Euro Stoxx 50 Market Index (right-hand scale, black line), 18 February 2020-18 February 2021



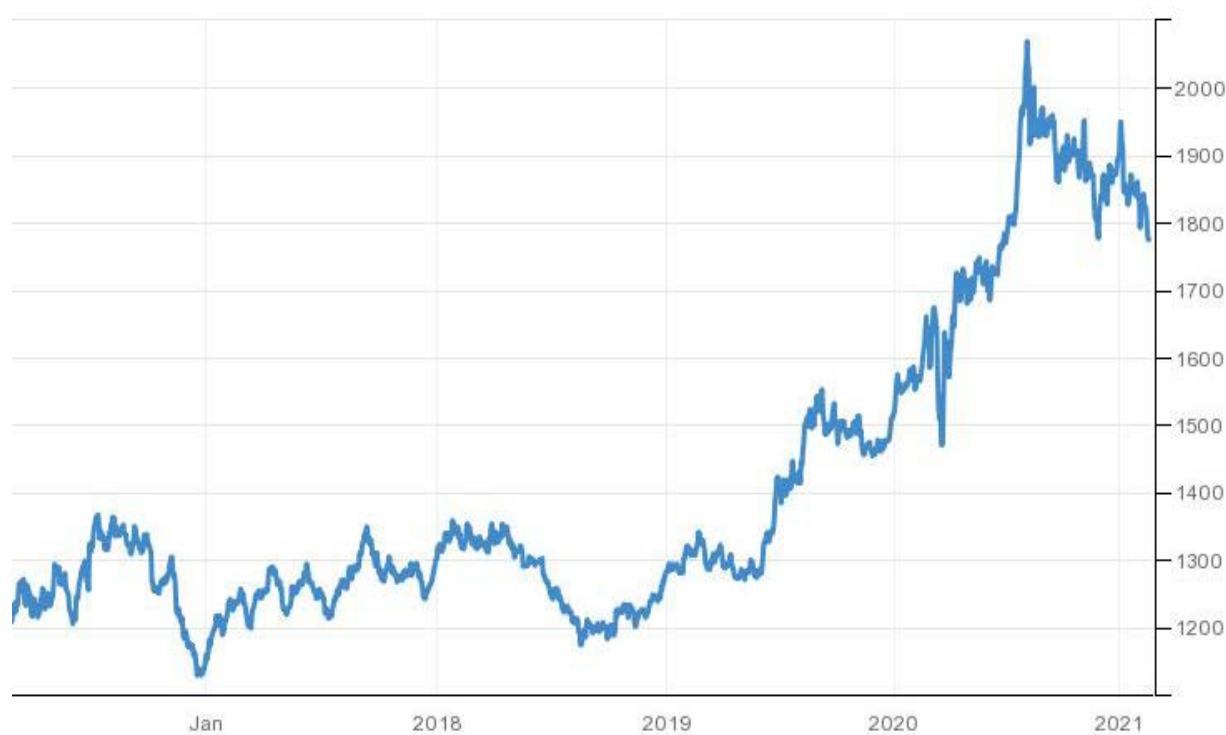
Source: Trading Economics, <https://tradingeconomics.com>.

Figure 17: US (left-hand scale, blue line) and euro area (right-hand scale, black dotted line) Nominal Home Prices Indexes, 18 February 2020-18 February 2021



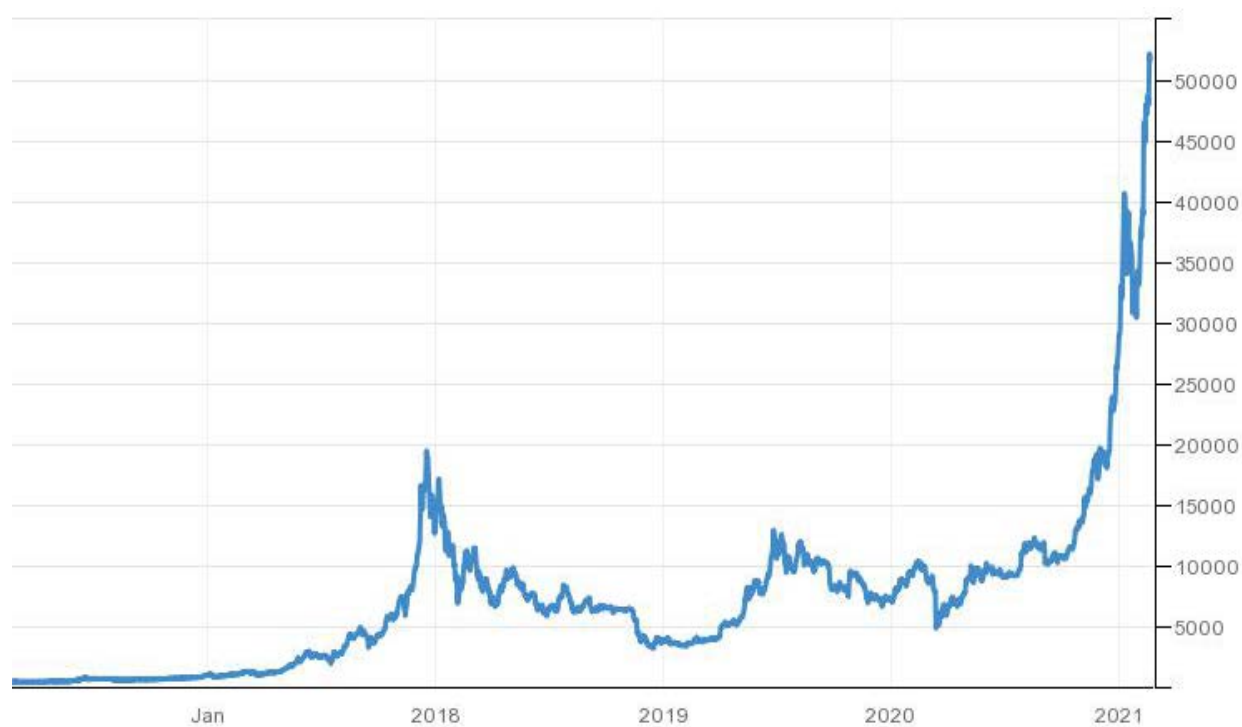
Source: Trading Economics, <https://tradingeconomics.com>.

Figure 18: Price of gold in USD for 1 troy ounce, 2016-2021



Source: Trading Economics, <https://tradingeconomics.com>.

Figure 19: Price of Bitcoin in USD for 1 unit, 2016-2021



Source: Trading Economics, <https://tradingeconomics.com>.

In our previous analysis (Dabrowski, 2019), we argued that changes in the CPI are not able to fully capture the existing inflationary pressures because part of this pressure is absorbed by changes in asset prices. Figures 16-17 present the dynamic of housing prices and the stock market (both in the euro area and the United States), while Figures 18-19 – the dynamics of the prices of gold and the Bitcoin virtual currency. They all demonstrate a strongly increasing trend during the pandemic, except the price of gold, which after a rapid increase in the first half of 2020 moderated somewhat in the second half of 2020 and the beginning of 2021, and a short dip in stock prices in February and March 2020. This should serve as a warning signal of the unrecorded inflationary potential and the risk to financial stability – the two questions which we will address in Chapter 4.

3.7. The nexus between monetary and fiscal policies

Figure 4 shows that purchases of government bonds have dominated all APPs conducted by the ECB. The same relates to APPs conducted by the BoJ, the Fed, and other CBs that engage in QE. As a result, CBs in several AEs, including the three CBs analysed in this paper, accumulated large stocks of government securities.

Such an effect of QE, even if originally unexpected and undesired, seems to be unsurprising and unavoidable. Several rounds of large-scale QE since 2008 absorbed the bulk of commercial papers and securities of sufficient quality and liquidity acceptable to CBs. Government bonds remain the only available assets to continue QE, especially as their supply is growing rapidly due to large fiscal imbalances and increasing public sector borrowing requirements (PSBRs) during the pandemic. The higher supply of government bonds meets the higher demand for them by those CBs that want to expand their APPs.

However, such a “symbiosis” has several negative consequences and involves serious risks to macroeconomic and financial stability (see Chapter 4). Even if APPs are conducted exclusively for monetary policy purposes (to increase the CB’s monetary base or flatten a yield curve) and via the secondary market, they mean the *de facto* monetisation of public debt. QE increases demand for government securities and makes public debt financing easier. In many instances, it reduces market pressures on more prudent fiscal policies. It also decreases public debt service costs¹⁵. This means that the phenomenon of record-low nominal and real interest rates in AEs, which often serves as an argument in favour of the further expansion of government borrowing (see Blanchard, 2019; Furman, 2020), is not only an effect of the excessive saving as compared to investment needs¹⁶ but can also be seen as an indirect effect of QE.

Overall, as a result of QE, major CBs, including the ECB, became increasingly involved in the indirect financing of public debt, which can narrow the monetary policy room for manoeuvre, make it more dependent on fiscal imbalances, and compromise CB independence. We will further discuss this issue in Chapter 4.

¹⁵ In the case of the PEPP, the ECB did not follow the strict country capital key on a monthly basis to help those euro area governments whose yields were higher. However, towards the end of 2020, the ECB minimised such interventions.

¹⁶ See the hypothesis of secular stagnation as developed by Summers (2016) and Summers and Stansbury (2019).

4. CHALLENGES FACED BY CENTRAL BANKS AFTER THE PANDEMIC

Regardless of the length of the COVID-19 pandemic, it will leave behind a heavy social and economic legacy, which will be uneasy to overcome. For this reason, policymakers should not limit their actions and decisions to responding to today's challenges, however serious and dramatic they are. They should think ahead to the post-pandemic period and its challenges and assess the consequences of today's choices from a longer-term perspective. Too often, anti-crisis measures taken hastily today without due consideration of the potential side effects can have serious repercussions for the future.

The postulate of thinking ahead of the curve also concerns monetary policymakers. For central bankers, three problems in the post-pandemic era may be particularly challenging: (i) the potential return of inflationary pressures, (ii) fiscal dominance, and (iii) risks to financial stability.

4.1. The potential return of inflationary pressures

Inflation in AEs was low during the entire decade of the 2010s (Dabrowski, 2019) and even lower in 2020, after the outbreak of the COVID-19 pandemic (see Section 3.6 and Figure 13). This may support the expectation (based on an extrapolation of past trends) that the low inflationary environment will continue for the next couple of years, regardless of monetary and fiscal policy decisions (see e.g., Blanchard, 2020; Demertzis, 2021). Some financial market forecasts even warn of a continuous deflation risk in 2021 (Zangana, 2020).

Early 2021 official macroeconomic forecasts predict a moderate inflation pick up based on the assumption of a gradual but relatively fast economic recovery. According to the IMF (2021a, footnote 8 to Table 1, p. 4), inflation in the euro area will amount to 0.9% in 2021 and 1.2% in 2022, in Japan – 0.1% in 2021 and 0.5% in 2022, and in the US – 2.1% in both 2021 and 2022. According to the European Commission (2021, Table 1, p. 1), inflation in the euro area will amount to 1.4% in 2021 and 1.5% in 2022.

Inflationary expectations measured by surveys of professional opinions or derived from market-based indicators (changes in bond yields and swap rates) also show only a very modest inflation revival, not exceeding an annual rate of 2% (Dermertzis, 2021; ECB, 2021, Chart 9; European Commission, 2021, Graph 1.17, p. 19).

However, by their very nature, both macroeconomic forecasts and various measures of inflationary expectations are based, explicitly or implicitly, on the assumption of the continuation of past trends and economic behaviour and an unchanged policy regime (Blanchard, 2020). Therefore, they may not be able to capture the actual inflation risks coming from the economic aspect of the COVID-19 crisis (see Section 2.3), the consequences of anti-crisis monetary and fiscal policy responses (see Chapter 3), and the longer-term demographic and structural challenges faced by AEs (Goodhart and Pradhan, 2020).

Even if the previous warnings on returning inflation (including the ones presented by the author of this paper – see e.g., Dabrowski, 2019) have not materialised yet, it does not mean that it will never happen. There are several arguments that may validate the hypothesis on a more pro-inflationary macroeconomic environment in the post-pandemic era as compared to the decade of the 2010s.

In the short term, there are several potentially pro-inflationary factors which should be taken into consideration. The most important one relates to the monetary overhang (the effect of forced saving – see Section 2.3) accumulated in 2020. At the moment, it is quite difficult to estimate its actual size and predict how quickly it can be unfrozen. Putting it in other words, the question is whether the demand

for money will return to its pre-pandemic level and, if yes, how quickly. The rapid increase in asset prices (Section 3.6) may suggest that the hidden (or repressed) inflationary potential is quite substantial.

The recovery of commodity prices to their pre-pandemic levels (see Figure 14 for oil prices) means that their deflationary impact observed in 2020 is largely over. There are also first signs of supply-side bottlenecks, for example, in container transport (Smith, 2021) and semiconductor production (Miller et al., 2021), which may lead to respective price increases. They confirm the hypothesis that the post-crisis recovery will not mean a simple reemployment of idle capacities. Rather, the structural changes induced by the COVID-19 pandemic and lockdown will lead to a certain mismatch between demand and supply.

There are also concerns related to the size of the fiscal stimulus package proposed by the Biden administration in the United States and its potential inflationary consequences. Olivier Blanchard, in a series of tweets¹⁷ published on 7 February 2021, argues that the size of the proposed stimulus (USD 1.9 trillion), in addition the Coronavirus Aid, Relief, and Economic Security (CARES) package of USD 900 billion approved by the US Congress in December 2020 and the high probability that consumers will spend USD 800 billion out of the excessive saving accumulated in 2020, gives a total amount of USD 3.6 trillion of additional effective demand, while the upper bound estimation of the output gap in the United States is USD 900 billion – that is, four times less. Summers (2021) raised similar concerns and arguments. Interestingly, both authors downplayed the inflation risk and called for a more active fiscal policy not so long ago.

Going beyond short-term considerations, there are several arguments pointing to potential inflationary forces in the medium- to long-term. First, deflationary pressures triggered by the immediate effects of the GFC (serious disruption in financial intermediation) and followed by a new set of financial regulations (Dabrowski, 2019) will not continue forever. Their potential seemed to reach their limits in the second half of the 2010s.

Second, according to Goodhart and Pradhan (2020), China's integration with the world economy since the 1990s produced a powerful deflationary impact because of its abundant, well-trained, and inexpensive labour force and high national saving. However, this impact is about to expire or even turn to the opposite, largely due to demographic changes in China (shrinking working age population and population ageing) and its maturing economy. Similar demographic changes in AEs will work in the same, inflationary direction (Bartsch et al., 2020).

Third, tensions in the world trade system triggered by the protectionist policies of the United States under President Donald Trump may also produce inflationary consequences if continued. At the time of writing this paper, it remains unknown whether the new US administration of President Joseph Biden will conduct more pro-trade policies than its predecessor. However, one can assume that substantial progress in the liberalisation of world trade like that observed in the 1990s and early 2000s is very unlikely in the near future. The continuation of the downward pressure on the prices of tradeable goods and services generated in the previous 30 years by global competition is very unlikely (Bartsch et al., 2020; Goodhart and Pradhan, 2020).

Fourth, the rapid deterioration of fiscal balances and the growing public debt have an inflationary character in the long term. Furthermore, they constrain a CB's room for manoeuvre in fighting inflation. This issue will be further discussed in Section 4.2.

¹⁷ See Olivier Blanchard, <https://twitter.com/ojblanchard1/status/1358122336432648192>.

4.2. Increasing fiscal dominance

The analysis presented in Sections 2.4 and 3.7 show the narrowing fiscal space in most AEs, which has been temporarily relaxed only by ultra-loose monetary policies conducted via large purchases of government securities and *de facto* public debt monetisation. This has led to an increasing fiscal dominance (Landau, 2021) or, using other words, an increasing monetary policy dependence on fiscal policy. In practice, CBs may become hostages of fiscal authorities and the inability or unwillingness of governments to carry out a necessary fiscal adjustment on time¹⁸. In turn, this may create a serious obstacle to monetary policy tightening and reversing QE when inflation pressure comes back.

In such circumstances, CBs will be confronted with an increasingly dramatic dilemma. Fulfilling their price stability missions will require first stopping the APPs and then reducing their balance sheets, on the one hand, and hiking interest rates, on the other (Blanchard, 2020). However, both will lead to an increase in the government's interest payments and a further deterioration of its fiscal position, other things being equal. Some governments may face the risk of sovereign insolvency which, in turn, will undermine the stability of the financial sector (see Section 4.3) and boost inflationary expectations.

On the other hand, giving in to fiscal pressures would lead to higher inflation and undermining thus far stable inflationary expectations (Landau, 2021), which has constituted a stable anchor to both monetary and fiscal policies in major currency areas since the mid-1990s. Higher inflation could perhaps depreciate the real stock of public debt (i.e., if it had an unexpected character), but other economic and social consequences would be negative.

Unfortunately, the ongoing process of updating monetary policy strategies (completed by the Fed, unfinished by the ECB) seems to go towards creating formal excuses for higher inflation by the mechanism of making up past inflation “underperformance”.

The new version of the “Statement on Longer-Run Goals and Monetary Policy Strategy” (FOMC, 2020) announced by the Fed on 27 August 2020 reinterpreted the inflation target of 2% as a longer-term average, which means that “...*following periods when inflation has been running persistently below 2 percent, appropriate monetary policy will likely aim to achieve inflation moderately above 2 percent for some time.*” With all the imprecision of this declaration (what does “*moderately above 2 percent*” and “*for some time*” mean exactly?)¹⁹, it looks like giving price stability less attention in the future in favour of other declared (maximum employment, moderating long-term interest rates) or undeclared policy goals (for example, easing fiscal constraints).

In January 2020, the ECB also launched the process of its monetary policy strategy review, its first since 2003. At the time of writing this paper, it is still an ongoing process scheduled to be concluded in 2021. However, the public address of ECB President Christine Lagarde on 30 September 2020 in which she mentions the need for “symmetry” in regard to the inflation target and discusses the possibility of making up for inflation misses (Lagarde, 2020) may suggest a similar approach to the Fed's strategy revision.

