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# COVID-19 and Economic Policy Toward the New Normal: A Monetary-Fiscal Nexus after the Crisis?

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Policy Department for Economic, Scientific and Quality of Life Policies  
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# COVID-19 and Economic Policy Toward the New Normal: A Monetary-Fiscal Nexus after the Crisis?

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## **Abstract**

Current developments during the COVID-19 pandemic involve strongly complementary monetary and fiscal policy, but both as responses to COVID-19 and not the outcome of an emergent monetary-fiscal nexus. Therefore, the ECB maintains its independence by using unconventional monetary policy measures to reach price stability, according to its mandate.

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## LIST OF ABBREVIATIONS

<b>ABC</b>	Austrian business cycle theory
<b>ABM</b>	Agent-based model
<b>APP</b>	Asset purchase programme
<b>BIS</b>	Bank for International Settlements
<b>CLM</b>	Community Loan Mechanism
<b>DSGE</b>	Dynamically stochastic general equilibrium
<b>ECB</b>	European Central Bank
<b>EIB</b>	European Investment Bank
<b>EP</b>	European Parliament
<b>ESCB</b>	European System of Central Banks
<b>ESM</b>	European Stability Mechanism
<b>EU</b>	European Union
<b>FC</b>	Fiscal Compact
<b>FIH</b>	Financial instability hypothesis
<b>GDP</b>	Gross domestic product
<b>ICT</b>	Information and communication technology
<b>MFF</b>	Multiannual Financial Framework
<b>MFI</b>	Monetary financial institution
<b>NGDPLT</b>	Nominal GDP level targeting
<b>NGEU</b>	Next Generation EU instrument
<b>NPL</b>	Non-performing loans
<b>PEPP</b>	Pandemic emergency purchase programme
<b>PSPP</b>	Public sector purchase programme

<b>QE</b>	Quantitative easing
<b>RFF</b>	Recovery and Resilience Facility
<b>SDC</b>	Sovereign debt crisis
<b>SGP</b>	European Stability and Growth Pact
<b>TLTRO</b>	Targeted longer-term refinancing operations
<b>TFEU</b>	Treaty on the Functioning of the European Union
<b>ZLB</b>	Zero lower bound

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## EXECUTIVE SUMMARY

- **The European Union has responded to the COVID-19 crisis with expansionary fiscal and monetary policy.** The fiscal policy includes a recovery fund under Next Generation EU, which focuses on the green and digital transitions. The monetary policy includes unconventional policy measures, in particular asset purchases under the pandemic emergency purchase programme and targeted longer-term refinancing operations to support bank lending to businesses and households, but that is consistent with independent central banking.
- **A sharp decline in GDP has been met with a growing money supply, raising concerns of future non-performing loans.** This can be understood in terms of financial instability and malinvestment due to credit creation, warranting consideration of the production structure.
- **A disequilibrium approach to output-inflation dynamics considers monetary-fiscal policy interactions with production as a process in time, involving interactions among heterogeneous agents.** Coordination differs among industrial sectors. The supply of credit is not always met by the same demand for credit due to expectations and financialisation. Unconventional monetary policy needs to be combined with fiscal policy for growth. Production occurs in several stages, involving a capital structure based on technological complementarities and an asset structure, involving reshuffling. Structural change matters.
- **Experimental studies for monetary-fiscal policy interactions in an evolutionary, complex economy suggest that fiscal rules are destructive to stability and growth and that a dual-mandate monetary policy is preferred.** Macroeconomic outcomes emerge out of interactions among heterogeneous agents coordinating through adaptation. One study suggests that unconstrained fiscal policy and a monetary policy targeting both price and employment stability would achieve lower GDP volatility and a lower likelihood of crises without increasing inflation and public debt to GDP.
- **The common European fiscal response (Next Generation EU), which aims at green and digital transitions, is crucial to recovery.** Next Generation EU is seen as strongly complementary to the pandemic emergency purchase programme and the targeted longer-term refinancing operations by the European Central Bank. Public investment provides an important instrument for the green and digital transitions, providing suitable infrastructure. National recovery and resilience plans need continual evaluation to avoid public malinvestment.
- **The monetary policy measures have injected liquidity into the banking system and supported lending by banks.** In contrast to other proposals, such as helicopter money and zero-coupon perpetuities, debt monetisation has been avoided while providing adequate liquidity preventing deflation. Liquidity injections need to be controlled.
- **The strong complementarity between monetary and fiscal policy is related to the pandemic, but not a monetary-fiscal nexus threatening central bank independence.** Fiscal and monetary policy have responded to COVID-19 and monetary policy has focused on price stability, according to the given mandate. There is no monetary-fiscal nexus threatening central bank independence, but the new normal will have high private and public debt burdens to address through debt restructuring.