The expert debate, which accompanies the process of the ECB strategy review, brings even more radical proposals like, for example, increasing the inflation target to accommodate structural changes in the economy originating from the EU's decarbonisation policy (Rey, 2020).

¹⁸ The broad critique of the supposed fiscal austerity in the 2010s in the United States, euro area and UK (see e.g., Krugman, 2015; Skidelsky, 2015) and the disregard for fiscal sustainability constraints will not help in timely decisions to stop fiscal expansion and taking the necessary fiscal adjustment measures.

¹⁹ Being such an imprecise formula itself may create higher inflationary expectations – see Bartsch et al. (2020).

Overall, the increasing fiscal dominance may undermine CB independence, the fundamental institutional achievement of the last two decades of the 20th century (Landau, 2021), which can be considered from a historical perspective as the equivalent of the metallic standard or hard peg. Unfortunately, in the context of increasing fiscal dominance, there are experts who are ready to recommend monetary accommodation by increasing PSBRs and who consider CB independence as an illusion (see Buiter, 2020; 2021).

4.3. Risks to financial stability

Risks to financial stability is another potential challenge that deserves the serious consideration of both governments and monetary authorities. On the one hand, painful lessons and memories from the GFC and the resulting financial regulation and supervision reforms in the 2010s made the financial sector more stable and resilient to adverse shocks. However, on the other hand, the COVID-19 crisis has generated new risks and uncertainties. In particular, banks and non-banking financial institutions can become victims of asset bubbles, especially in the housing and stock markets (see Section 3.6), and recession. While in 2020 the number of enterprise insolvencies (clients of commercial banks) did not increase due to various governmental support schemes (Claeys et al., 2021), the situation may change in 2021 and subsequent years for the worse. It will result in an increasing share of non-performing loans and deteriorating financial results and balance sheets for banks. Bank profitability has also been negatively influenced by very low market interest rates and negative CB interest rates. In addition, low interest rates may distort credit allocation in favour of the so-called “zombie” firms (i.e., those without a viable market perspective) and further deteriorate the quality of banks’ assets.

The increasing risks to financial stability may pose a serious challenge to CBs both in their role of financial supervisors and institutions responsible for financial stability (all three CBs analysed in this paper are mandated with such a role) and as monetary authorities. Any potential incidence of financial instability may have a negative impact on monetary stability. In addition, the necessity to rescue the financial sector, especially banks, may stay in conflict with monetary policy objectives and their price stability mandate (see Cukierman, 1996; Dall’Orto Mas et al., 2020).

5. CONCLUSION

The economic crisis caused by the COVID-19 pandemic has been the second global adverse shock of this size in the 21st century, after the GFC of 2007-2009. However, its economic characteristics are different from the GFC and other financial crises and business cycle downturns. While the GFC generated a powerful deflationary shock due to far-reaching disruption in financial disintermediation and then the new regulatory regime in the financial sector, the COVID-19 crisis is a combination of supply- and demand-side disruptions caused by anti-pandemic containment measures, massive uncertainty, and the resulting precautionary behaviour of both consumers and investors. This leads to the phenomenon of forced (involuntary) saving and the building up of a monetary overhang.

However, disregarding differences between both crises, governments and CBs reacted to the current crisis in a similar way as 12 years earlier, that is, by massively relaxing both fiscal and monetary policies. While the necessity of some forms of fiscal and monetary support (to fight the pandemic, compensate for the lockdown, supply the financial sector with sufficient liquidity, and help economies outside major currency areas) has been out of question, the idea of the aggressive and untargeted boosting of aggregate demand by fiscal and monetary measures in the time of lockdown restrictions raises serious doubts. First of all, it is very costly, especially when most governments entered the COVID-19 crisis without sufficient fiscal buffers.

Similarly, CBs in AEs did not manage to withdraw from UPMs, stop QE, reduce their balance sheets, or increase interest rates above zero in the second half of the 2010s (the Fed was a partial exception) (Dabrowski, 2019). Therefore, after the outbreak of the COVID-19 crisis, they had only one method of monetary policy easing left – the further intensification of APPs. However, as already experienced in the 2010s, QE has numerous shortcomings and undesired side effects²⁰. One concerns the adverse impact of QE on financial intermediation and the monetary transmission mechanism. The additional monetary base is not fully absorbed by commercial banks and does not reach their clients – enterprises and households. The reason being that banks prefer to keep a substantial part of their additional liquidity in the form of voluntary deposits with CBs (despite negative interest rates).

Another problem relates to the monetary-fiscal nexus. Conducting a mass-scale QE, CBs must rely on purchasing government bonds because of a shortage of other assets of sufficient quality and liquidity. However, this leads to an increasing monetary policy dependence on fiscal policy (fiscal dominance) and, by decreasing yields on government bonds, weakens government incentives to conduct a prudent fiscal policy. On the contrary, it creates the expectation of low interest rates in the long term – an illusion of a “free lunch” – which is far from reality (Rogoff, 2020). Actually, it only delays the moment of truth when governments are confronted with fiscal sustainability constraints. This is the challenge faced not only by EM economies. Governments of AEs, including those which have global currencies, are not fully free of them as demonstrated, for example, by the fiscal crisis at the euro area periphery in the first half of the 2010s.

For CBs, such an ever closer “symbiosis” between monetary and fiscal policies can mean the dramatic narrowing of their room for policy manoeuvre and the *de facto* compromising of their independence. This may happen when CBs should tighten monetary policy to resist inflationary pressures. Because each form of tightening (stopping QE, reducing CB balance sheets, and hiking CB interest rates, among others) will create upward pressure on government bond yields, it can lead to an open conflict between CBs and the executive and legislative branches of government (Goodhart and Pradhan, 2020). Again, something that has been experienced on numerous occasions by CBs in EM economies may also

²⁰ See Hartwell (2018) and Siklos (2020) for overviews of the successes and failures of QE.

become a reality in AEs, even those with the advanced institutional safeguards of CB independence like in the euro area.

This is not a purely hypothetical scenario. The reversal of a more than a decade-long deflationary pressure may come sooner than many tend to think, for a number of reasons. In the short term, it may originate from the unfreezing of the monetary overhang formed during the pandemic, demand-supply mismatches resulting from pandemic-induced structural changes, and overshooting monetary and fiscal stimulus packages, to mention only a few. In the medium- to long-term, inflationary pressures can result from the expiring deflationary impulses of the 2010s (related to the legacy of the GFC and tighter financial regulations), demographic changes, deglobalisation, and the deterioration of fiscal balances.

Governments and CBs should think ahead about how to avoid a policy trap caused by a rapidly growing public debt and its *de facto* monetary financing, especially in the context of the potential return of inflationary pressures. With no doubt, balancing short-term needs (especially in times of emergency) and long-term constraints and challenges is an art of policymaking (see Landau, 2021). Such an art is badly needed in the current situation, especially if fighting the COVID-19 pandemic is going to take longer and cost more than originally expected.

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Monetary Policy During the Pandemic: Fit for Purpose?

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Abstract

This contribution reviews the ECB measures since the start of the COVID-19 crisis, i.e. the extension of APP and the introduction of PEPP. We show that APP announcements have helped steer inflation expectations upward. We also show that PEPP has alleviated fragmentation risk. Finally, we show that since the mid-2000s, ECB measures have had real effects on euro area unemployment rates, nominal effects on inflation rates and financial effects on banking stability.

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LIST OF ABBREVIATIONS

APP	Asset purchase programme
ECB	European Central Bank
EONIA	Euro overnight index average
EP	European Parliament
EU	European Union
GDP	Gross domestic product
HICP	Harmonised index of consumer prices
LTRO	Longer term refinancing operations
OMT	Outright monetary transactions
PEPP	Pandemic emergency purchase programme
PELTRO	Pandemic emergency longer term refinancing operations
PSPP	Public securities purchase programme
QE	Quantitative easing
SMP	Securities market programme
TLTRO	Targeted longer-term refinancing operations
VAR	Vector autoregression
ZLB	Zero lower bound

EXECUTIVE SUMMARY

- **This contribution reviews the different policy measures introduced by the ECB since the inception of the COVID-19 crisis in Europe, mainly the extension of APP measures and the development of PEPP measures.**
- APP and PEPP have had distinct objectives in comparison with former policies. APP has been oriented towards inflation expectations while PEPP has been oriented towards the mitigation of financial fragmentation.
- We analyse the effects of APP announcements (including asset purchase flows) on inflation expectations and show that they help steer expectations upward.
- We also analyse the impact of PEPP on sovereign spreads and show that PEPP has had heterogeneous effects that have alleviated fragmentation risk: PEPP has had an impact on the sovereign spreads of the most fragile economies during the pandemic (e.g. Italy) and no impact on the least fragile (e.g. the Netherlands).
- However, sovereign spreads have not completely vanished, making monetary policy transmission not fully homogeneous across countries.
- We also show that overall macroeconomic effects have been in line with expected outcomes since the mid-2000s: ECB monetary policy measures have had real effects on euro area unemployment rates, nominal effects on inflation rates and financial effects on banking stability.
- We conclude that an increase in the size of the PEPP program may be useful only in case financial risks re-emerge. Meanwhile, we argue that an ECB decision to cap the sovereign spreads during the COVID-19 crisis would alleviate the crisis burden on the most fragile economies in the euro area, where sovereign spreads remained the highest.

1. INTRODUCTION

The outbreak of the COVID-19 pandemic has led central banks to take several decisions to deal with the economic and financial consequences of the crisis. In the euro area, the ECB took its first decisions on 12 March 2020, when euro area countries started to take lockdown measures.¹ As the policy rate was already at the zero lower bound (ZLB), the ECB resorted to non-standard measures. It has notably consisted in amplifying existing measures such as asset purchases (under the asset purchase programme [APP]) and liquidity provision (through the longer-term refinancing operations [LTRO] and the targeted longer-term refinancing operations [TLTRO]). These measures have been supplemented by new measures specifically dedicated to alleviate the consequences of the pandemic. Even if all those measures have contributed to increasing the accommodative stance of monetary policy, some of them have also had distinct objectives. The latter needs a proper assessment as regards their fit towards those specific objectives.

The aim of this paper is not only to illustrate the macroeconomic effect of the accommodative stance of monetary policy but also to document the respective effects of two specific measures: the APP and the PEPP. The first one – the APP – aims at ensuring a *highly* accommodative monetary policy stance in order to weigh on inflation expectations and reach the inflation target. The role of the PEPP is to avoid disruption in the transmission of monetary policy across euro area countries and to that end, it aims at limiting the sovereign spreads. It is therefore important to assess whether those measures have attained their targets.

The APP was announced in January 2015, when the euro area was struggling to get out the double-dip recession and the inflation rate was far below the 2% target.² Under the APP, the ECB adopted quantitative easing (QE) measures as was done earlier by the Federal Reserve, the Bank of England and the Bank of Japan. The recovery led the ECB to progressively slow down and then stop net purchases as of January 2019.³ However, in September 2019, the Governing Council decided to reactivate the programme from November 2019, as there were signs that economic activity slowed down and with the inflation rate still not sufficiently converged to the inflation target. In March 2020, the euro area faced a new negative shock, which required to amplify the accommodative stance of monetary policy, through asset purchases.

Even if all euro area countries were hit by the pandemic, its diffusion was not uniform, with some countries hit harder and more rapidly than the other. The first consequences of the COVID-19 crisis were on the health systems. The implementation of lockdown measures was meant as the only way to slow down the spread of the virus. The higher the intensity of these measures, the stronger the expected economic impact on households and firms' revenues, hence the higher required fiscal support. Lockdown measures have therefore led to large increases in public debts and to the resurgence of sovereign risk in some fragile countries. As the shock was exogenous to euro area countries and fiscal policy was necessarily the main policy tool to tackle the crisis, it was important for countries to keep fiscal leeway. However, the possible increase in sovereign yields would have compromised the ability of countries to implement the required policies. Consequently, in order to dampen sovereign risk in the absence of fiscal federalism, the ECB has had to make sure that these sovereign spreads would remain contained. This is why the PEPP was announced on 18 March 2020 and then further extended twice in 2020.

¹ Local measures have been taken in Italy and Germany from the end of February but global lockdown measures have been first announced by Italy on 10 March 2020, followed closely by Spain (14 March) and France (17 March).

² In 2014, the annual inflation stood at 0.4% in the euro area.

³ Maintaining, still, reinvestments of the principal payments from maturing securities.

The COVID-19 crisis had already led to a surge of theoretical and empirical literature on its macroeconomic effects. Regarding the impact of central banks' response to the crisis, Rebucci et al. (2020) assess the impact of QE decisions taken by a large set of advanced and emerging central banks in March and April 2020. Their results suggest that QE has not lost effectiveness and that it has been associated with reduction in sovereign bond yields and exchange rate depreciations. However, their analysis suggests that the announcement of the PEPP has not triggered a significant decrease in the sovereign yield in the euro area, which is also confirmed by Bernoth et al. (2020). It may yet be noticed that the principal aim of this programme was not to weigh on the benchmark euro area yield but to decrease sovereign spreads. Besides, the allocation of weekly purchases across country markets was the main channel through which the ECB expected to influence spreads. In that way, the PEPP differs from the OMT (outright monetary transactions) announcement, as the effect of the PEPP was not intended to result only from a pure signalling effect. Finally, Ortman and Tripier (2020) do not show a direct effect of ECB decisions on spreads but rather suggest that they have mitigated the financial stress stemming from the diffusion of the pandemic. They show that the publication of daily figures on the number of COVID-19 cases increased the sovereign spread before the ECB decisions but that this effect has then progressively been muted after the ECB's decisions.

The rest of the paper is organised as follows. We first review the decisions taken by the ECB during the crisis and then provide a first macroeconomic assessment of their effectiveness. Finally, we specifically assess the impact of APP announcements with an event-study and the effect of the PEPP on sovereign spreads. All empirical assessments point to the consistency of outcomes with policy objectives.

2. A LARGE SET OF EXPANSIONARY MEASURES

The ECB has rapidly reacted to the outbreak of the pandemic and the upsurge of downside risks for economic activity and financial stability. As the monetary policy rate was already at the ZLB since March 2016,⁴ the ECB resorted to balance sheet policies and reiterated forward guidance announcements.⁵ The first measures were announced on 12 March 2020, followed by additional decisions on 18 March and 30 April. The ECB has extended its toolkit to deal with the ongoing crisis, which resulted in a sharp increase of the Eurosystem's balance sheet. From February 2020 to the end of January 2021, total assets have increased by more than EUR 2.3 trillion (Figure 1) representing 19.4% of 2019 GDP. By way of comparison, the size of the Federal Reserve balance sheet has increased by USD 3.1 trillion (14.5% of 2019 US GDP).

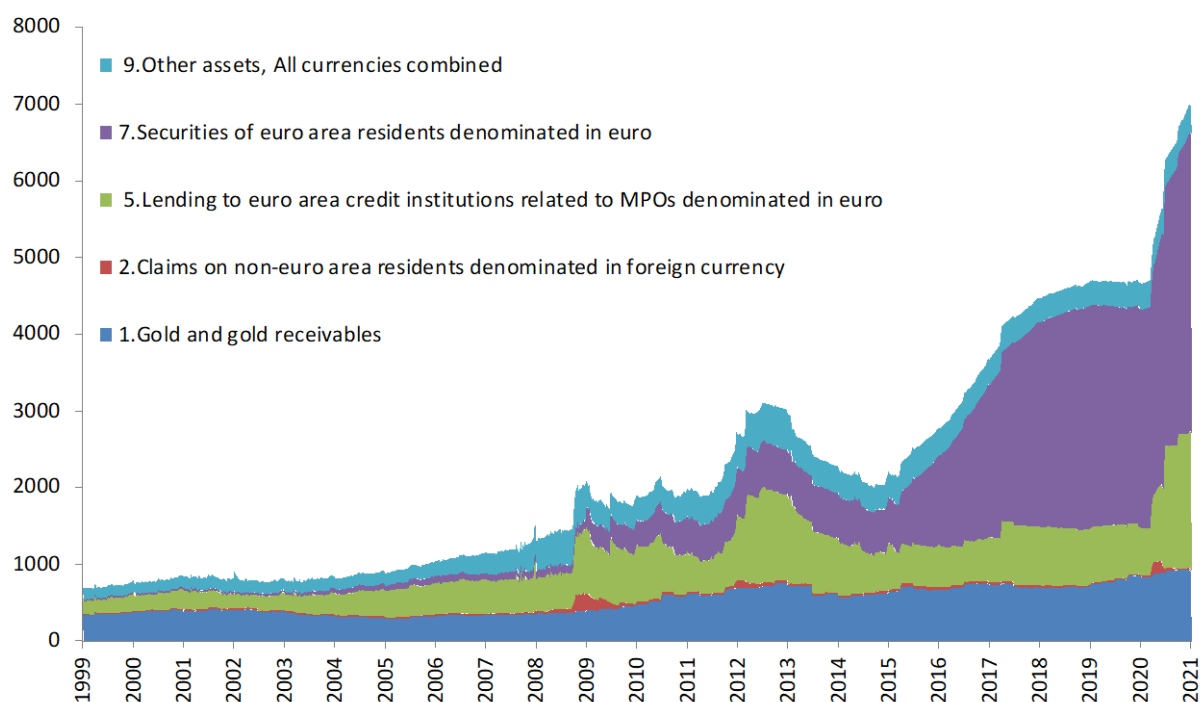
Balance sheet policies implemented by the ECB entail asset purchases (labelled securities held for monetary purposes in Figure 1) and liquidity operations (lending to euro area credit institutions related to monetary policy operations). The first decision was to add an additional envelope of EUR 120 billion to be used until end-2020 under the APP (Table 1).⁶ The PEPP was launched soon after, on 18 March 2020. It was first calibrated to EUR 750 billion with a deadline fixed for the end of 2020. In June 2020 and December 2020, the envelope was raised by EUR 600 billion and EUR 500 billion, respectively, to finally reach EUR 1.85 trillion. The horizon was also extended to June 2021 and March 2022, respectively. By end-January 2021, EUR 810 billion out of EUR 1.85 trillion of assets have been purchased. As explained in Blot et al. (2020), even if APP and PEPP consist in asset purchases – mainly public securities – they pursue different objectives. While the APP was implemented to provide the needed expansionary monetary policy to “ensure price stability”, the PEPP aimed to address the risk of fragmentation related to a surge of sovereign spreads in some countries. The first objective of the APP is therefore to provide additional stimulus and weigh on overall financing conditions in order to reach the inflation target. The rationale given to the PEPP suggests an implicit objective of spread targeting among euro area countries.

⁴ This is indeed the case for the interest rate on main refinancing operations. The interest on deposit facilities, which is the driving rate for the overnight interest rate in a context of excess liquidity, was set to zero in July 2012 and is even negative since June 2014.

⁵ The following statement was announced for the first time on 12 September 2019 and systematically reaffirmed at each Governing Council meeting since then: “The Governing Council expects the key ECB interest rates to remain at their present or lower levels until it has seen the inflation outlook robustly converge to a level sufficiently close to, but below, 2% within its projection horizon, and such convergence has been consistently reflected in underlying inflation dynamics.”

⁶ Looking at effective net purchases, the additional envelope was used in full until the end of 2020, with frontloading in the first months of the pandemic. The additional envelope came on top of the EUR 20 billion net purchases per month that started in November 2019.

Figure 1: Total assets of the Eurosystem, EUR billion



Source: ECB.

Regarding liquidity measures, the first decisions – on 12 March 2020 – consisted in easing the conditions applied to TLTRO III and providing liquidity to the credit institutions through additional LTROs. The conditions applied to TLTRO III were further eased in April and December 2020. Furthermore, on 30 April 2020, seven monthly refinancing operations were announced under the pandemic emergency long-term refinancing operations (PELTRO). These operations were settled from May to December 2020, with maturities between 8 and 16 months. In December 2020, it was also decided to offer four additional PELTRO operations between March and December 2021, with one-year maturities.

On 7 April 2020, the ECB adopted a package of temporary collateral easing measures that include valuation haircuts of 20%, extensions of the additional credit claims framework, waiver to accept Greek bonds as collateral and other temporary measures. The duration of these measures was extended until June 2022. Furthermore, on 22 April 2020, the ECB decided to grandfather (until September 2021) the collateral eligibility of marketable assets used in Eurosystem's credit operations that fall below minimum credit quality requirements.

Table 1: Main policy decisions taken by the ECB during the pandemic

	Asset purchases		Liquidity operations	
	APP	PEPP	TLTRO	LTRO / PELTRO
12 March 2020	Additional EUR 120 billion envelope until December 2020.		Reduction of interest rate applied to new operations (as low as -0.75%), recalibration of the terms.	Additional LTROs.
18 March 2020		Creation of the PEPP with a total envelope of EUR 750 billion until December 2020.		
30 April 2020			Reduction of interest rate applied to new operations (as low as -1%), recalibration of the terms.	Creation of the PELTRO.
4 June 2020		Increase and extended deadline for the envelope: EUR 600 billion until June 2021.		
10 December 2020		Increase and extended deadline for the envelope: EUR 500 billion until March 2022.	Extension of the reduced interest rate period, recalibration of the terms and additional operations.	Additional PELTRO operations.

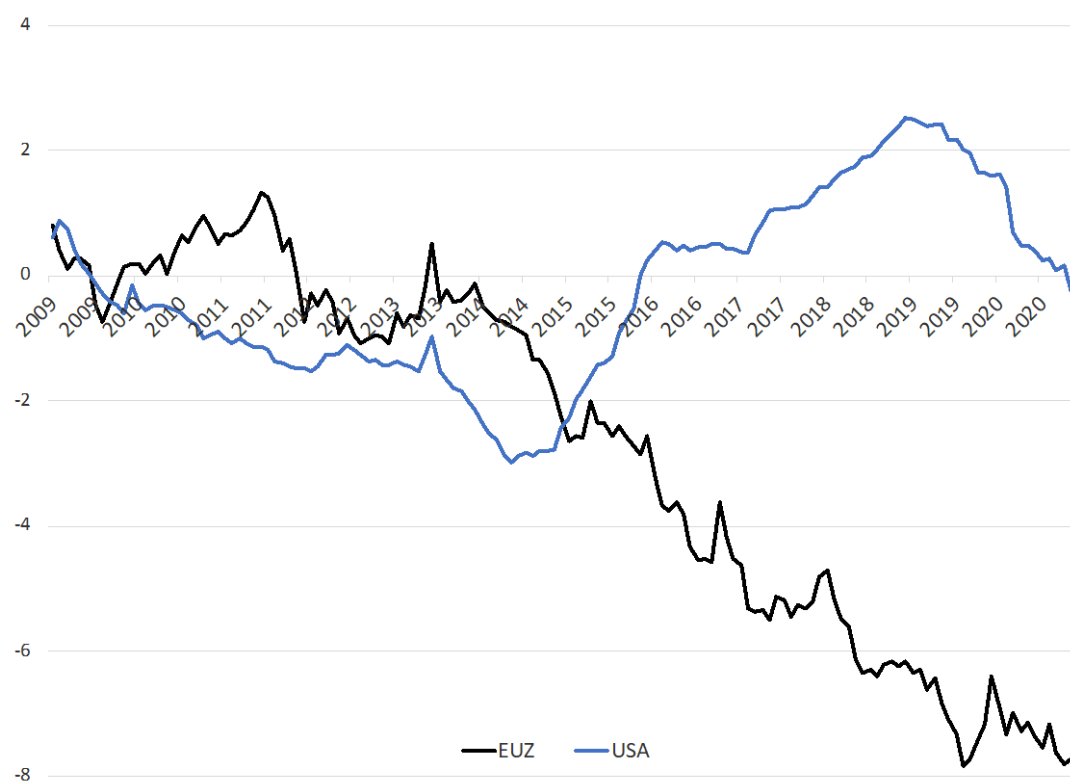
Source: ECB.

Note: The table summarises the main policy decisions taken by the ECB during the crisis. It focuses on decisions related to asset purchases and liquidity operations. It overlooks decisions regarding the announcements on the reinvestment policy of principal payments from maturing securities purchased under the APP, forward guidance announcements, on collateral and provision of foreign exchange liquidity through swap line arrangements.

Even if the aim of those measures are different and complementary, they all contribute to making the stance of monetary policy expansionary in the euro area. As the policy rate is stuck at the ZLB, it does not provide a reliable information on this stance. To account for non-standard measures, which mainly influence interest rates along the term structure of interest rates and above the overnight interest rate,

shadow rates have been computed.⁷ Based on the yield curve, they provide an assessment of the overnight interest rate, which is consistent with all measures: asset purchases, liquidity and forward guidance. Despite the uncertainty surrounding those measures, the shadow rate was close to -8% in December 2020 (Figure 2). Compared to the United States, the shadow rate is much lower for the ECB. However, the Federal Reserve had started to phase out unconventional measures in 2015 and the shadow rate estimated had returned to a positive territory. Measures taken by the Federal Reserve in 2020 have also contributed to easing the monetary stance for the United States as highlighted by the 1.9 percentage point decrease of the shadow, compared to a reduction of 1.3 percentage points in the euro area.

Figure 2: Monetary stance measured by the shadow rate, in %



Source: Wu and Xia (2016), retrieved from Eikon Datastream.

⁷ See Wu and Xia (2016).

3. ECB MONETARY POLICY EFFECTS: A MACROECONOMIC VIEW

There have been only a few attempts at estimating the macroeconomic impact of unconventional monetary policy shocks since the global financial crisis.⁸ The first reason is that unconventional policy decisions mainly aim at banking and financial stability, via asset price transmission. The second one relates to the difficulty of identifying monetary policy shocks with time series (see Miranda-Aggripino and Ricco, forthcoming): disentangling the unexpected monetary policy shock from the monetary policy decision requires to clearly identify the information that the policy decision has conveyed on the state of the economy. The third reason relates to the difficulty of identifying the monetary instrument when unconventional decisions are taken. In this situation, central bankers do not modify directly a policy rate. Rather, they modify the allocation and/or the size of their balance sheet to influence long-run interest rates as well as bond and stock prices.

Most attempts at discussing the macroeconomic impact of unconventional monetary policies have used the central bank balance sheet as the main driver of policy decisions. However, a change in the balance sheet can reflect other shifts in the economy, e.g. outputs or uncertainty. It is therefore important to isolate the exogenous part of the balance sheet so that one can then identify as a pure shock to the economy. While this latter statement is not specific to balance sheet shocks and it is shared with all other kinds of shocks, the macroeconomic literature on the determinants of central bank balance sheets is much less developed than that on the determinants of interest rates. In the latter case, the list of possible determinants is well circumscribed and some sign restrictions can unfold from well-known theoretical frameworks. In contrast, the macroeconomics of central bank balance sheet remains an open research field. Last, most quantitative easing measures decided by central banks since the global financial crisis have been publicly announced in advance: as for the ECB, it stated the amount of bonds it would be purchasing every month. Consequently, from 2015 onwards, the change in the balance sheet is mainly mechanical and results from the announced flow of assets purchase. Besides, from the end of 2008 to 2014, the size of the balance sheet was mainly driven by liquidity needs of credit institutions in the euro area and not necessarily related to the willingness of the ECB to expand monetary policy. Actually, these announcements do not correspond to *unexpected* shocks to the euro area economy.

Boeckx et al. (2017) study a vector autoregression (VAR) model of the euro area and identify central bank balance sheet shocks by introducing some zero restrictions on the instantaneous impact of unconventional monetary shock on output, prices and the policy rate (hence separating unconventional from conventional policy decisions). They also introduce sign restrictions on the instantaneous impact of the unconventional policy shock on interest rate spreads and on an indicator of financial instability (both with a negative sign). They finally assume a positive impact of the shock on the central bank balance sheet. They showed that between 2007 and 2014, unconventional monetary policy shocks produce higher output and inflation and may therefore help stabilise the macroeconomy.

In contrast with Boeckx et al. (2017), Lhuissier and Nguyen (2021) dismiss zero and sign restrictions and prefer to proxy unexpected variations in ECB balance sheet by relying on surveys conducted by Reuters and Bloomberg ahead of Governing Council meetings. Therefore, they highlight the difference between the expectations, not only on the size of the asset purchases but also on their pace, and the realisations. Their estimation period goes from 2015 to 2019. Results point to a weak impact of unconventional policy shocks on industrial output and on inflation (impulse response functions are weakly statistically significant) and contrast with those of Boeckx et al. (2017).

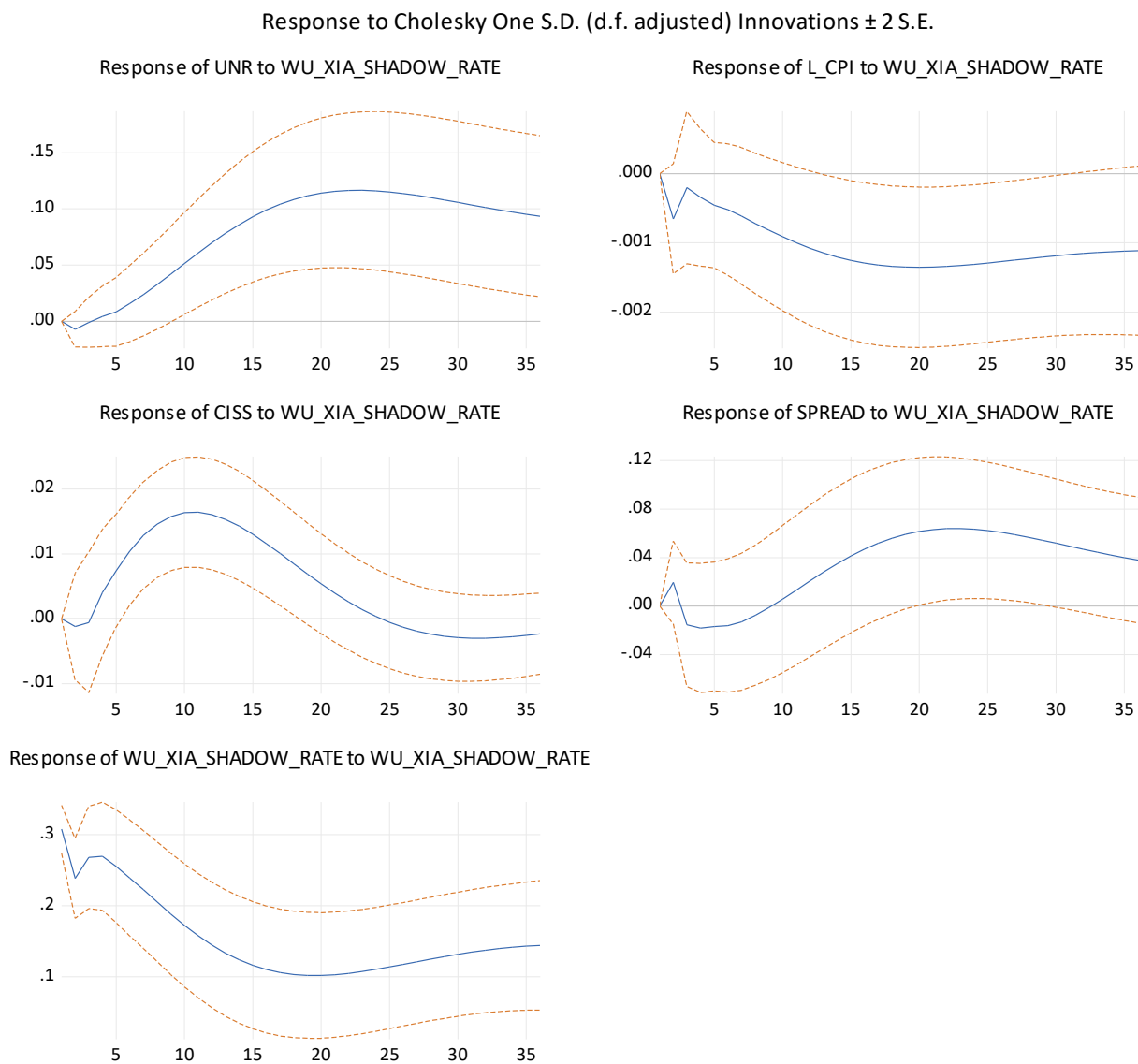
⁸ We abstract from event study here for, by construction, they do not convey information on the macroeconomy beyond a few days.

In complement to these two studies, we estimate another model in which we use a shadow rate as the instrument of monetary policy. The shadow rate calculates the artificial policy rate that prevails under the ZLB after the term structure of interest rates is introduced and reflects the unconventional measures that have been undertaken by the central bank. While new unconventional decisions do not shift the actual policy rate (at the ZLB), they may decrease long-term interest rates. The decline in long-term rates can be partly attributed to the short run policy decisions via the term structure and can be embedded in the shadow rate.

We estimate a VAR model (without restrictions) including: the unemployment rate (to estimate the real effect of monetary policy), the consumer price index (in log), the composite index of systematic stress (CISS), the spread between ten-year public bonds and the EONIA (the latter two variables to estimate the impact of monetary policy on financial stability) and the shadow rate. Monetary policy shocks are identified as the residuals of the shadow rate. Data come from Datastream, except the CISS (ECB) and the shadow rate (Wu and Xia, 2016). Data are monthly and go from January 2007 to December 2020. Results (reported in Figure 3) confirm that a positive shock to the shadow rate produces a real effect (unemployment increases), a nominal effect (CPI decreases) and a financial stability effect (the CISS and the spread tend to increase). However, it takes time for these macroeconomic effects to unfold. The respective impacts of monetary policy on the unemployment (upper-left impulse response function) and the inflation (upper-right impulse response function) rates are significant after almost a year. On the financial side, monetary policy has a rapid impact on financial instability, modifying the indicator after 6 months (middle-left impulse response function), whereas the impact on sovereign spreads (middle-right response function) takes almost 2 years to spread out.

All in all, these results point to the effectiveness of ECB policies since 2007 (shadow rates decline quite substantially, see Figure 2) to alleviate the crisis and boost inflation, while preserving financial stability. Monetary policy effectiveness does not mean that monetary policy has been powerful enough though. According to our results, a 1 percentage point unexpected drop in the shadow rate would have decreased the unemployment rate and increased inflation in the euro area by 0.3 percentage points each.

Figure 3: Impulse response functions – VAR model



Sources: Eikon Datastream, ECB, Wu website, own computations.

NB: These results show the impact of a *restrictive* monetary policy. The effects of an accommodative policy are symmetric.

4. ASSESSING THE EFFECT OF ASSET PURCHASES

As mentioned in ECB communications, the measures taken aim at providing a highly accommodative monetary policy stance. Yet, the use of balance sheet policies enables to tackle several objectives as they provide a larger toolkit compared to the standard policy rate decisions. The TLTRO, for instance, aims at supporting credit to households and firms. Regarding asset purchases, the ECB has also intervened on several markets: public securities, covered bond markets, asset-backed markets and corporate securities. However, most of asset purchases are concentrated on sovereign markets, through two programmes: the public sector purchase programme (PSPP), which is part of the APP, and the PEPP, introduced during the pandemic. While the APP aims at providing favourable financing conditions to promote price stability, the role of PEPP is mainly to ensure a homogeneous transmission of monetary policy across countries and implicitly to counter financial risk on sovereign yields and is then closer to the objectives of the securities market programme (SMP), implemented from 2010, and to the OMT, announced in September 2012. Implicitly, it is therefore geared toward a reduction of spreads. As those policies aim at different objectives, it is worth assessing whether APP and PEPP have effectively attained their objectives.