## 1. INTRODUCTION

To address the socioeconomic consequences of the coronavirus (COVID-19) pandemic, the European Union (EU) has developed a fiscal expansion package for the period 2021-2027, which aims at sustainable and resilient recovery through massive public and private investments, while meeting its targets for green and digital transitions. The European Council agreed in a Special Meeting on 17-21 July 2020 to a comprehensive package of EUR 1,824.3 billion. This package combines the multiannual financial framework (MFF) 2021-2027 and an extraordinary recovery effort under the Next Generation EU (NGEU) instrument to build long-term recovery and resilience. NGEU and MFF work together by putting the recovery within the framework of long-term budget policies involving the green and digital transitions (European Council, 2020). The European Council explicitly combines fiscal measures aimed at recovery from COVID-19 with measures aimed at supporting the green transitions within the MFF framework. First, a climate target of 30% will apply to the total amount of expenditure from the MFF and NGEU, in accordance with the objective of EU climate neutrality by 2050, the new 2030 climate targets of the EU, and the Paris Agreement. Second, the MFF for the period 2021-2027 involves the provision of adequate capital to the European Investment Bank (EIB) to support MFF and NGEU instruments and EIB activity to fight climate change and to digitalise the EU economy. Although all items of EU financing are to be included in the MFF, the rapidly changing situation of the COVID-19 pandemic warrants special instruments outside MFF ceilings. Third, within the MFF, digital transformation is supported through the instruments Digital Europe, the Connecting Europe Facility, and Horizon Europe. The Recovery Fund NGEU provides the EU with the necessary means to address the challenges posed by the COVID-19 pandemic. This allows the Commission to borrow up to EUR 750 billion on the markets, out of which EUR 672.5 billion is earmarked to the Recovery and Resilience Facility (RRF), which provides funds to the countries and sectors most affected by the crisis for 2021-2023 requiring Member States to develop national recovery and resilience plans that contribute to green and digital transitions (European Council, 2020). Hence, EU fiscal policy puts the recovery of European economies from the negative socioeconomic consequences of the COVID-19 pandemic within the context of the green and digital transformation of European economies.

The European Central Bank (ECB) has continued to pursue an accommodative monetary policy. On 10 September 2020, its Governing Council reconfirmed its accommodative policy measures, considering a robust convergence of inflation to its target in the medium term: keeping ECB interests unchanged, continuing its purchases under the pandemic emergency purchase programme (PEPP, with a total envelope of EUR 1,350 billion at least to the end of June 2021 or when the Governing Council considers the COVID-19 crisis phase to be over), and continuing purchases under the asset purchase programme (APP), at a monthly pace of EUR 20 billion together with purchases under the additional EUR 120 billion temporary envelope until the end of the year, while providing ample liquidity through its refinancing operations, in particular targeted longer-term refinancing operations (TLTRO) (ECB, 2020a). Both the APP – purchasing private and public sector securities – and TLTRO – supporting bank lending to businesses and households – belong to the non-standard monetary policy measures that the ECB introduced during the global financial crisis (GFC) and the subsequent sovereign debt crisis (SDC) as a second phase of the GFC (ECB, 2020b). The response to COVID-19 adds more of these, such as the PEPP. This expansionary accommodative monetary policy may nevertheless be consistent with an independent monetary policy based on convergence to an inflation target.

As a consequence of COVID-19, real gross domestic product (GDP) declined by 11.8% during the second quarter 2020 and is estimated by ECB staff to decline by 8% for 2020, turning to a growth of 5% in 2021 and 3.2% in 2022. The annual growth rate of broad money (M3) is 10.2% by July 2020 due to domestic credit creation, asset purchases, and higher liquidity preference in the money-holding sector.

ECB staff estimate inflation rates of 0.3% in 2020, 1% in 2021, and 1.3% in 2022 (ECB, 2020a). Hence, as inflation is estimated to be below target for the period 2020-2022, an expansionary accommodative monetary policy is consistent with what an independent central bank with a price stability mandate would pursue. However, M3 includes bank money – the deposits banks create when they extend credit – so M3 reflects credit creation in the economy. In a crisis, there is a precautionary motive for holding money, but credit creation in a declining economy means a substantial increase in the liquidity of the economy, which opens the door for financial instability (causing debt-deflation) and malinvestments (causing liquidation) in the future, when the production structure is considered. Consumers have increased their saving due to COVID-19, but more due to being forced as a consequence of lockdown measures than for precautionary measures (ECB, 2020a).

The COVID-19 crisis, like the GFC, raises concerns about non-performing loans (NPL), which occur as the economy sharply declines. The annual growth rate of loans to non-financial firms is 7.0% by July 2020 (ECB, 2020a). Although the COVID-19 crisis is not a banking crisis caused by credit expansion, it made the economy come to a halt, and the economic recovery will depend on the NPL resolution (Ari et al., 2020). NPL may be understood as financial instability, which is a consequence of the complexity of the financial structure.