4.1. Does the APP influence inflation expectations?

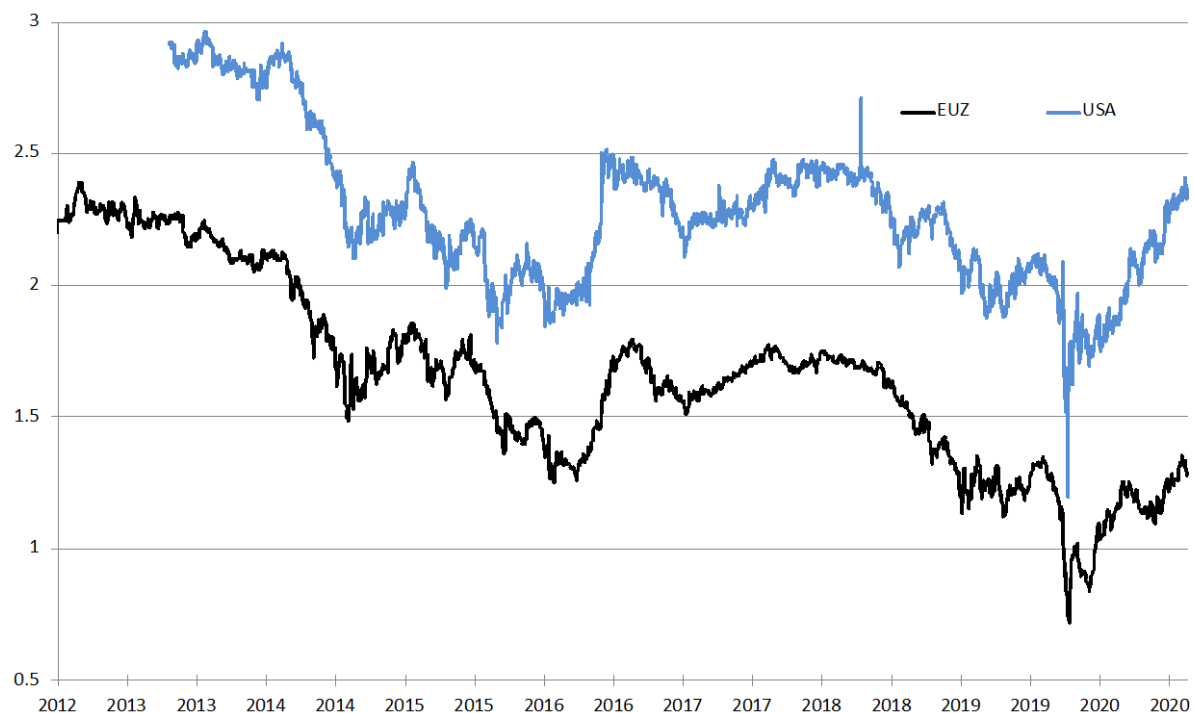
The role of APP is to provide a highly accommodative monetary policy stance in line with the primary objective of price stability in the euro area. As emphasized with the VAR model, it seems that those decisions have been effective at the macroeconomic level. We complement this analysis by focusing on the effect of APP announcement on market-based inflation expectations. Compared to the macroeconomic analysis, we aim to provide a high-frequency analysis of the APP decisions. Do announcements related to APP influence market perception of the effect of monetary policy? To that end, we focus on the 5-year on 5-year inflation rate, which is an indicator of long-term inflation, scrutinised by the ECB to assess its ability to anchor inflation expectations.

Inflation expectations play at least two important roles in central banking. First, as important inputs into price and wage setting, they provide a summary statistic of where inflation is likely to be headed. Second, if inflation expectations are well anchored, central banks can affect inflation through inflation expectations (Scharnagl and Stapf, 2015). The ability of a central bank to affect inflation expectations is therefore a direct measure of central bank credibility.

The central bank can influence inflation through the traditional channel of interest rates but also through expectations about future inflation. With the interest rate reaching the ZLB, central banks are now resorting to unconventional monetary policy tools. Signalling and reputation effects have hence become indispensable tools for influencing inflation (Coibion et al., 2020). In turn, the increase in the ECB's balance sheet size through asset purchase may also affect confidence and thus inflation expectations via a signalling channel (Borio and Disyatat, 2010) and van den End and Pattipeilohy, 2017)

In this context, the implementation of the APP is designed to influence inflation expectations. Specifically, its expansions which were announced in January 2015 and in September 2019 were aimed at guiding inflation expectations toward a future path consistent with the ECB's mandate of an inflation rate below, but close to, 2%. However, since the start of 2014, inflation expectations have fallen well below 2%, indicating that the ECB may have lost its ability to influence inflation expectations (Figure 4).

Figure 4: Market-based expected inflation, in %



Source: Eikon Datastream.

Market-based measures of inflation may help to assess the effectiveness of ECB policy measures (such as the APP) through an event study. Compared to other studies, not only do we assess the impact of announcements, but we also consider the effect of changes in the flow of purchases which are announced.

Methodology

Our event study analysis assesses the effect of ECB's monetary policy announcements on anticipated inflation, using a simple ordinary least squares estimation. Specifically, we estimate the following equation with daily data over the period 1 January 2013 – 31 December 2020.

$$\Delta \pi_t^e = \alpha + \beta_1 \cdot ME_t + \beta_2 \cdot \Delta VIX_t + \beta_3 \cdot \Delta IR_t + \beta_4 \cdot NSMP_t + \mu_t$$

π_t^e is our dependent variable of interest (i.e. inflation expectation proxied by 5-year on 5-year inflation rate in first difference). The VIX is the volatility index for the euro area and we employ it to control for periods of heightened volatility in euro area financial markets. The variable *IR* stands for interbank interest rate (*EONIA*). The variable *ME* is a specific event dummy associated with the announcement of the APP in a first step, and with the amount of purchases announced for each APP in a second step. The vector *NSMP* contains the event dummies related with other ECB monetary policy announcements, while α is a constant term.

An event study assumes high frequency daily or intraday data. Regarding inflation expectations, we obtain daily data from DataStream. This methodology allows us to consider the time window of the

monetary event. It should be noted that this event window does not distinguish between the effect of the press release and the effect of the press conference, as both occur on the same day.⁹

Results

First, we analyse the effect of APP announcements on expected inflation (Table 2). In the first regression (column 1), we estimate the impact of APP announcements only, controlling for the first difference of the VIX index and the first difference of the EONIA rate. Our event study shows a positive and significant relationship in which an APP announcement is associated with an increase in the variation of expected inflation of 0.022 percentage points. If the expected rate of inflation before the APP announcement was 1.5%, it would increase to 1.52% after the announcement. This is not a major increase. Yet, it is positive and significant and it is therefore consistent with the APP objective.

Second, we use the information content communicated by the ECB related to the APP. The implementation of APP can be considered as a flow-based strategy since the ECB announces a quantitative target for the monthly purchases. Those decisions provide therefore an additional information to the market and the role of this information can be assessed with the event study identification strategy. In the second step, we study the effect of announcements of APP amounts on expected inflation. The results are displayed in (Table 3) where the first regression is the same as in (Table 2) except that we consider the announcement of the amount of purchases. We find a positive and significant relationship in which a monthly increase of EUR 10 billion of APP leads to an increase in the variation of expected inflation of 0.006 percentage points.

Table 2: Event study analysis on APP decisions (1 day window)

Variables	Every day of observation		ECB meeting days	
	Expected infl.	Expected infl.	Expected infl.	Expected infl.
APP	0.0221** (0.0104)	0.0224** (0.0109)	0.0206* (0.0112)	0.0200* (0.0118)
1.TLTRO		-0.00300 (0.0141)		0.00377 (0.0198)
1.PEPP		-0.00263 (0.0249)		-0.00286 (0.0265)
D.vix	-0.00154*** (0.000324)	-0.00154*** (0.000324)	-0.00178*** (0.000668)	-0.00176** (0.000673)
D.eonia	0.0191** (0.00974)	0.0190* (0.00974)	0.473* (0.274)	0.493* (0.273)
Constant	-0.000569 (0.000375)	-0.000562 (0.000373)	-0.000240 (0.00260)	-0.000191 (0.00235)
Observations	2,087	2,087	73	73
R-squared	0.032	0.032	0.158	0.160

Source: Authors' estimations.

⁹ The ECB announces the policy decision in a press release published at 13h45. It is then followed by a press conference that begins at 14h30 where the ECB President reads a statement and conducts a Q&A session. The ECB press conference statement provides a rational for the policy decision and presents an outlook of the future course of monetary policy. See Altavilla et al. (2019) for a discussion on the importance of the communication timing of the ECB.

The robustness of these results is checked across different specifications in Tables 2 and 3. In columns 2 and 4 we control for other ECB announcements of unconventional monetary policy measures such as TLTRO and PEPP on inflation expectations. In addition, in columns 3 and 4 we regress our expected inflation data on a sub-sample with only the days of monetary policy meetings. We find that the results are significant and robust to these different specifications. We therefore conclude that APP announcements have been effective at improving the anchoring of inflation expectations and that not only do market participants react to the decision to implement an asset purchase policy but they also react to the information related to the flow of monthly purchases. This result is found for all APP decisions and does not only lean on the decisions taken during the pandemic, but it suggests that the decision taken on the 12 March 2020 to increase the monthly flow of purchases of public securities had a significant impact on market-based long-term inflation rates.

Table 3: Event study analysis on APP decisions (1 day window)

Variables	Every day of observation		ECB meeting days	
	Expected infl.	Expected infl.	Expected infl.	Expected infl.
APP_flow	0.000590*** (0.000219)	0.000647*** (0.000231)	0.000553** (0.000214)	0.000581** (0.000251)
1.TLTRO		-0.0128 (0.0168)		-0.00655 (0.0214)
1.PEPP		-0.00265 (0.0249)		-0.00330 (0.0263)
D.vix	-0.00155*** (0.000323)	-0.00156*** (0.000323)	-0.00188*** (0.000526)	-0.00190*** (0.000540)
D.eonia	0.0190* (0.00971)	0.0187* (0.00969)	0.454* (0.255)	0.420* (0.250)
Constant	-0.000555 (0.000375)	-0.000542 (0.000373)	9.48e-05 (0.00256)	0.000350 (0.00236)
Observations	2,087	2,087	73	73
R-squared	0.034	0.035	0.191	0.194

Source: Authors' estimations.

4.2. Does the PEPP influence sovereign spreads?

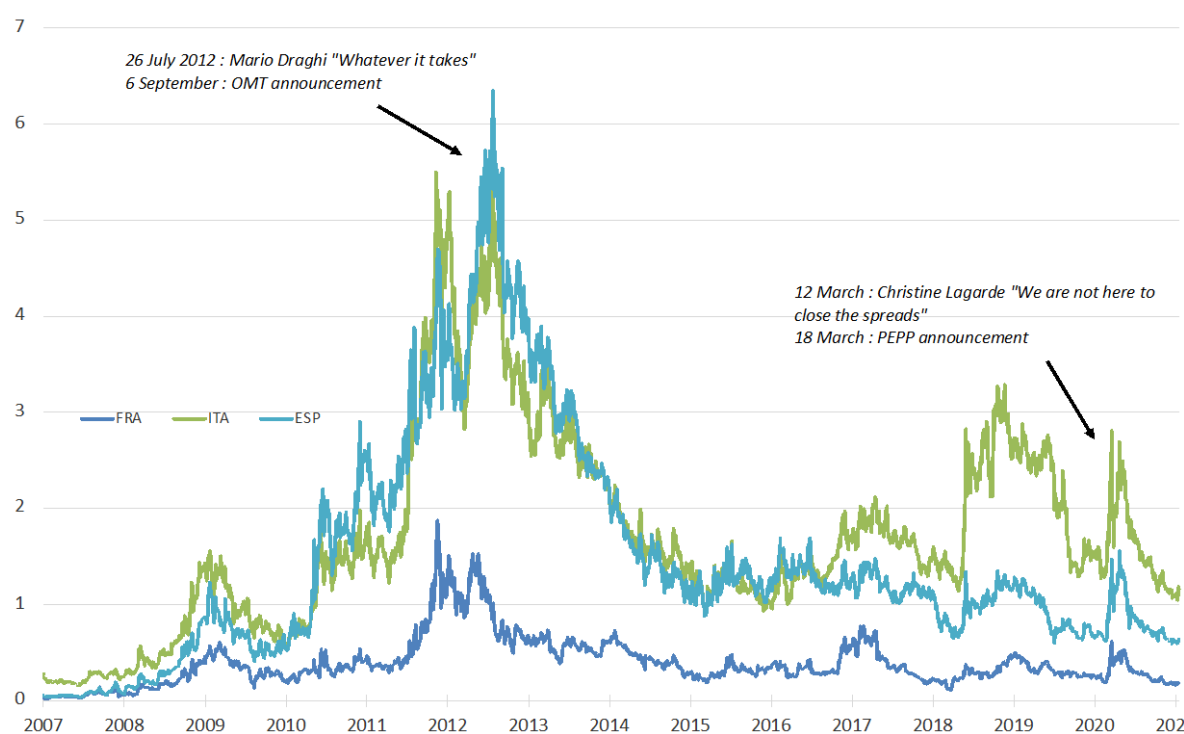
It may first be noticed that the PEPP was not announced during a scheduled meeting of the Governing Council but a few days later. When it was decided, it was simply announced with a press release indicating the total envelope of the program and stipulating that purchases would be conducted in a “flexible manner over time, across asset classes and among jurisdictions”. The message was therefore that deviations to the capital key would be tolerated.¹⁰ The aim was to avoid fragmentation risk, e.g. the risk that monetary easing is not equally transmitted in some countries because of a rise in the sovereign spread. As claimed by Christine Lagarde on 30 April 2020: “we will use any and all flexibility that we have in accordance with our mandate in order to make sure that our monetary policy is

¹⁰ Under the PSPP, the cross-country allocation of purchases are indeed expected to be realised according to the countries' respective share of the ECB capital.

properly transmitted to all jurisdictions". After the 4 June 2020 meeting, she reaffirmed that "First of all, it [the PEPP] has a backstop function (...). It is intended and it has demonstrated its capacity to deal with short-term market stress. It has the capacity to address the risk of market fragmentation".

It seems that this objective was well understood by financial markets (Figure 5) as was the case in 2012 when Mario Draghi invoked the famous "whatever it takes" and announced the OMT a few weeks later.¹¹ The outbreak of the pandemic and the expectation that it would bring governments to resort to necessary and significant fiscal measures has led to the resurgence of sovereign risk, notably for countries with a high level of debt and those first hit by the pandemic. It was notably the case in Italy. From mid-February to 11 March 2020, the spread on the Italian sovereign yield had risen by 0.6 percentage points, reaching 195 basis points. It jumped to a record level of 280 basis point after the declaration of Christine Lagarde on 12 March 2020 saying "we are not here to close spreads". The announcement of the PEPP changed the market sentiment and sent the signal that the ECB was actually preoccupied by the spreads. On 26 March 2020, the Italian spread had dropped to 1.6%.

Figure 5: Sovereign spread in the euro area, in percentage points



Source: Eikon Datastream.

Contrary to the OMT, the PEPP does not boil down only to an announcement effect. By declaring that purchases would be conducted in a flexible manner, it clearly said that weekly operations would be adjusted in case of rising turmoil in sovereign markets. Thus, the effect of the PEPP may be distinct and stronger than the effect of the OMT. In that regard, the PEPP is closer to the SMP.¹² The main difference stems from the announcement of a total envelope, which was adjusted during the year.

¹¹ See Altavilla et al. (2016) for an analysis of the effect of these decisions.

¹² See for instance Szczerbowicz (2015), Eser and Schwaab (2016) and Ghysels et al. (2017) for analyses on the effectiveness of the SMP.

The effective breakdown of purchases under the PEPP does show neither a strong departure from the capital key (Table 4) nor a high volatility. The share of Belgian securities ranged from 3.5% and 3.7% for instance. Regarding securities issued by Germany, it ranged from 25.1% to 27.1% while the German share in the ECB capital key is 26.4%. The main variance in those purchases concerns France and Italy. After the launch of the PEPP, it seems that the Eurosystem has purchased a higher proportion of Italian sovereign securities. The share accounted for 21.6% against a capital key of 17%. It has then progressively converged to the capital key. The adjustment was mainly realised on French securities since the share of purchases was well below the French capital key. Besides, it may be noticed that those figures, provided for 2- or 3-month periods may hide a higher variance on a weekly basis.

Table 4: Breakdown of public sector securities under the PEPP

	Mar-May	Jun-Jul	Aug-Sep	Oct-Nov	Dec-Jan	Cumul. Mar-Jan	Capital Key*
Austria	2.8	2.8	2.9	3.0	3.0	2.9	2.9
Belgium	3.7	3.5	3.7	3.7	3.7	3.7	3.6
Cyprus	0.3	0.2	0.2	0.2	0.2	0.2	0.2
Germany	27.1	25.1	26.5	27.0	26.9	26.4	26.4
Estonia	0.0	0.1	0.0	0.0	0.0	0.0	0.3
Spain	13.0	12.9	12.3	12.2	12.2	12.6	12.0
Finland	1.9	1.8	1.8	1.9	1.9	1.8	1.8
France	13.7	19.5	20.5	20.9	20.8	18.7	20.4
Greece	2.7	2.9	2.5	2.5	2.5	2.7	2.5
Ireland	1.7	1.6	1.7	1.7	1.7	1.7	1.7
Italy	21.6	19.6	18.0	17.4	17.4	19.1	17.0
Lithuania	0.6	0.3	0.3	0.1	0.1	0.3	0.6
Luxembourg	0.3	0.2	0.2	0.2	0.1	0.2	0.3
Latvia	0.2	0.2	0.0	0.1	0.0	0.1	0.4
Malta	0.1	0.0	0.1	0.0	0.0	0.0	0.1
Netherlands	6.0	5.6	5.9	6.0	6.0	5.9	5.8
Portugal	2.4	2.5	2.4	2.4	2.4	2.4	2.4
Slovenia	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Slovakia	1.3	0.8	0.5	0.3	0.6	0.8	1.1
Total	100	100	100	100	100	100	100

Source: ECB.

*: It must be noted that even countries which are not in the euro area have subscribed to the ECB capital. Capital keys are here adjusted to account only for countries in the Eurosystem.

Detailed data on those weekly operations are not provided by the ECB. However, the total amount of purchases under the PEPP is known so that it is possible to test whether the PEPP has been effective at reducing spreads in the euro area. However, we need to account for potential endogeneity problems

since purchases may also depend on financial stress and on rising spreads. As PEPP aims at avoiding fragmentation, the ECB may decide to increase the weekly purchase of securities for which stress has resurfaced. Consequently, we cannot test directly the following equation:

$$spread_{i,t} = \alpha_i + pepp_t$$

Where the spread is the difference at the end of week (t) between the sovereign yield in country (i) and the German sovereign yield: $spread_{i,t} = sov_yield_i - sov_yield_{deu}$.