According to Minsky's (1986, 1992) financial instability hypothesis (FIH), the economy, whose financial structure is complex, involves both stable and unstable financial regimes, and prolonged prosperity may transform financial relations from stable to unstable, which may cause debt-deflation. Hedge finance is stable, as the cash flow from operations cover contractual payments, while a speculative finance unit requires the unit to issue new debt to cover for the principle while it pays the interest from its cash flows. The Ponzi finance unit fails to cover both payment of the principle and interest, reducing equity through the sale of assets and new loans. The unstable financial relations – speculative finance and Ponzi finance - would increase the likelihood of NPLs. Hence, a stable recovery may become unstable, as some firms take too much debt early.

NPL may also be understood in terms of malinvestment caused by credit expansion. According to Austrian business cycle theory (ABC) (see e.g. Mises [1912] 1924; 1928; Hayek [1929] 1976/2016; [1931] 1976/2016; Huerta de Soto 2006), credit creation causes economic cycles by creating an artificial boom that leads to a bust, because it injects liquidity into the real economy beyond what is backed by voluntary saving, thus distorting the production structure. Rather than being a random event, ABC explains recessions by a wedge between saving and investment due to credit creation causing an unsustainable increase in aggregate demand, while the FIH explains them by stable expansion making firms overleveraged, because firms underestimate the variance of expected profits, thus making these two perspectives complementary, since both find expansion to be the cause of the contraction (Mulligan, 2013). In a banking crisis caused by too high a liquidity, excessive credit creation leads to malinvestments, as high profit expectations during expansion increase leveraging, which gives financial instability as those profit opportunities will not be met when the expansion ceases. Injecting liquidity to recover from a crisis involves risks of creating too optimistic profit opportunities again, given the uncertainty around COVID-19.

Expansionary monetary policy is seen as a cause of credit creation, giving unsustainable growth according to ABC (Garrison, 2001), while it will not increase investment if current and anticipated profits are low according to FIH (Minsky, 1986). Hence, the production structure must be considered.

Although unconventional monetary policies helped banks and other financial institutions recover from the GFC and prevented the interest rates on government from rising during the SDC, they have not stimulated economic growth, unless combined with expansionary fiscal policy, warranting a disequilibrium approach to the analysis of output-inflation dynamics rather than a general equilibrium

one, which focuses only on some aggregate interactions in order to correct distortions due to price rigidity (Gaffard et al., 2018). This explains the expansionary fiscal policy for recovery from the COVID-19 crisis. However, a disequilibrium approach has implications. Monetary policy cannot simply control inflation by changing interest rates because agents and markets are heterogeneous. When considering the economy as a complex, evolving system rather than a general equilibrium system, price turbulence – high price volatility – rather than friction is a problem, and that turbulence of relative prices during high inflations causes intertemporal markets to disappear due to short-memory/short-foresight adaptation (Leijonhufvud, 1997).

Coordination in markets relies on price signals, but inflation disturbs price signalling by changing relative prices, which causes distortions in the capital structure of the economy (Horwitz, 2000). When markets are in disequilibrium, price rigidity may contribute to market coordination and the evolution of imbalances among markets must be assessed, so there are no systematic links between persistent low interest rates and inflation (Gaffard et al., 2018). Coordination operates differently between various sectors in the economy. Fiscal rules can be asymmetric and aggravate fluctuations, bringing in the temporal distribution of excess supply and excess demand for consideration in the policy mix, where quantitative easing (QE) would shape banks' leveraging, which is the mechanism for how money is created today (Gaffard et al., 2018). When interests are at or close to zero, QE provides a means for central banks to increase the liquidity of banks by buying long-term securities, including government and corporate debt, with newly created bank reserves, in order to stimulate investment and economic growth. As most money today is credit money, created by banks, QE would stimulate the growth of credit money. However, investments depend on expected profit opportunities. As Gaffard et al. (2018) argue, the increased supply of credit due to QE has not been matched by a corresponding demand for credit, partly due to the low demand expectations of firms and households (further depressed by fiscal austerity policies) and partly because of the increasing financialisation in recent decades. Battiston et al. (2018) point out that due to financialisation, both the liquidity remaining in the financial sector and the financial activities of non-financial firms have increased. Hence, more liquidity does not necessarily lead to new investment in the real economy, thus being excess liquidity. QE is reversible and offers the opportunity to reduce liquidity.

For new investment to happen, restoration of confidence is crucial to create demand for investible funds. First, structural maladjustments matter. Haberler ([1937] 2011) points out that maladjustments in the structure of production may turn expansion into contraction, since bottlenecks may arise in both the consumption goods industries and capital goods industries, while no interest rate would lead to revival when the demand for investible funds is low, and there may be a flight to liquidity keeping the supply of investible funds low too, but when liquidity is high enough, money will become available at the capital market when confidence is restored. Hence, while expansion involves the seeds of its own destruction, along FIH and ABC, high liquidity is insufficient for recovery unless confidence is restored.

Second, financialisation – the growth of the financial sector relative to the real economy and the greater involvement of non-financial firms in financial activities not directly related to production – is destabilising. Empirical results suggest that financialisation has increased in the euro area during the last two decades and could be obstructive to the EU 2030 agenda, because excessive financialisation hampers economic growth, reduces innovation, contributes to inequality, and may cause financial instability (Battiston et al., 2018). Concerning economic growth and financial instability, the arguments resemble those of ABC for unsustainable economic growth due to malinvestment and FIH for financial instability.

According to Battiston et al. (2018), economic growth is hampered because a larger proportion of credit is directed to unfruitful investment projects and financial instability arises from the increasing

leveraging of interconnected financial institutions and the risk of the mispricing of assets, while innovation suffers from the separation of risk-taking and rent-extraction and inequality increases as top earners' bargaining power becomes stronger and public budgets give support to financial institutions in times of crisis. However, credit yields innovation, according to Schumpeter (1911), while ABC considers credit a harmful injection effect. Combining these two perspectives, a monetary regime must keep the credit creation sufficient to meet the financing requirements of innovation, while avoiding cycles caused by excessive credit creation (Marmefelt, 2018). Such a monetary regime would need to prevent excessive financialisation.

What would this mean to the future policy after the crisis in the new normal we do not know? The massive coordinated monetary and fiscal expansion to prevent serious socioeconomic problems in case of an economic collapse and to secure future economic growth will increase the public deficit and public debt, while central banks have resorted to purchases of government bonds to maintain monetary transmission, as interest rates are close to the zero lower bound (ZLB). Is there an emerging monetary-fiscal nexus? May fiscal policy dominate? What policy trade-offs does the ECB face? How could an ECB that lacks a fiscal counterpart maintain its monetary independence? This paper reviews the literature to make conjectures of the new normal.

## 2. HETEROGENEITY, TIME, AND MONETARY-FISCAL POLICY INTERACTIONS

In order to analyse the emergence of a monetary-fiscal nexus and policy trade-offs, we should consider monetary-fiscal policy interactions and the production process together. This means an economy, where production is a process in time, involving heterogeneous agents.

Production involves several stages. Lundberg (1937) develops sequence analysis, in which he considers production time and expenditure periods, observing sequences of payments in time, expressed in the velocity of circulation of money that in a well-developed credit system through bank clearing reduces the quantity of money required. Using Wicksell's ([1906] 1966) cumulative process and pure credit economy, Lundberg effectively allows for heterogeneous money, where bills of exchange are private monies and commercial banks create credit money, which is endogenous, demand-driven money reflecting the capital structure (Marmefelt, 2018). According to Lachmann ([1956] 1978), capital is a heterogeneous structure, whose composition changes over time, based upon technological complementarities among entrepreneurial plans, and an underlying asset structure, in which capital goods and money are operating assets, but the composition of capital may change through reshuffling capital without money, but the regroupings of capital between firms may be inconsistent, thus requiring money, which would be needed when correcting for mistakes requiring substantial reshuffling. Successful capital reshuffling funds itself to some extent through profits increasing net capital value, while failed capital reshuffling contributes to losses, suggesting multiple monies adapted to the financing needs of the capital reshuffling process rather than just more money (Marmefelt, 2018).

Making sure that money goes to productive investments is key in order to avoid the crucial problems with excessive financialisation observed by Battiston et al. (2018) who find that economic growth is hampered because a larger proportion of credit is directed to unfruitful investment projects and financial instability arises from the increasing leveraging of interconnected financial institutions and the risk of mispricing of assets. It makes sense to consider the complexity of production as well as disequilibrium market processes.

### 2.1. Macroeconomics for complex, evolving economies

Heterogeneity matters when markets are in disequilibrium and coordination involves sequential processes, while financial interlinkages matter to the formation of asset prices, the origin of crises, and the difficulty of recovery, suggesting another approach to understand the monetary transmission mechanism than the New Keynesian dynamically stochastic general equilibrium (DSGE) one (Gaffard and Napoletano, 2018). Prior to the GFC, representative-agent models were the dominant paradigm, but a more disaggregated approach is necessary to understand key aspects of the Great Recession, studying the effects of firm and household heterogeneity might help us better account for the severity of the slow recovery as well as to understand the effects of monetary and fiscal policy on aggregate demand when monetary transmission involves more channels (Yellen, 2016). In addition, there is heterogeneity in the effects on various sectors of the COVID-19 pandemic (Becker et al., 2020).