We resort to a two-step approach where we first estimate the relationship between weekly purchases and an indicator of sovereign stress.¹³ The residual from this first-stage equation can then be used as a proxy of PEPP exogenous shocks, which is used in the second-stage equation to assess its impact on the sovereign spread of each country. As we have weekly data, we also consider that PEPP decisions in week (t) depend on sovereign stress in the previous week. The indicator of sovereign stress is simply the first component of a principal component analysis estimated over 10 sovereign yields.¹⁴ The first-stage and second stage equations are:

$$pepp_t = \theta + \rho \cdot pepp_{t-1} + \beta_1 \cdot pca_spread_{t-1} + \beta_2 \cdot pca_spread_{t-2} + \gamma \cdot VIX_t + \epsilon_t^{pepp}$$

$$spread_{i,t} = \alpha_i + \beta_i \epsilon_t^{pepp} + \theta \cdot X_t$$

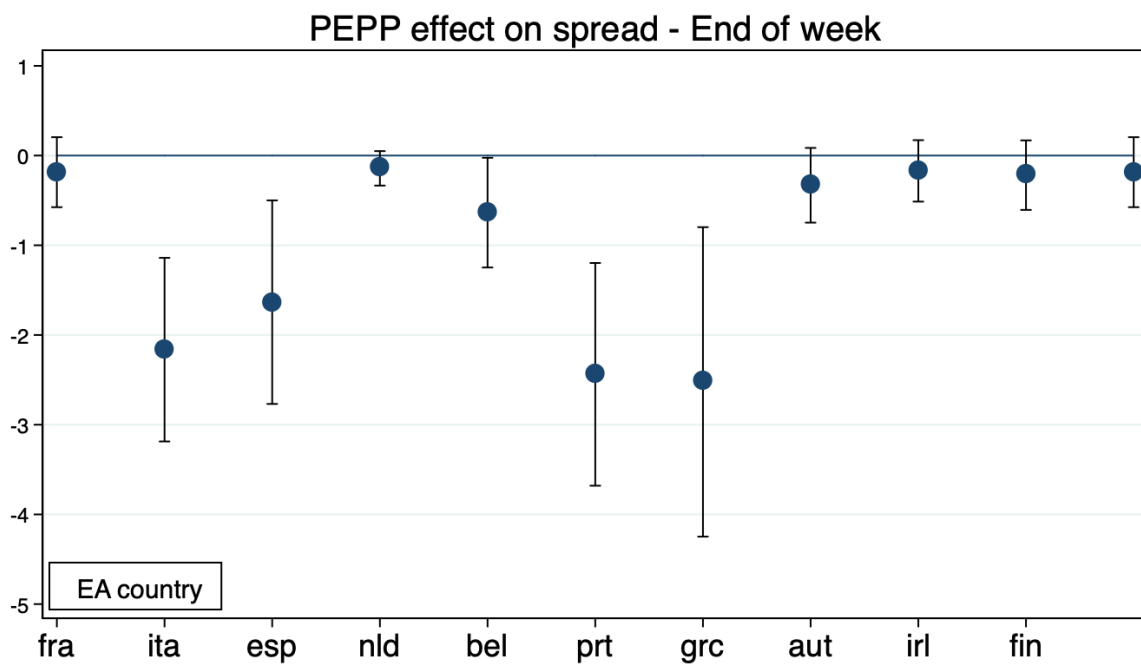
With $pepp$ expressed in logarithm and X a vector of controls including two lags of the spread, an indicator of financial stress (the VIX) and the lagged value of $pepp$.

The result of the second-stage equation for each sovereign yield are displayed by Figure 6 and shows a significant response, at the 5% percent level, of the Italian, Spanish, Belgian, Portuguese and Greek spreads at the end of the week to the PEPP. Other sovereign spreads do not react significantly to the decision to increase the weekly purchase of public securities under the PEPP. We show in the appendix that the reduction of spreads is also effective the week after and if we consider an alternative measure of the sovereign stress in the first-stage equation.

¹³ See Blot et al. (2020b) for a similar approach.

¹⁴ France, Italy, Spain, the Netherlands, Belgium, Portugal, Greece, Austria, Ireland and Finland.

Figure 6: Reaction of sovereign spreads to PEPP, in basis points



Source: Authors' estimation.

These results show that PEPP seems to be an effective instrument to reduce spreads, notably for countries that can be considered at risk, since it has no effect on the sovereign spread of France, the Netherlands and Austria for instance. But for those countries, the financial stress was limited.

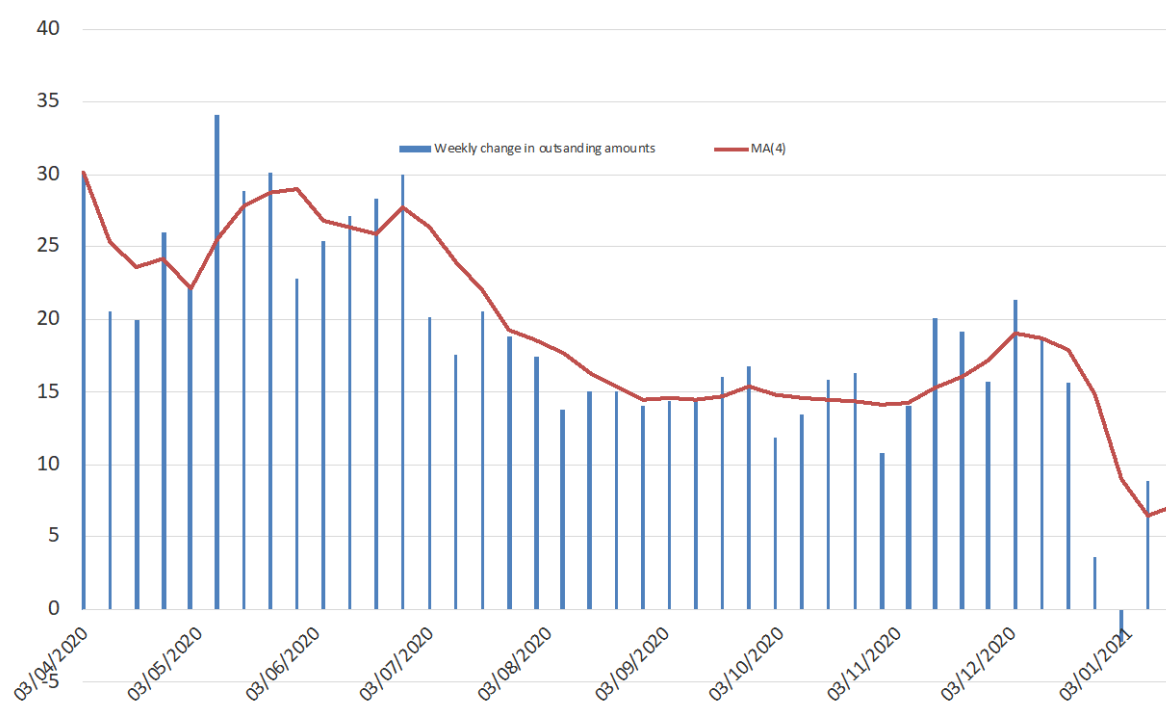
5. CONCLUSION

This contribution has reviewed the different policy measures introduced by the ECB since the inception of the COVID-19 crisis in Europe, mainly the extension of APP and the introduction of PEPP. APP and PEPP have had distinct objectives in comparison with former policies. APP has been oriented towards inflation expectations while PEPP has been oriented towards sovereign spreads. Consequently, we analyse the effects of APP announcements (including asset purchases flows) on inflation expectations and show that they help steer expectations upward. We also analyse the impact of PEPP on sovereign spreads and show that PEPP has had heterogeneous effects that have alleviated fragmentation risk: PEPP has had an impact on the sovereign spreads of the most fragile economies during the pandemic (e.g. Italy) and no impact on the least fragile (e.g. the Netherlands). Finally, the contribution has also shown that overall macroeconomic effects have been in line with expected outcomes since the mid-2000s: monetary policy measures have had real effects on euro area unemployment rates, nominal effects on inflation rates and financial effects on banking stability.

In the absence of a common fiscal policy and Eurobonds, it is important that euro area members preserve their ability to use their fiscal policy to deal with the health, social and economic consequences of the pandemic. In this respect, it is worth noticing that at the end of December 2020, central banks purchases were in line with the initial envelope: EUR 750 billion. An increase in the size of the program may be useful only in case financial risks re-emerge. Weekly purchases have been high at the beginning of the crisis and have decreased after (Figure 7). However, sovereign spreads have not completely vanished, making monetary policy transmission not fully homogeneous across countries. By the end of January 2021, the Italian sovereign yield was still more than 1 percentage point above the German sovereign yield, increasing the relative fiscal cost of emergency measures taken by the Italian government to deal with the crisis.¹⁵ Italian yields may well be at record low levels, even below US yields. However, in comparison with German bunds, at record *lower* levels, it may not be fair to penalise Italy in the context of this exogenous shock since it puts a drag on the ability to finance health expenditures or to provide help to agents hit by lockdown measures. Instead of announcing a total envelope, the ECB could cap domestic spreads for the time of the crisis to eliminate fragmentation risk and ensure financial stability. As claimed by Christine Lagarde on 19 March 2020: “fiscal policies must be front and centre in this response. Monetary policy has a vital role to play in tandem.” Capping spreads would be a good way to reconcile actions with words.

¹⁵ The total impact is reduced since the Bank of Italy holds more than 20% of Italian debt and therefore may redistribute the payments received on this debt to the government.

Figure 7: Weekly purchases of public securities under PEPP, in EUR billion



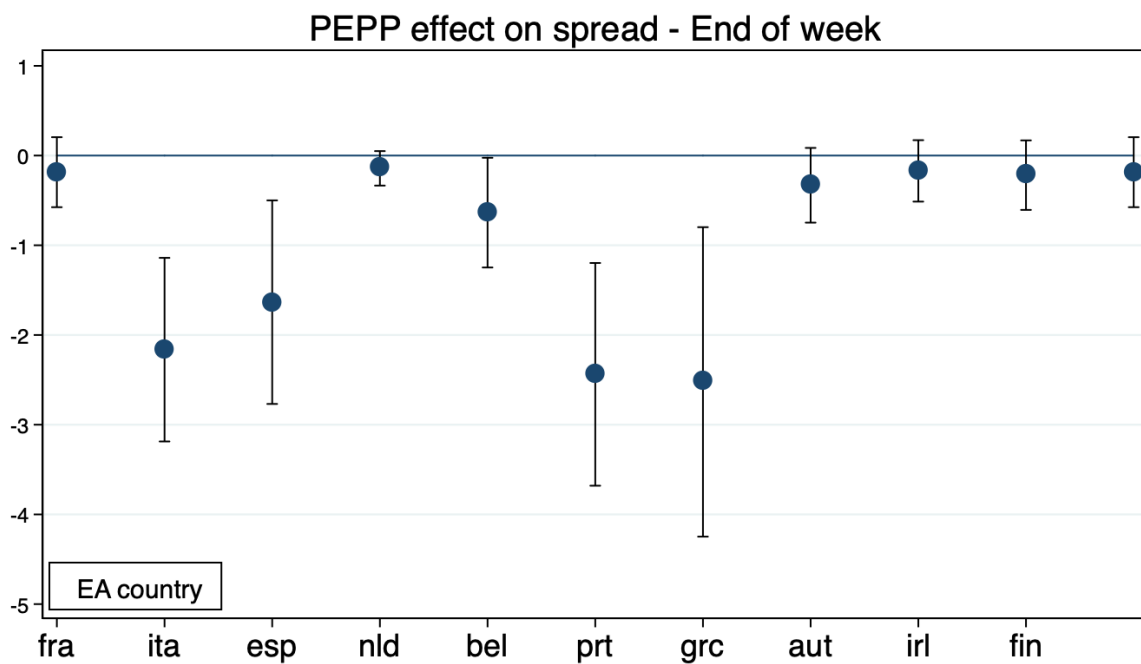
Source: ECB.

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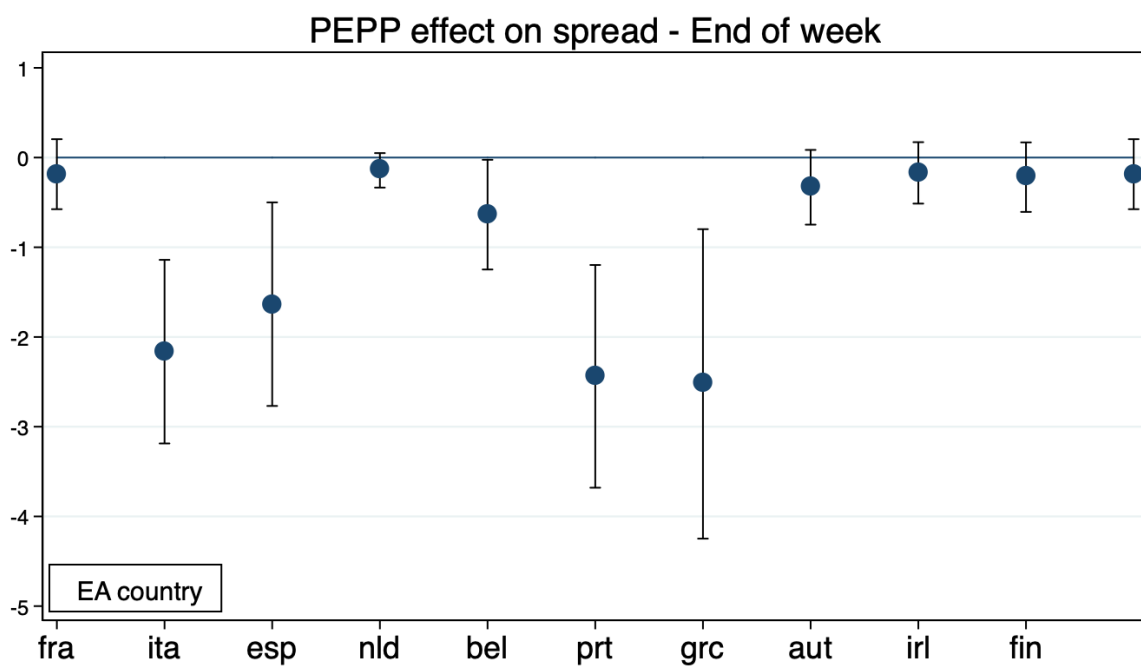
ANNEX

Figure 8: PEPP effect on spreads – one week after, in basis points

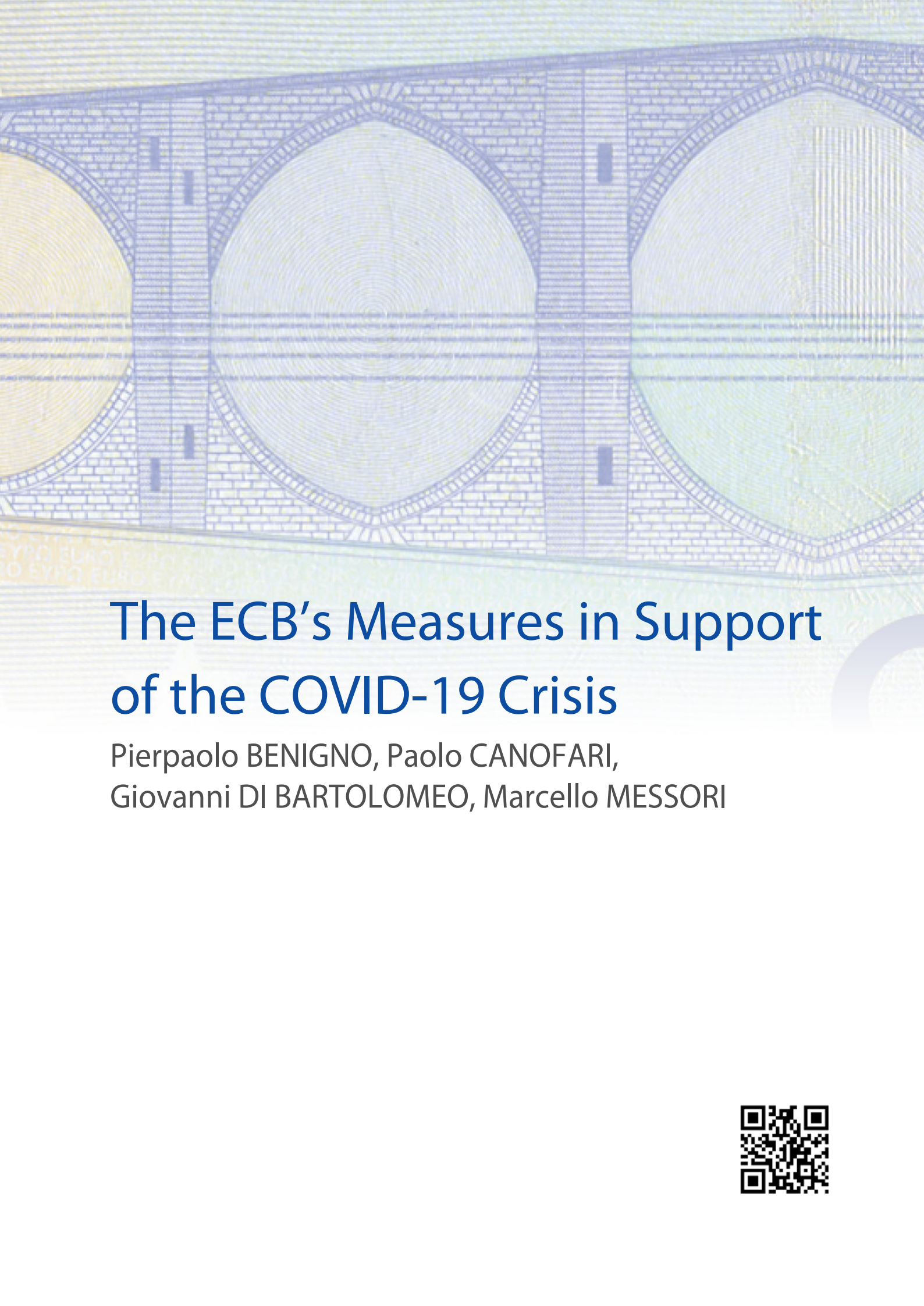


Source: Authors' estimation.

Figure 9: PEPP effects on spread (alternative measure of sovereign stress), in basis points



Source: Authors' estimation.



The ECB's Measures in Support of the COVID-19 Crisis

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Abstract

This paper illustrates and discusses the monetary policies activated in response to the COVID-19 crisis. We argue that these policy measures have stabilised the European economic and financial system by incentivising banks' lending to households and businesses and by indirectly creating short-term fiscal capacity also for those Member States of the euro area that have a very high government debt/GDP ratio.

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LIST OF ABBREVIATIONS

APP	Asset purchase programme
EEPUI	European Economic Policy Uncertainty Index
EU	European Union
NG-EU	Next Generation - EU
NRRP	National Recovery and Resilience Plan
PELTRO	Pandemic emergency longer-term refinancing operations
PEPP	Pandemic emergency purchase programme
RRF	Recovery and Resilience Facility
SSCI	Systemic Stress Composite Indicator
TLTRO	Targeted longer-term refinancing operations

EXECUTIVE SUMMARY

- **The ECB's expansionary monetary policy has stabilised the European economic and financial system** by indirectly creating short-term fiscal capacity at the national level and by incentivising banks' lending to households and businesses.
- **The first descriptive evidence of these aspects is offered by the examination of the monetary policy roadmap, implemented by the ECB after the spread of COVID-19.** This roadmap is centred on three initiatives: the strengthening of already operative monetary policy tools (such as the APP and the TLTRO III); the implementation of an emergency tool to increase the purchase of government bonds and other securities (PEPP); and the relaunch of refinancing operations with an unlimited potential amount at a fixed interest rate (PELTRO).
- **The ECB's policy initiatives have been implemented since March 2020 and have made recourse to monetary and banking channels.** Despite their significant impact, they can be reduced to a limited number of events characterised by actual decisions and/or policy announcements.
- **To study the possible impact of these events on spreads in financial markets and inflation expectations, we apply an event-based methodology.** To overcome the limitations of this methodology, we complement it with a qualitative analysis of the same variables.
- **The results concerning the spreads for government debts in the euro area and in Italy are particularly important.** However, some events offer interesting suggestions even with reference to spreads in banks' costs and in inflation rates.
- **The conclusion is that the ECB's expansionary monetary policy has positively affected the functioning of the euro area economic system and has avoided a severe deflation.**
- **An open question, however, still remains:** which is the positive impact imputable to the ECB's monetary policy in itself and which to the innovative interaction between an expansionary monetary policy and expansionary fiscal policies?
- **The answer to this question is crucial for policy makers.** In fact, this answer should clarify if it is reasonable to pursue an effective policy mix between the ECB's initiatives and the centralised fiscal policy measures made it possible by Next Generation – EU.

1. INTRODUCTION

The pandemic represents a significant challenge to monetary policy. “The coronavirus (COVID-19) has produced a highly unusual recession and is likely to give rise to a similarly unsteady recovery” (Lagarde, 2020a). The policies activated by the European Central Bank (ECB) have therefore been extraordinary. This paper illustrates and discusses the impact of the ECB’s recent policy on relevant spreads in financial markets and on inflation expectations.

We argue that the expansionary monetary policy measures, activated since March 2020 by the ECB and by the Eurosystem of national central banks in response to the COVID-19 shock,¹ have stabilised the European economic and financial system by indirectly creating short-term fiscal capacity also for the heavily indebted euro area Member States and by incentivising banks’ lending to households and businesses.

These achievements have been accomplished through policy tools aimed at guaranteeing the effectiveness of the monetary and banking transmission mechanisms, at supporting the demand for financial assets in circulation, at avoiding the fragmentation of the euro area financial markets, and at ensuring accommodative liquidity conditions for the euro area banking sector. The indirect results have been the actual expansionary stance of national fiscal policies as well as low volatility in the European financial markets and favourable access to the European credit market for households and firms, despite the dramatic macroeconomic exogenous shocks.

The rest of the paper is organised as follows. Section 2 provides a taxonomy of recent policy measures adopted by the ECB to counteract the pandemic crisis. Section 3 evaluates the impact of these measures on key variables (spreads in financial markets and inflation expectations) by applying an event-based methodology. Section 4 provides a broader illustrative view of the post-pandemic behaviour of relevant spreads in financial markets and of inflation expectations. Section 5 concludes the paper.

¹ For the sake of simplicity, in the following we will often utilise the label ECB to indicate the Eurosystem of national central banks.

2. THE ECB'S RESPONSE TO THE COVID-19 CRISIS

The ECB's recent measures can be grouped into two different categories that refer, respectively, to monetary and banking channels.² The former category includes the monetary policy stimuli based on the continuation and the one-off strengthening of the asset purchase programme (APP), whose re-start was decided by the ECB in September 2019 and implemented in the following November, and on the launch of the new pandemic emergency purchase programme (PEPP). The latter category includes the refinancing, at generous conditions, of the euro area banking sector by means of the pandemic emergency longer-term refinancing operations (PELTRO) and by strengthening the targeted longer-term refinancing operations (TLTRO III), already in place. Moreover, these policy measures were accompanied – for good or ill – by a number of ECB policy announcements.

In what follows we describe these two sets of measures and the related announcements in detail.

2.1. The monetary channel

On 12 March 2020, the ECB Governing Council strengthened the existing APP. The programme consisting of a EUR 20 billion monthly purchase of securities (mainly government securities) was confirmed; moreover, an overall temporary purchase increase of EUR 120 billion by the end of 2020 was approved. In the extraordinary meeting held a few days later (18 March 2020),³ the ECB Governing Council launched the PEPP, designed to offset the negative impact of the pandemic shock on firms' liquidity and on households' income by easing the fiscal constraints on national public spending and the short-term sustainability conditions of the consequent increase in national government debts. The PEPP was based on an envelope of EUR 750 billion to be pumped into the economic system by the end of 2020. The architecture of this new programme coincides with the APP, in the sense that the PEPP purchases the same type of financial assets (mainly government securities) and meets the "capital-k" rule to determine the national composition of these securities.⁴ However, in the PEPP case, the capital-k rule is applied in a more flexible way: "fluctuations in the distribution of purchase flows over time, across asset classes and among jurisdictions" are permitted, given that these fluctuations are compatible with this rule's final equilibrium.

After the March 2020 decisions, the PEPP was subjected to two major changes.

The first change, approved in the ECB's meeting of June 2020, concerned three factors. Firstly, the programme was increased by EUR 600 billion, so that it reached a total amount of EUR 1.35 trillion. Second, its time horizon was extended at least until the end of June 2021; and, in this respect, the ECB's Governing Council committed itself to continuing the PEPP as long as the European economies are affected by the pandemic emergency. Third, the ECB decided to reinvest "the maturing principal payments from securities purchased under the PEPP" until, at least, the end of 2022.

The second major change, implemented during the ECB's meeting of December 2020, was characterised by a further increase of the PEPP envelope by EUR 500 billion, reaching a total of EUR 1.85 trillion. The time horizon of the programme was extended to at least the end of March 2022, under the usual clause that the PEPP's net purchases would last until the coronavirus crisis phase is over. Finally,

² This section partly resumes the content of Messori (2020: Section 3). If not differently specified, quotations refer to the ECB's press conferences relative to various Governing Council's meetings.

³ As we will point out below (see Section 2.3), this unplanned new meeting was also required to correct a miscommunication made by President Lagarde in the Q&A of the 12 March meeting.

⁴ In the same meeting, the ECB extended the set of eligible financial assets which can be purchased under the APP and the PEPP to non-financial commercial papers that meet a sufficient credit quality. It also eased the collateral standards to include "claims related to the financing of the corporate sector." This move was reinforced by the following lowering of the minimum quality of collaterals temporarily accepted by the ECB (see the decisions taken on 7 and 22 April 2020).

the ECB's Governing Council extended the reinvestment of principal payments from maturing securities purchased under the programme until at least the end of 2023.

In terms of forward guidance, the above-described decisions indicate that the ECB has committed itself to continuing the expansionary utilisation of the monetary channels that also ease the national fiscal policies constraints until the expiry date of the full spending commitments included in the National Recovery and Resilience Plans (NRRPs), that is, in the Plans to be elaborated by the European Union (EU) Member States to have access to the funds of the Recovery and Resilience Facility (RRF) programme.⁵ This means that, in the absence of unexpected events, the current expansionary stance of European policies (monetary policy, national fiscal policies, centralised fiscal policy) will last until the end of 2023. However, the ECB decided to pursue its expansionary monetary policy also through the banking channel.

Regarding this last transmission mechanism, the ECB introduced a temporary LTRO during the meeting of 12 March and launched a new LTRO program (the PELTRO) during the meeting of 30 April 2020. It strengthened its operating TLTRO III during the meetings of 12 March and 30 April 2020.⁶ Finally, both the PELTRO and the strengthened TLTRO III were further improved in the ECB's meeting of 10 December 2020.

2.2. The banking channel

The temporary LTRO, approved on 12 March, should be considered a short-term liquidity bridge to cover the period between mid-March 2020 and the following 24 June, which is the expiry date of this refinancing, as well as the starting date of the strengthened TLTRO III. The temporary LTRO was centred on the ECB's approximate weekly liquidity supplies to euro area banks with full allotment at an interest rate set by the ECB's average interest rate on deposit facility (at that time and even today – i.e., February 2021, - this rate is equal to -0.5%).

The new programme, labelled PELTRO, was instead centred on seven refinancing operations to be implemented between May and December 2020 and to be closed by September 2021. This programme is characterised by the ECB's fixed-rate liquidity supplies for an amount that, as in the other LTRO programmes, is only limited by the corresponding demands from banks. Each of these refinancing operations has had an interest rate equal to the average interest rate on the ECB's main refinancing operations (today equal to 0%), as set along the duration of each specific loan, decreased by 25 basis points.⁷ Therefore, also the operations of the PELTRO programme have been characterised by a negative interest rate (-0.25%) until today. In the meeting of 10 December 2020, the ECB added four PELTRO operations to the original seven. These new operations, replicating the features of the old one, should be implemented in 2021 with a "tenor of one year."

The strengthened TLTRO III programme was defined by the ECB in its meetings of 12 March and 30 April 2020. Here, we refer to the April formulation and to the operations that started in June 2020 and that would have to be concluded by June 2021. This program has pursued the aim of providing for three-year refinancing of the euro area banking sector; and it has represented the continuation of the targeted-programme designed between March and June 2019 and launched in September of the same

⁵ It must be recalled that the RRF is the most important programme of the Next Generation – EU (NG-EU), which, in turn, represents the EU's decision to launch an expansionary centralised fiscal policy. The funds, allocated through the RRF, are equivalent to almost 90% of the NG-EU's total envelope of EUR 750 billion.

⁶ Let us emphasise that a generous refinancing of the euro area banking sector indirectly eases the expansionary stance of national fiscal policies because banks are one of the most important purchasers of government securities.

⁷ The maturities of these operations are between sixteen and eight months (i.e. in September 2021 for the first operations and in July 2021 for the last).

year.⁸ It has offered refinancing for a maximum amount of 50% of the eligible loan stock accounted for in the balance sheet of each bank at the end of February 2019, thus increasing the previous threshold which was equal to 30% of the eligible loans. The effectiveness of the TLTRO III was further strengthened by the easing of collateral requirements until June 2021, implying that the ECB accepted to temporarily increase its tolerance towards risks.

The new TLTRO III improved the refinancing conditions for the most, medium, and less virtuous bank types already set in September 2019.⁹ The most virtuous banks should get an interest rate equal to the average rate on the excess of bank reserves at the ECB (that is, -0.50%) decreased by 50 basis points. In the June 2020 - June 2021 period, their current interest rate (-1%) should also be the maximum rate for their TLTRO III refinancing, while for refinancing preceding or following that period, the interest rates should be the average rates on the excess of bank reserves at the ECB in force for the duration of refinancing. Median virtuous banks should obtain interest rates on refinancing equal to those in force on average in that period. However, between June 2020 and June 2021, its rate on refinancing should not be higher than the corresponding average rate on the main refinancing operations of the ECB¹⁰ decreased by 50 basis points. The less virtuous banks should obtain, in the same period, an interest rate equal to the maximum rate to be paid by the median virtuous banks.

During the meeting of 10 December 2020, the ECB decided to launch three additional TLTRO III operations from June to December 2021. Moreover, it decided to extend the most favourable interest rates and collaterals' conditions, set on refinancing in the previous April meeting, by one year (that is, from June 2021 to June 2022); and it increased the maximum amount of refinancing that euro area banks can borrow by fixing the threshold at 55% of their stock of eligible loans. However, these improved conditions were limited to the most virtuous banks and to those able to meet "a new lending performance target" with respect to their previous class.

2.3. The ECB's announcements

The monetary policy roadmap, implemented by the ECB since the spread of COVID-19 and described in the two previous sub-sections, has been complemented by the decisions taken by the European and international regulatory and supervisory authorities. These authorities have temporarily eased some prudential and accounting rules as well as a number of supervisory requirements. Here, it is not necessary to enter into a detailed presentation of the initiatives that do not belong to monetary policy (see, in this respect: Gortsos and Ringe, 2020). Instead, it can be interesting to complete our descriptive presentation of the ECB's responses to the pandemic shocks by selecting the main announcements made by ECB President Christine Lagarde during the presentation of the ECB's monetary policy decisions. In fact, these announcements can have an important impact on the effectiveness of monetary policies (see Section 3).

In this respect, the key problem is represented by the selection's criteria adopted to classify a statement as an announcement. On the one hand, it is crucial to be selective: the re-reading of the press conferences and other documents should suggest the insulation of a large number of apparent announcements that had, in fact, negligible impacts. On the other hand, the selection cannot be based

⁸ In the original formulation (June 2019), the refinancing of the TLTRO III had a two-year duration. This refinancing was extended to a three-year duration in September 2019.

⁹ In the original formulation of the TLTRO III, the benchmark of each bank was defined by referring to the amount of eligible loans disbursed in previous periods. Under the new TLTRO III, banks are catalogued according to their ability to meet their reference threshold (benchmark plus a possible add-on) relating to the net loans granted to the productive sector. The most virtuous banks would meet their reference threshold in the March 2020 - March 2021 period. The medium virtuous banks would meet the benchmark increased by 1.15% in the longer April 2019 - March 2021 period. The remaining banks are the less virtuous ones.

¹⁰ It was (is) 0% in June 2020 (today).

on *ex post* criteria of significance; otherwise, the subset of the selected announcements would matter by definition. Since it is impossible to solve this well-known logical and analytical problem here, we will make recourse to a judicious, even if sloppy, criterion of reasonableness.

It is reasonable to maintain that President Lagarde made an important announcement answering the following question raised by a journalist in the Q&A session on 12 March 2020: “At the moment certain countries are hit especially hard, like Italy. What can the ECB do if the spread for government bonds increases? [...] Could there be ... possibilities to help certain countries”? Mrs. Lagarde replied: The ECB is not “[...] here to close spreads. This is not the function or the mission of the ECB. There are other tools for that, and there are other actors to actually deal with those issues.”

The above reply can be classified as an announcement for at least three reasons. First, it is based on a credible and shared view. Draghi (2014), Visco (2019), and many other members of the ECB’s Governing Council had repeatedly emphasised that monetary policy could not be the only player “in town” and could not play a role of substitution in relation to the objectives of the fiscal policy. At the opposite, during the economic crisis, monetary policy would need the support of an expansionary and centralised European fiscal policy. The second reason is that the timing for the reappraisal of this shared view was, however, so inappropriate that it transformed the statement into a negative surprise: in those days, a large number of Europeans were watching on TV the dramatic Italian emergency caused by an external factor that was out of the national governments’ control. Finally, the contrast between the first and the second reason was so significant that President Lagarde had to correct her statement a few hours later and the Governing Council had to immediately launch new initiatives.

A second significant announcement was made by President Lagarde during the presentation of the ECB’s monetary policy decisions taken in the 29 October 2020 meeting. On that occasion, the ECB’s President affirmed that, despite the fence-sitter attitude taken by the Governing Council, new monetary policy initiatives were likely in the near future: “Staff macroeconomic projections in December 2020 will allow a thorough reassessment of the economic outlook and the balance of risks. Based on this updated assessment, the Governing Council will recalibrate its instruments, as appropriate, to respond to the unfolding situation.”

In this case, we can also mention – at least – three reasons to justify our interpretation. First, in the fall of 2020 there was a prevailing expectation that the pandemic impact would have required further policy interventions due to the unanticipated significance of the second wave of COVID-19. Second, Mrs. Lagarde made a precise commitment, in the sense that she clearly specified the timing and the conditions for strengthening the ECB’s monetary policy. Third, the main economic forecasts indicated that – on average – the fourth quarter of 2020 would have re-opened a recessionary phase in the euro area. In fact, as we already specified, in the meeting of December 2020 the ECB strengthened its expansionary unconventional monetary policy through the monetary and banking channels.

On the contrary, we maintain that it would be inappropriate to classify the repeated statements on the possible strengthening in the expansionary stance of the ECB’s monetary policy as announcements. In the press conference of 30 April 2020, President Lagarde affirmed that the Governing Council was “fully prepared to increase the size of the PEPP” and “to adjust all of its instruments, as appropriate”. The same concepts were restated in the press conferences of 4 June and 16 July 2020, even if in a milder form. Then, despite the improved utilisation of all the tools of monetary policy, in the meeting of 10 December 2020 it was reiterated that the ECB’s Governing Council remained “ready to adjust all its instruments, where appropriate...”. There are two reasons why we do not consider these affirmations announcements. First, the content is self-evident but, in the meantime, it does not commit the ECB to specific initiatives. Consequently, it follows a common view.

Given the last observations, assessing a statement made by Mrs. Lagarde during the press conference relative to the meeting of 21 January 2021 becomes more controversial. Before confirming that the monetary instruments will be utilised to “counter the negative pandemic shock to the path of inflation”, the ECB President claimed that, “if favourable financial conditions can be maintained with asset purchase flows that do not exhaust the envelope over the net purchase horizon of the PEPP, the envelope need not be used in full.” In terms of our reasonable but sloppy criteria of selection, this last statement is ambiguous. It does not commit the ECB to specific initiatives; however, it could be perceived as a surprise.