Heterogeneity implies complexity and disequilibrium processes rather than general equilibrium. The disequilibrium nature of market processes, heterogeneous agents interacting in markets in disequilibrium, and financial interlinkages generating contagion phenomena matter when structural change and innovation create radical uncertainty in markets, so heterogeneous agents coordinate in disequilibrium markets subject to structural and technological change, according to Gaffard and Napoletano (2018), which is an experimental process rather than an intertemporal optimisation problem. Haldane and Turrell (2018) argue that in epidemics and crises, the economy is damaged

because people change their behaviours, while the digital transformation improves matching processes, reduces information asymmetry, promises to identify new risk factors, and offers substantial gains in productivity and climate change has non-linear effects on productivity, growth, and financial stability, and more fundamentally, heterogeneity at the micro-level yields non-linear responses and emergent outcomes at the macro-level.

In 1987, the Santa Fe Institute started the exploration of the economy as a complex, evolving system, accounting for process and emergence and applying nonlinear dynamics to economics, developing the Santa Fe approach, called the complexity perspective, the Santa Fe perspective, or the process-and-emergence perspective, which constitutes a dynamical systems approach, defining economies as adaptive nonlinear networks, or complex, evolving systems with the following characteristics (Arthur et al., 1997):

- **dispersed interaction:** parallel interaction among many dispersed agents;
- **no global controller:** controls by competition and coordination;
- **cross-cutting hierarchical interaction:** many levels of interaction with tangled interactions across levels;
- **continual adaptation:** agents revise their strategies as they accumulate experience;
- **perpetual novelty:** niches are continually created by new markets, new technologies, and new institutions;
- **out-of-equilibrium dynamics:** because new niches are continually created, the economy operates far from equilibrium.

This means that agents use various cognitive structures to make sense of their economic environment and interact within network structures, guided by institutions in a recursive way. Inflation is a monetary disequilibrium which alters relative prices and thereby induces producers to adapt their capital in a way that makes the capital structure inconsistent (Horwitz, 2000). Unemployment is a disequilibrium phenomenon, where adjustment is an out-of-equilibrium process, including coordination through constrain-decisions-constraints sequences where excessive financial asset prices may crowd out real investments which hurts productive capacity, and phases of construction and utilisation of productive capacity are no longer consistent with each other due to coordination failures in production (Amendola and Gaffard, 2010). This involves the coordination of multiple agents through continuous adaptation, where macroeconomic outcomes emerge (Axtell, 2006), focusing on the complexity of interactions (Colander, 2006). This approach uses a bottom-up approach to coordination through interaction, using an agent-based model (ABM). The important feature of ABMs is that they explain the overall evolution of a system by simulating the behaviour of each individual agent within it and then explicitly combining their micro-level behaviours to give a macro-level picture, adding most value when problems revolve around heterogeneity, complexity, non-linearity, emergence, heuristics, and detailed rules (Haldane and Turrell, 2018). ABMs can be used to study the effects of various combinations of monetary and fiscal policy with heterogeneous banks and firms.

## 2.2. Monetary-fiscal policy interactions in complex, evolving economies

Monetary-fiscal policy interactions in complex, evolving economies may be analysed using an ABM. Dosi et al. (2015) develop an ABM to analyse combinations of monetary and fiscal policies that yield the possibility of persistent fluctuations, recessions, and banking crises, acknowledging that dysfunctional financial markets and the emergence of the zero lower bound put a constraint on monetary policy (Eggertsson and Krugman, 2012), while financial crises put a constraint on fiscal policy (Reinhart and

Rogoff, 2009), which QE may relieve. Rather than relying on a representative agent, Eggertsson and Krugman (2012) distinguish between creditors and bankers, and they point out the importance that fiscal stimulus is effective to the extent debt-constrained agents benefit. Reinhart and Rogoff (2009) find that financial crises tend to increase public debt considerably, which they attribute to cuts in tax revenue and increased spending to address the recession. Dosi et al. (2015) consider the effect of austerity and euro area fiscal rules for a complex, evolving economy, where macroeconomic phenomena emerge out of interaction among heterogeneous agents. Their model has heterogeneous banks, providing credit, and firms, the latter being either capital-producing, using labour and investing in R&D to produce heterogeneous machine tools, or consumption-goods firms, using labour and investing in machine-tools to produce a homogeneous consumption good. Consumption-good production is funded either through internal funds or bank credit, a central bank setting the baseline interest rate, and a public sector issuing bonds and taxing the profits of firms and banks to pay unemployment benefits. Note that although capital is heterogeneous, because of heterogeneous machine tools, there is no capital structure based on technological complementarities in several stages of production because there is only one capital-good production stage and one consumption-good production stage with matching between capital-production firms and consumption-good production firms. Thus, value-added chains with more stages of production than two are excluded. Hence, the model does not account for possible coordination problems in the production structure that may arise due to excessive credit creation.