3. ASSESSING THE IMPACT OF THE ECB'S PANDEMIC MEASURES

In this Section, we evaluate the impact of the measures implemented by the ECB to counteract the pandemic crisis by applying an event-based methodology, which allows us to study the effects of the policies undertaken or announced by the ECB on key variables (spreads in financial markets and inflation expectations). These variables are important for the monetary policy's transmission mechanism. We follow, and extend, the analysis of Szczerbowicz (2015), who instead focuses on the monetary policies implemented after the 2007-2008 financial crisis.¹¹

3.1. Events

A monetary event which can be significant in our analysis is identified by the time in which new decisions are undertaken or new information is released regarding the monetary policy stance. Our analysis is focused on the pandemic crisis, and therefore our search for monetary events starts from the beginning of 2020. Moreover, we are interested in the euro area's expected and actual monetary policy. Hence, we refer to the actual initiatives and to the announcements made by the ECB since the beginning of its reaction to the pandemic shock (mid-March 2020).

In Table 1, we date the events that, following the discussion in Section 2, we have identified as significant changes in the implemented monetary policy and/or as significant "announcements." It is worth noting that we define an event on the basis of its timing; therefore, this event can refer to multiple ECB announcements and/or multiple ECB actions that occurred on the listed date. It is also worth noting that we have decided to neglect a specific policy action (4 June 2020) and a possible announcement (21 January 2021) that were examined in the previous Section. In the former case, the actual strengthening of the PEPP had been largely anticipated by the market investors without any ECB announcement; moreover, this action was the only component of the possible event.¹² Our conclusion is that this event did not mark a significant change in the ECB's monetary policy. In the latter case, the wording of President Lagarde's statement was still so vague that our decision is based on the dominance of the ECB's lack of commitment with respect to the possible surprise effect.

Table 1: Monetary policy events

Event #1 12 March 2020	Having reached some time ago a zero lower bound in policy interest rates, the ECB implemented an enlargement of the APP and a strengthening of the TLTRO III. Moreover, President Lagarde announced that the ECB's duty was not "to close spreads" between euro area national government bonds, despite the exceptionality of the economic crisis.
Event #2 18 March 2020	The ECB implemented the PEPP and the enlargement of the range of the eligible assets in the APP. Moreover, it started the easing in the quality of accepted collaterals.
Event #3 30 April 2020	The ECB implemented the PELTRO and further strengthened the TLTRO III. Its Governing Council also affirmed that it stands ready to provide additional

¹¹ See also, among others: Gagnon *et al.* (2011), Krishnamurthy and Vissing-Jørgensen (2011), Swanson (2011), Campbell *et al.* (2012), Hamilton and Wu (2012), and Altavilla and Giannone (2017).

¹² This aspect explains why we did not have any doubt about including the event of 10 December in Table 1, which is composed by several ECB initiatives.

	liquidity, if needed. However, according to our previous analysis, this statement is not included in the significant events.
Event #4 29 October 2020	The ECB announced that its monetary policy instruments will be recalibrated to support economic recovery and counteract the projected negative inflation path, according to the new empirical evidence provided in December.
Event #5 10 December 2020	The ECB implemented further strengthening of the PELTRO, the PEPP, the TLTRO III.

Source: Authors' elaborations on ECB decisions and press conferences.

3.2. Methodology and results

An event-based analysis allows us to evaluate the impact of the events considered on variables of interest. We aim at evaluating how the ECB's unconventional and extraordinary monetary-policy measures have impacted two important aspects of the economic processes: 1) the borrowing conditions of agents (banks, firms and national governments), since these conditions are key elements in a smooth functioning of the monetary policy's transmission mechanisms; 2) the inflation expectations, since these expectations are important both as an element of the monetary policy's transmission channels and as an indicator of the ECB's achievement in terms of its price stability objective.

Let us refer to point 1) above. We measure the impact of ECB extraordinary monetary policy initiatives on several variables. Starting with the transmission of this policy or of its announcement to the banking sector, we look both at short-term and long-term measures of spreads in credit markets. These spreads highlight banks' borrowing costs. For the short-term spread, we use the differential between the 1-month (3-month) interbank rate captured by the EURIBOR and the 1-month (3-month) overnight indexed swap (OIS) rate, which is assumed as a proxy of the risk-free rate in the economy. For the long-term spread, we use the differential between a composite yield on bank bonds and the 10-year swap rate capturing the long-term risk-free rate.¹³ Examining then the transmission of ECB monetary policy (implemented or announced) to the corporate sector, we consider the spread between a composite long-run yield on BBB corporate bonds and the 10-year swap rate.¹⁴ Finally, turning to the national governments we consider two cases: (i) the variation of the spreads between the composite yield of the 10-year government bonds of the euro area and the swap rate with the same maturity assumed as a benchmark; (ii) the spread between the yield of the 10-year Italian government bonds and the same benchmark just specified.

The source of all the data is Datastream, and the period examined for the sample is January 2019-January 2021. For each of the above-mentioned variables, we run the following regression:

$$(1) \quad y_t = \alpha + \sum_1^m \beta_i y_{t-m} + \sum_1^d \delta_j x_t + \sum_1^5 \gamma_v Z_t + \varepsilon_t$$

where the variables denote: y_t , the two-day changes of the variable under scrutiny (e.g., spread for – respectively – bank borrowing, corporate bonds, and government bonds); x_t , the control variables (where the control is set for week-calendar days); Z_t , the five dummy variables for the identified monetary policy event; ε_t , a random shock; α , the constant in the regression; β_i ($i = 1 \dots m$), the

¹³ The Datastream mnemonic for the bank bond index is IBCBANK (IBbox index), which aggregates bonds at different maturities.

¹⁴ The Datastream mnemonic for the corporate bond index is IBCB10, which aggregates bonds at different maturities.

coefficients referring to the respective lags of the variable y_t ; δ_j ($j = 1 \dots d$), the coefficients with respect to the control variables; γ_v ($v = 1 \dots 5$), the coefficients with respect to the dummies of the five events identified.

The results of the regressions are presented in the following Tables only with respect to the coefficients that relate to the events identified.

Table 2 considers the impact of the events on the variations in the spreads faced by the banking sector. The first two columns refer to the short-term spread at 1-month and 3-month maturities, while the last column refers to the long-term spread.

Table 2: Effects of the events on banks' spreads

	1-month spread	3-month spread	Long-term spread
12 March 2020	-0.01***	-0.02**	-0.09**
18 March 2020	-0.01***	-0.02*	0.03
30 April 2020	0.02***	0.00	0.00
29 October 2020	0.01***	0.00	-0.01
10 December 2020	0.00	0.00	0.00
Obs.	521	520	519
R ²	0.23	0.38	0.67

Notes: *** if $p < 0.01$; ** if $p < 0.05$; * if $p < 0.1$.

Source: Authors' elaborations.

In commenting Table 2, it should be noted that the estimated parameters of the regression capture the short-term impact, on a two-day horizon, that the various events examined have had on the variation of the spread. A coefficient of 0.01, for example, indicates that the event increased the spread after two days by 0.01%, i.e., 1 basis point. Under this metric, the same Table shows that the monetary policy event identified only had marginal impacts on moving the spreads that are relevant for banks' borrowing conditions. The additional and more convenient refinancing offered by the strengthening of the TLTRO III on 12 March 2020 was the ECB initiative that had the most significant effect in reducing spreads at all horizons considered. In particular, the long-term spreads have decreased by almost ten basis points. The other events did not have a comparable impact on banks' spreads. In some cases, they have just had a marginal impact on short-term maturities.

The results become more interesting if we look at the spreads for government debts in the euro area. This is shown in the first and second column of Table 3, which display, respectively, the euro area overall government spread and the Italian government spread.

The results for the first two events, 12 and 18 March 2020, are significant and sharp. The ECB's monetary policy decisions and announcements of 12 March 2020 significantly contributed to the rise of the government spreads that occurred on that day and on the following two days. This specifically applies to the Italian spread, which is estimated to have increased by 28 basis points after this event. The main culprit is President Lagarde's famous sentence at the press conference. As we already recalled, Mrs. Lagarde said that the ECB's role was not that of closing sovereign debt spreads. Indeed, as shown in Table 3, the market understood the message fairly well; and this message was not compensated for by the strengthening of the TLTRO III. However, our analysis cannot exclude the fact that investors were also disappointed by the modest strengthening of the APP. On the contrary, on 18 March 2020, the ECB launched the new EUR 750 billion PEPP. This event had a significant impact on reducing government spreads and, mostly, on reducing the Italian one. The effect was important since it has amounted to 77 basis points.

Table 3: Effects of the events on firms' and governments' spreads

	EA sovereign spread	Italian sovereign spread	Corporate bond spread
12 March 2020	0.11***	0.28***	-0.02
18 March 2020	-0.23***	-0.77***	0.04
30 April 2020	0.01***	0.00	0.01
29 October 2020	-0.02***	-0.05***	0.01***
10 December 2020	0.00	0.02**	-0.01**
Obs.	522	522	518
R ²	0.36	0.33	0.62

Notes: *** if $p < 0.01$; ** if $p < 0.05$; * if $p < 0.1$.

Source: Authors' elaborations.

It is interesting to note that the mere announcement of the future strengthening of the ECB's expansionary monetary policy, which occurred on 29 October 2020, produced relatively weak results: a 5-basis-point reduction of the Italian debt spread and an even lower reduction in the euro area debt spread. However, the robust implementation of this announcement on 10 December apparently had no effect at all. At first glance, this empirical result is difficult to explain. In fact, it signals that positive announcements do not have the same impact as actual positive initiatives; however, financial investors tend to incorporate the news in their market reactions so that the announcements can defuse the implementations due to the lack of market surprise.

The third column of Table 3 shows that the monetary events here examined have had only marginal effects on spreads in the corporate bond markets. Interestingly, the controversial announcement characterising the 12 March event did not completely blur the positive effects of the ECB's actual decisions on corporate bonds. This means that the strengthening of the TLTRO III was perceived by potential borrowers as good news in terms of the interest rates structure. However, the impact was small (only 2 basis points) and not significant; hence, it does not allow for a robust interpretation.

Let us now turn to point 2) above. In Table 4, we repeat the econometric analysis of equation (1) by using measures of inflation expectations captured by the spread between nominal and real yield and by using swap rates at the same maturity. We use 5- and 10-year inflation expectations.¹⁵

Even in this case, the announcements did not have much impact on inflation expectations. An interesting observation is that in some cases the responses went in the opposite direction of the economic intuition suggested by the announcements. For example, the announcement of 12 March had a deflationary content; on the contrary, the whole event produced an increase in inflation expectations probably due to the expected impact of the strengthened TLTRO III. Moreover, the 18 March event should have boosted inflation expectations rather than producing a long-term decline. A caveat to consider, as it will be clear in the next Sections, is that the above analysis better captures the short-term movements of the variable of interest in response to the event identified rather than the persistent effect of the policies. Moreover, market-based measures of inflation expectations may not be appropriate for measuring the relevant inflation expectations for economic agents' consumption and investment decisions. But, most importantly, they may adjust only slowly to new information as agents process their long-term economic impact. As it will be shown in Section 4, agents' reaction started to head in the "correct" direction, but with some delay.

¹⁵ The source of the market-based expectation data is again Datastream.

Table 4: Effects of the events on inflation expectations

	5-year horizon	10-year horizon
12 March 2020	0.02***	0.04***
18 March 2020	0.01	-0.05***
30 April 2020	0.01*	0.01*
29 October 2020	0.02***	0.02***
10 December 2020	-0.01**	-0.01***
Obs.	522	520
R ²	0.48	0.48

Notes: *** if $p < 0.01$; ** if $p < 0.05$; * if $p < 0.1$.

Source: Authors' elaborations.

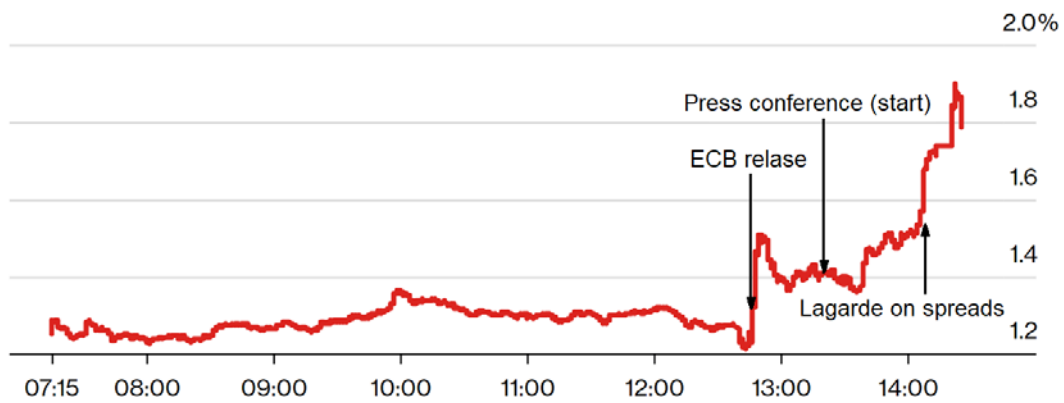
3.3. Limitations

An event study analysis has some significant limitations that are worth considering. First, in the case of actual decisions on monetary policy stances, the event should not be anticipated by the market. This anticipation could result from leakage of information or simply because the market had anticipated, albeit partly, the possible ECB measures before they were implemented. In these cases, the event study analysis could still capture some surprise in the actual release of the decision with respect to the previous market information set. The same applies to the announcements. The latter should not be fully anticipated by the market; otherwise, their possible impact is cancelled.

Second, on an event day, different decisions and announcements could be released with a consequent flow of contradictory information. Since we are analysing the impact on two-day changes of the variables of interest, it is not possible to disentangle the effects of the different decisions and announcements given on the same event day. Event #1 is a good example of this problem. At that date, the ECB strengthened some key parameters regarding TLTRO III and enlarged – even if mildly – the APP but, afterward, during the press conference Mrs. Lagarde suggested that the ECB's role was not that of closing spreads in sovereign debt markets.¹⁶ Figure 1 illustrates the complexity of this event by plotting the 10-year benchmark yield on Italian debt. At the time in which the ECB released information on the monetary policy decisions (12:45 GMT), the market yield on Italian debt had already jumped. This was probably due to the ECB's expansionary initiatives being weaker than generally expected. As the press conference started (13:30 GMT), the yield progressively increased and jumped even further after Mrs. Lagarde's statement.

¹⁶ The ECB also decided to leave unchanged interest rates on the main refinancing operations, the marginal lending facility, and the deposit facility.

Figure 1: Italian ten-year yield (12 March 2020; GMT)



Source: Bloomberg.

Finally, an event study analysis can only capture short-run effects of the events identified on the variable of interest. It cannot capture persistence, which instead should be investigated in the case of the monetary policy decisions undertaken by the ECB.¹⁷ We provide more suggestive analysis of the persistence of policies in the next Section.

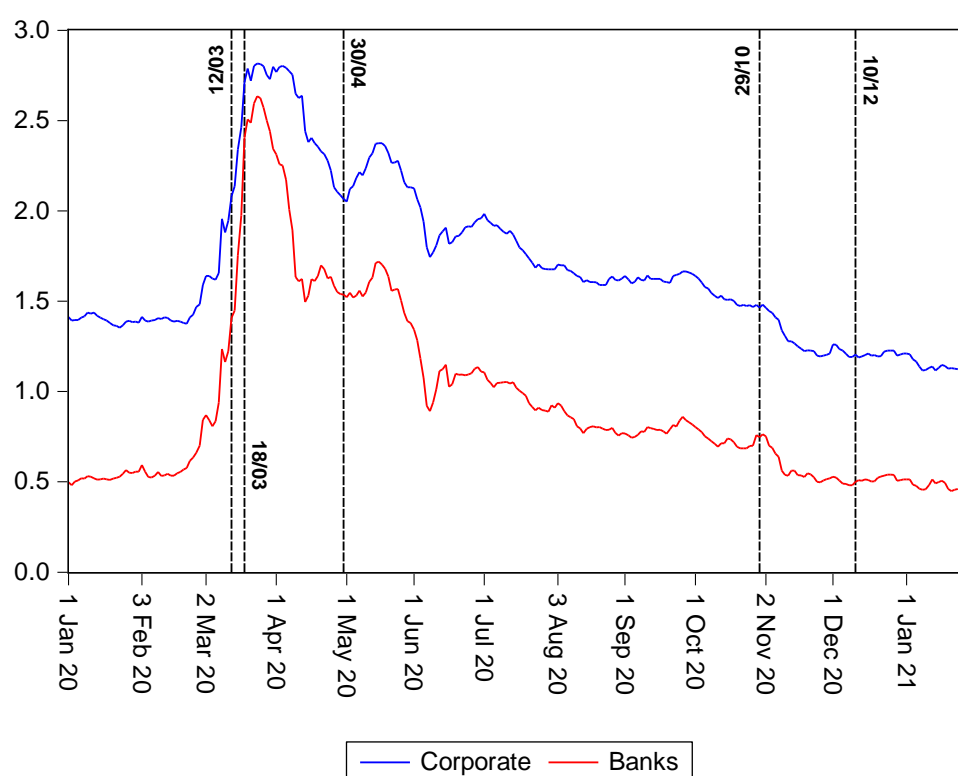
¹⁷ More precisely, the underlying assumption is that new information is incorporated into the financial variables immediately and permanently (cf. Gurkaynak and Wright, 2013).

4. QUALITATIVE ANALYSIS

In this Section, we provide a broader view of the behaviour of relevant spreads in financial markets after the beginning of the pandemic crisis. This analysis is only illustrative of the persistent effects of policy on longer horizons while a thorough evaluation should rely on a proper econometric analysis, which falls outside the scope of this policy paper.

We present our discussion following the same variables of Section 3. Starting from the borrowing conditions in the banking and corporate sector, Figure 2 plots the long-term spreads on corporate and bank bonds as in Section 3. In the figure, we underline with vertical lines the same events identified in that Section. As the pandemic crisis erupted at the beginning of March 2020 with the first lockdown in Italy, spreads increased substantially, reaching levels higher than 250 basis points. Both spreads are now at the pre-crisis levels, suggesting that ECB policies have been important in reducing them.

Figure 2: Spread on corporate and bank bonds yields



Source: Datastream.

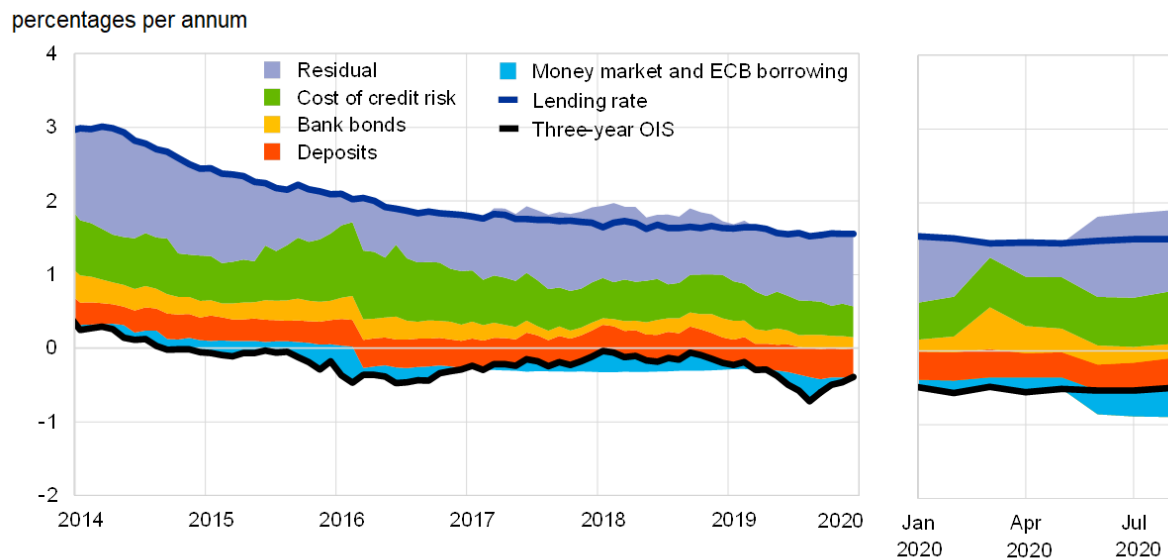
An examination of this figure produces interesting observations. Following the 12 March event, an analysis of Section 3 shows a positive effect (that is, a reduction) – even if marginal – on both spreads. However, this positive impact was immediately reversed during the days after the announcement (an increase in both spreads), when the market panicked as it digested Mrs. Lagarde’s press conference remarks. Only the policy measures taken on 18 March were able to reverse the trend. Interestingly, the downward pressure on spreads became effective only after some time, consistently with the mild short-run reaction found in Section 3, perhaps suggesting the importance of other channels or policies not captured in our analysis.

Looking at the market of bank loans, the ECB’s overall action has helped to keep lending rates near historically low pre-pandemic levels by easing the terms and conditions on bank lending, thereby avoiding a credit crunch, despite an increase in the credit risk. This is illustrated by Figure 3, which reports the time series of the average euro area lending rate. The figure highlights the intermediation

wedge, i.e. the spread between the lending rate for non-financial corporations and the risk-free rate captured by the three-year swap rate. In the figure, the lending rate is broken down into the factors that banks consider when pricing a loan, i.e. the risk-free rate, the funding costs, the credit risk, the cost of capital, and the residual factors.

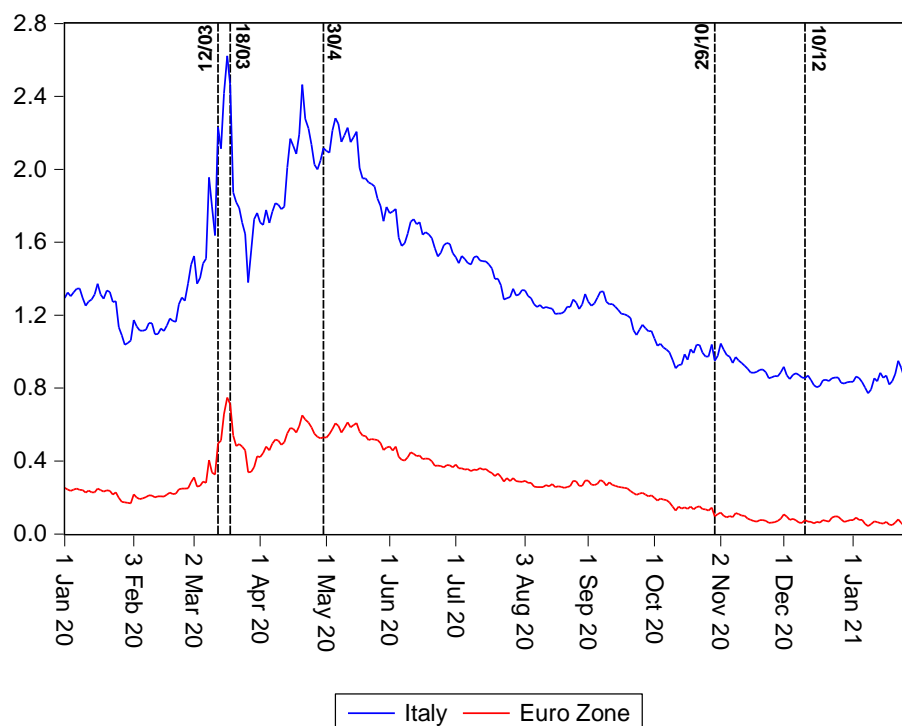
Consistently with Section 3, we evaluate the impact of ECB policies on government borrowing by looking at the dynamic of sovereign bond spread with respect to the risk-free counterparts at the same maturity. This is shown in Figure 4 for Italian debt and for the composite euro area sovereign debt.

Figure 3: Lending rate to non-financial corporations and its components



Source: Lane (2020b) [Original source: ECB, Moody's and ECB calculations].

Figure 4: Euro area and Italian sovereign 10-year maturity spreads (January 2020-January 2021)



Source: Datastream.

The observed convergence of the spreads can suggest that ECB policies have provided a stabilising force for this segment of the financial markets. As noted, spreads substantially increased after the start of the pandemic shock and even more so following the unfortunate press conference of 12 March 2020. However, the impact of the decision to introduce the PEPP (18 March 2020) on reducing the spreads in a persistent way is evident. Overall, the APP scaling-up on 12 March 2020 and the ECB's decisions on the PEPP (18 March and June 2020) are conservatively estimated to have reduced the euro area GDP-weighted ten-year sovereign yield by almost 45 basis points (ECB, 2020: Box 3).¹⁸

As stressed by Mrs. Lagarde on several recent occasions,¹⁹ the introduction of the PEPP and the PELTRO, within the strategy already designed by the ECB,²⁰ has provided crucial support for the resilience of inflation within the euro area, preventing a much larger disinflationary shock and a risk of triggering a deflationary spiral at the end of 2020.

Figure 5 plots the two market-based measures of expected long-run inflation in the euro area that have already been used in Section 3. Inflation expectations have strongly declined since the outbreak of COVID-19. In fact, they reached a historic minimum of 0.72% for the 5-year horizon and 1.05% for the 10-year horizon on 23 March 2020. After the 12 March press conference, the introduction of the PEPP on 18 March and the PELTRO on 30 April were associated with a sharp increase in inflation expectations, especially for the very long-run component. As Section 3 has shown, however, it took some days for these announcements to impact the indicators in the “right” direction, perhaps suggesting that additional information was needed for financial markets to process the magnitude of the monetary policy stimulus.

A key driver of the positive reflationary reversal could perhaps be traced back, at that time, to the start of concrete conversations on implementing a common European fiscal policy reaction, thus providing a boost to the monetary policy stimulus. It is important to underline, however, that market-based inflation expectations are still largely below the ECB's 2% target, suggesting that all the policies undertaken have come short of reaching the ECB's long-term price objective.

The ECB's post-pandemic policies have also addressed the uncertainty generated by the COVID-19 crisis. The pandemic shocks are in fact significant sources of uncertainty, which in turn may impact the European economies along several dimensions. Higher uncertainty causes substantial declines in output, consumption, investment, and hours worked (Bloom, 2014; Baker et al., 2016; Basu and Bundick, 2017). In the case of the current COVID-19 crisis, the uncertainty may also generate additional adverse conditions, impeding a rapid recovery from the recession if it is not offset by appropriate policies (Benigno et al., 2020).

Figure 6 shows two different measures of uncertainty concerning the euro area: the European Economic Policy Uncertainty Index (EPU) and the Systemic Stress Composite Indicator (SSCI). The former is a broad measure of uncertainty computed from newspaper articles.²¹ The latter is computed by the ECB by using several indicators of the financial sector which capture systemic stress in different market segments.²² Compared to the EPU, the SSCI is useful for policymakers because it captures conditions of financial stress and offers early signals on the growing risk of systemic crises.

¹⁸ See also Lane (2020a, 2020b).

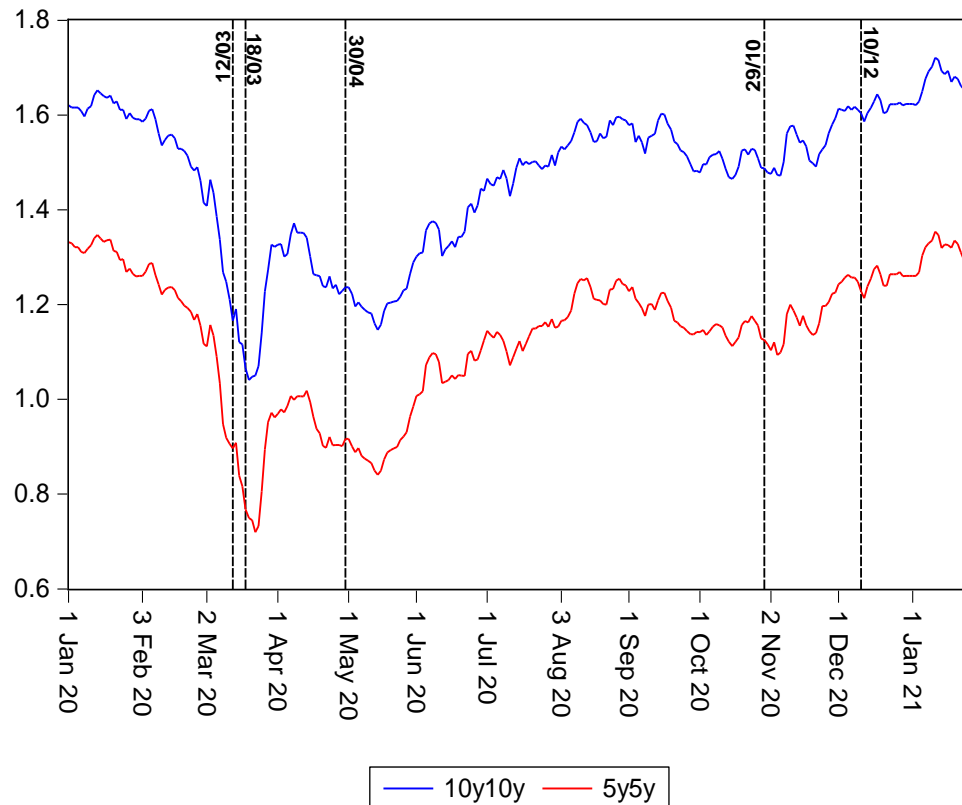
¹⁹ Cf., e.g., Lagarde (2020a, 2020b).

²⁰ See, e.g., Neri and Siviero (2018), and Rostagno et al. (2019).

²¹ The index is based on two newspapers per country (Le Monde and Le Figaro for France, Handelsblatt and Frankfurter Allgemeine Zeitung for Germany, Corriere Della Sera and La Stampa for Italy, El Mundo and El Pais for Spain, and The Times of London and The Financial Times for the United Kingdom). The index is built as the average of the relative number of monthly uncertainty-related articles from each of these ten newspapers. See https://www.policyuncertainty.com/europe_monthly.html.

²² See Hollo et al. (2012).

Figure 5: Inflation expectations in the euro area at 5- and 10-year horizons (January 2020 – January 2021)



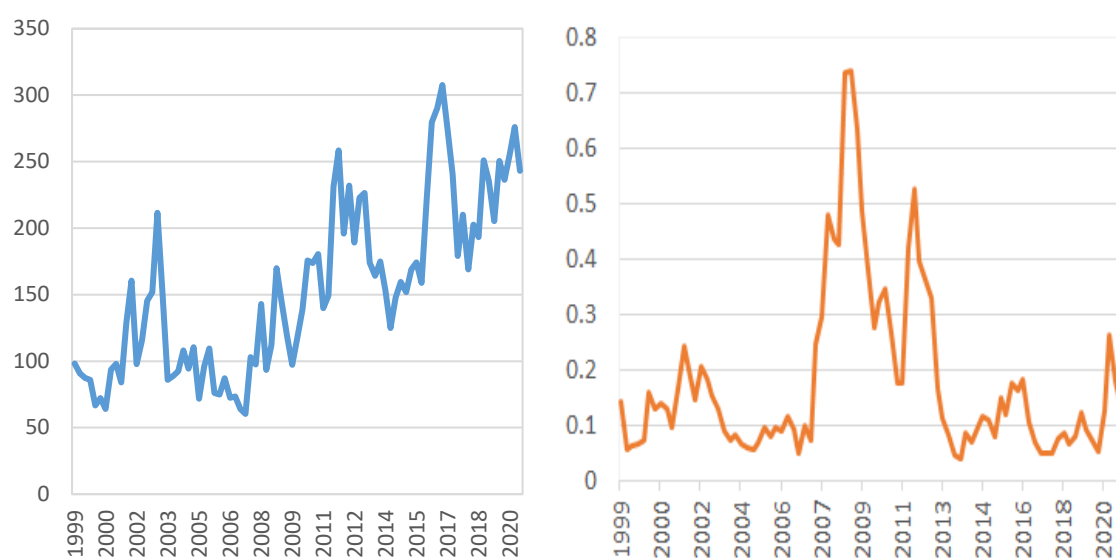
Source: Datastream.

According to Benigno et al. (2020), in 2020 the EEPUI displayed a spike due to the COVID-19 outbreak exceeding the peaks reached during the 2007 financial crisis and the sovereign debt tension in 2011-2012.²³ The SSCI presents a different view, i.e. a different ranking across the different episodes. The SSCI reached its maximum peak during the 2007-2009 international financial crisis. Then, the second peak occurred during the 2011-2013 European sovereign debt and banking sector crises. The pandemic crisis is ranked only as the third peak; and the value of the increased uncertainty is largely below the first two. The figure tends to provide evidence in favour of a prompt reaction of European monetary and fiscal policies to the COVID-19 crisis.²⁴ Other economic indicators and financial data confirm that the jump in volatility ascribable to the first pandemic shock has been contained with respect to those connected to the two recent crisis episodes (see Benigno et al., 2020).

²³ However, it is worth noting that the EEPUI reached its maximum peak in 2016-2017, i.e. since the Brexit decision and the activation of art. 50 of the EU Treaty.

²⁴ The SSCI index is based on some specific components which are related to different segments of the financial markets. Evidence from these components also shows that by reducing uncertainty in some segments of the financial markets, appropriate monetary policies have implied an acceleration in the adjustment process after the pandemic shock, although they did not fully eliminate the peaks in volatility resulting from the shock (Benigno et al., 2020).

Figure 6: Uncertainty dynamics in Europe (EPU and SSCI)



Source: Benigno et al. (2020).

5. CONCLUSION

Our analysis emphasises that the ECB's monetary policy, implemented since March 2020 to contrast the negative impact of the pandemic, has obtained limited but significant and positive results. Notwithstanding this ultra-expansionary monetary policy, European firms and households are experiencing the dramatic consequences of the most severe economic and social crisis of the last two centuries: the devastation of important activities and the increasing unemployment rate. However, the huge amount of liquidity pumped into the economic system through the monetary channel has allowed the euro area's most fragile Member States to implement national expansionary fiscal policies that reduced the risk of general economic breakdowns and social collapse. The even larger amount of liquidity temporarily transferred by the ECB to the euro area's banking sector has decreased the number of firms and households hit by the quantity credit rationing. Hence, thanks to the ECB's extraordinary monetary policy, the euro area and the EU economies can overcome the emergency and aim at a recovery that will implement sustainable development in the upcoming years.

This positive and potential evolution remains fragile. It should be stated that Europe's evolution can establish several different equilibria (e.g., De Grauwe and Ji, 2012). In order to select "good" equilibrium and to avoid "bad" equilibria, an extraordinary and expansionary monetary policy is a necessary condition. However, it may be insufficient.

At least two elements support this statement.

First, monetary policies have a short-term impact on "real" economies that disappears in the long term; hence, to effectively contribute to the selection of "good" equilibrium in the current economic phase and in the following evolution, the ECB's expansionary and extraordinary monetary policy should be persistent over the short-medium term. This perspective, in turn, will become possible if a central bank does not meet any limit in the expansion and composition of its balance sheet. Second, even if the ECB was able to implement a persistent expansionary policy, the long-term impact of this monetary policy stance on national fiscal policies would remain unclear. The latter would clearly face an easier centralised fiscal constraint. Can we maintain that the majority of national policy makers would utilise this opportunity to efficiently support the future economic development of their economies so that increases in the national government debts would not threaten its future sustainability? We cannot get rid of the last question by means of a positive and unqualified answer.

In the light of the abovementioned problem, the third factor concerns the possible virtuous combination of an extraordinary monetary policy and an expansionary centralised fiscal policy within the euro area or the EU.

Let us note that even a centralised and expansionary fiscal policy is extraordinary in Europe. The pandemic impact has activated various EU and euro area initiatives that are pursuing that unusual direction. Hence, as we have already pointed out elsewhere (see Benigno *et al.* 2020), since spring 2020, the euro area has witnessed a policy innovation: for the first time, there is a convergence between expansionary monetary and fiscal policies.

We believe that one of the euro area's crucial problems, in terms of policy, is thus the method for defining an efficient and dynamic mix between fiscal and monetary policies. For instance, is it possible that, thanks to the positive incidence of a centralised fiscal policy, the ECB's monetary policy can become more prudent without penalising the search for a "good" equilibrium? Let us conclude by stating that this question is not just academic. The increasing long-term interest rates in the United States show that an increase in the inflation rates is not out of the grid.

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