When it comes to monetary and fiscal rules, Dosi et al. (2015) consider a Taylor rule that is either standard, adjusting only to inflation, or dual-mandate, adjusting to both inflation and the unemployment gap, while the fiscal rules consist of the European Stability and Growth Pact (SGP): the 3% deficit to GDP rule, and the Fiscal Compact (FC): the 60% public deficit to GDP rule, which is represented by a deficit-reduction rule that reduces public debt annually with 5% of the amount exceeding 60%. Additionally, there is also a risk premium on public debt. Their results are consistent with reality, e.g. investment varying more and consumption less than GDP, while firm financial health evolves according to Minsky (1986). Recall that according to the FIH, prolonged prosperity tends to increase financial instability, which the ABC would attribute to malinvestment due to credit creation.

Dosi et al. (2015) run several policy experiments, having no fiscal rule constraint (*no-rule*) and the standard Taylor rule targeting inflation as benchmark:

- **fiscal rules:** SGP and FC increase unemployment, output volatility, and the risk of economic crises which reduce GDP growth and increase public debt to GDP, thus making austerity policies self-defeating;
- **fiscal rules with escape clauses:** suspension of the implementation of SGP and FC in exceptional circumstances made the GDP growth rate close to the benchmark *no-rule*, but unemployment, output volatility, the risk of economic crises, and public debt to GDP were still higher than the benchmark *no-rule*;
- **fiscal rules under bond spend adjustment:** even when adding a risk premium to the interest rate on sovereign debt for all fiscal rules, the benchmark *no-rule* outperforms the other *fiscal rules*, SGP and FC without and with escape clauses;
- **alternative monetary rules:** a dual-mandate Taylor rule gives lower GDP volatility, unemployment, risk of crises, and public debt to GDP than a standard Taylor rule for the benchmark *no-rule*, and it alleviates the pains of fiscal consolidation and improves public debt to GDP for all *fiscal rules*, which is due to the interaction between the dual Taylor rule and the Basel rule that



makes credit dependent on banks' capital because a higher interest rate during expansion allows banks to build buffers.

These findings suggest that fiscal rules are destructive to economic performance, although escape clauses less so, while a dual-mandate Taylor rule gives better economic performance both for the benchmark *no rule* and fiscal rules (SGP and FC without and with escape clauses). Dosi et al. (2015) stress the bank and balance-sheet transmission channels of monetary policy, where capital adequacy and capital buffer adjustment have a combined effect<sup>1</sup>, so a dual-mandate monetary policy rule stabilises the economy better than a standard Taylor rule focusing on inflation only, because the dual-mandate Taylor rule makes more investment being financed and implemented at a lower rate of bank failure, while fiscal rules depress the economy without improving the ratio of sovereign debt to GDP.

However, there is no explicit dual-mandate monetary policy specified within the Treaty on the Functioning of the European Union (TFEU), Articles 119 and 127, which state that the main objective of monetary policy and the European System of Central Banks (ESCB) is price stability, but also to support general economic policies without harming price stability. This opens for consideration of aspects other than price stability, such as GDP volatility, risk of crises, unemployment, and public debt to GDP. According to Dosi et al. (2015), the best policy mix for stabilisation would be an unconstrained fiscal policy and a monetary policy targeting both price and employment stability, achieving lower GDP volatility and a lower likelihood of crises without increasing inflation and public debt to GDP. This suggests that price stability can be achieved together with other economic policy objectives with an unconstrained fiscal policy and a monetary policy targeting both price and employment stability, thus giving price stability while supporting general economic policies.

There are limitations to the model. First, it operates by having the central bank conducting monetary policy through the interest rate, thus neglecting both the ZLB and QE as a means to achieve monetary transmission. Second, it does not consider financialisation that may lead money into unproductive investments, too much financial assets relative to real assets. Third, banks and firms are heterogeneous, but not households, who are workers and consumers only, thus neglecting household debt as well as the intertemporal preferences of consumers. Fourth, production is only in two stages, thus neglecting mismatching between producers at various stages and malinvestment in capital goods production.

Nevertheless, the lessons are that fiscal rules are destructive as austerity mechanisms, while a dual-mandate monetary policy reduces the procyclical effects of the Basel II macroprudential rule. The massive fiscal and monetary response of the EU to COVID-19 will mean much higher public debt. Financial crises cause asset markets collapse, output and employment decline considerably, and government debts explode as tax revenue declines with output and countercyclical fiscal policies increase public spending (Reinhart and Rogoff, 2009). The GFC was followed by the SDC, where QE was a reasonable response. However, QE gives freedom in terms of fiscal policy, while it may tie monetary policy to fiscal policy.

Popoyan et al. (2017) develop an ABM considering the economy as a complex, evolving system where macroeconomic outcomes emerge out of interaction among heterogeneous agents in order to study the impact on macroeconomic dynamics of alternative macroprudential regulations and their possible interactions with different monetary policy rules, having a triple-mandate monetary policy rule where prudential rules constrain the endogenous creation of credit in the economy. First, they consider the

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<sup>1</sup> Capital adequacy rules constrain credit which, in turn, makes firms invest less, thus reducing aggregate demand, and less credit reduces technological progress, thus reducing long-term growth.

balance sheet of banks and let banks lend according to the '6C'<sup>2</sup> analysis, as well as the financial wealth of workers, shop owners, and bank owners, where consumption is out of current wealth, a fiscal policy where the tax rate is adjusted to the difference between the actual and target debt to GDP ratio. Second, they analyse monetary policy having a dual-mandate Taylor rule of inflation and an output gap as benchmark. Third, they add a triple-mandate Taylor rule considering the credit growth rate, explicitly connecting monetary and macroprudential policies, the latter guided by the global capital framework (Basel II and Basel III), the minimum static capital requirement, the counter-cyclical capital buffer, and the leverage requirement as well as the liquidity coverage ratio, accounting for the Basel III frameworks, the global capital framework and the global liquidity requirements. Popoyan et al. (2017) explore possible interactions between different macro-prudential policies, starting with Basel II, adding different levers of Basel III, alternative monetary rules, on a range of target variables. These include output gap, output gap volatility, inflation, unemployment, likelihood of economic crises (a drop of GDP higher than 3%), and bank failure rate. They find that the Basel III agreement appears to stabilise the banking sector and to improve the performance of the economy: the output gap and its volatility, average unemployment, the likelihood of economic crises, and the bank failure rates are significantly lower with Basel III than with Basel II, where the joint adoption of minimum static capital requirement and counter-cyclical capital buffer is the major driver of the improved performance of the economy under the Basel III framework. Furthermore, having these two or Basel III is complementary to their dual-mandate benchmark monetary policy, but a triple mandate monetary policy performs the best in different aspects. According to Popoyan et al. (2017), the joint adoption of the Basel III regulation and a triple-mandate would smooth credit fluctuations, which thereby increases the resilience of the banking sector and tames financial and macroeconomic instability.

Popoyan et al. (2017) use a fiscal rule with a target public debt to GDP, which seems more in line with the FC, which Dosi et al. (2015) find destructive, but it is more flexible as this target could be adjusted. Furthermore, they use a sales tax and let tax revenue be allocated to recapitalise banks. Nevertheless, central banks may benefit from taking financial stability into account by adjusting monetary policy to the credit growth rate, which would hamper financialisation. Both Dosi et al. (2015) and Popoyan et al. (2017) rely on conventional monetary policy, using the interest rate, but the latter mention the inclusion of an interbank market that could account for QE as a possible extension. However, Teglio et al. (2015) develop an ABM, which considers QE, having affinity with Dosi et al. (2015), but more focused on short-term fluctuations than long-term growth.

In their ABM, Teglio et al. (2019) develop a consumption market, where demand and supply are entirely endogenous and a financial market where households can invest their savings, having SGE and FC as baseline scenarios. First, they add an unemployment escape clause that suspends them by not raising tax rates even if they are above their thresholds when unemployment is sufficiently high. Second, they consider QE, where the central bank buys bonds on the financial market to sustain bond prices and then facilitates government debt financing in times of decreasing fiscal revenues. Third, they add a fiscal accommodation as complement to the unemployment clause and QE through a tax reduction. Like Dosi et al. (2015), Teglio et al. (2019) argue against fiscal austerity, pointing out that the potential loss to GDP is greater than the increase in the public deficit or public debt. According to Teglio et al. (2019), the unemployment clause (suspending SGP and FC when unemployment is very high) has a

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<sup>2</sup> The '6C' analysis is to provide a positive answer to the following questions about a shop demanding a loan (Popoyan et al. (2017): (i) can the shop pay its loan? (capacity check); (ii) does the shop have enough liquidity to pay its loan if a period of adversity arises? (capital check); (iii) will the bank be protected if the shop fails to repay the loan? (collateral check); (iv) did the shop pay back its loans in the past? (credit reputation check); (v) are there some known factors that could adversely affect the shop's ability to pay back its loan? (credit conditions check); (vi) does the shop owner demonstrate the ability to make wise decisions? (common sense check), considering the three objectives, (i)-(iii).

positive effect, increasing real GDP growth and decreasing unemployment, but when adding QE (allowing the central bank to buy government bonds in the financial market) to the unemployment clause worsens the real GDP growth rate and unemployment and government bond yield becomes lower, while both real GDP growth and unemployment improve when QE is supplemented with fiscal accommodation (reducing taxes when unemployment is high), which also leads to fewer crises with shorter duration. Consequently, we may conclude that QE is complementary to fiscal expansion, involving both increased public spending and tax cuts. This suggests that fiscal policy leads recovery, while monetary policy decreases the yield curve.

To summarise, these three studies using ABM for a complex, evolving economy shows that fiscal rules are destructive to macroeconomic growth (Dosi et al., 2015; Teglio et al., 2019) and stability (Dosi et al., 2015; Popoyan et al., 2017; Teglio et al., 2019), while monetary policy could benefit from a broader mandate considering inflation and unemployment (Dosi et al., 2015; Teglio et al., 2019), or inflation, the output gap, and credit growth, when considering the link between monetary and macroprudential policy (Popoyan et al., 2017). In monetary-fiscal policy interaction, monetary policy is accommodative, using a broader monetary policy mandate, while monetary-macroprudential policy interactions induce the central bank to consider credit growth to avoid excessive credit creation, but this is not necessarily the same as fiscal dominance, although fiscal policy would have a crucial role for recovery.

### 3. COVID-19 AND MONETARY-FISCAL POLICY INTERACTIONS

The EU response to COVID-19 involves a massive fiscal expansion to achieve a sustainable and resilient recovery through massive public and private investments, including green and digital transformations of the economy. The ECB is pursuing an accommodative monetary policy by means of unconventional monetary policy, such as QE through APP, now supplemented with PEPP, and providing liquidity long-term refinancing through TLTRO. The ECB was proactive, providing a series of measures guided at providing liquidity to the corporate sector, even relaxing banking regulations to make banks lend, while due to the lack of a fiscal EU counterpart, there has been less monetary-fiscal coordination, PEPP being a substitute to a fiscal response at the euro area level (Bénassy-Quéré and Weder di Mauro, 2020). Nevertheless, a fiscal policy having a long-term perspective has emerged, the MFF 2021-2027 and NGEU, where the green and digital transitions are key elements, which is acknowledged as crucial by the ECB. Christine Lagarde, President of the ECB, stresses the critical importance of the NGEU for a coordinated euro area recovery: “not only can it help support demand [...] it can also increase the structural resilience and growth potential of the entire area. [...] [NGEU] has the potential to significantly support the regions and sectors hardest hit by the pandemic, strengthen the Single Market and build a lasting and even recovery.” About the NGEU agreement, Lagarde (2020) states that it, together with bold national measures, shows “that Europe can react forcefully” and with it “there is a great opportunity to strengthen economic resilience and convergence of Member States.” This suggests that the fiscal response NGEU is the core of the EU recovery strategy and therefore also of a monetary-fiscal nexus emerging around COVID-19, which illustrates monetary-fiscal interdependence due to COVID-19 rather than an emerging monetary-fiscal nexus threatening central bank independence. In addition, under COVID-19, the ECB has a fiscal counterpart through the NGEU, which provides for structural change in the economy through green and digital transitions.

#### 3.1. Stability and growth with green and digital transitions

When the economy is in crisis, public spending may support technological transitions, so when the green and digital transformations of the economy receive public investment, in e.g. appropriate infrastructure, it creates an incentive to invest in those technologies, such as information and communication technology (ICT). As pointed out earlier, an expansionary fiscal policy with an accommodative monetary policy may contribute to stability and growth, but the funding has to be allocated properly in the production structure of the economy. Considering the green and digital transformations, Lagarde (2020) states: “the national support measures should be temporary and targeted to ensure that only structurally sound firms are supported. This allows the structure of our economies to adjust where needed, so that capital and labour flow to the most productive companies in the economy. This is particularly important now, with the digital and green transformations of our economies underway.”

The crisis provides an incentive to innovate and room for government support to technological transformations. COVID-19 is seen as offering great value to 5G, as expressed in Nokia’s 5G Readiness Report (Nokia, 2020): “COVID-19 has greatly accelerated the need for physical industries to digitally augment. Mature digital industries, such as online retail, media and banking, have been the immediate beneficiaries of COVID-induced demand shifts. [...] We expect physical industries to increase their ICT investment and adopt end-to-end 5G technologies extensively in the next decade, thus transforming themselves into augmented physical industries.” Fiscal expansion for economic recovery from COVID-19 includes public investment to support digitalisation. According to Nokia (2020): “As we head towards the ‘great re-set’ in the wake of COVID-19, national recovery budgets need to foresee adequate

financing for improving connectivity where needed for 5G and very high capacity fixed networks (fiber).”

Hence, in times of crisis, fiscal expansion, involving public expenditures to the digital transformation (like the green one, along the lines of the EU response), would benefit from a fiscal policy not constrained by rules and an accommodative monetary policy providing sufficient liquidity to the economy. Nevertheless, maintaining financial stability is crucial to innovation and growth.

As de Haan and Eijffinger (2016) argue, the GFC meant that central banks had to intervene to maintain financial stability, involving coordination between monetary and fiscal policy as well as too low inflation, while the Great Recession made the interest rates useless as a policy instrument, inducing central banks to pursue unconventional monetary policies, such as QE, involving large-scale asset purchases. However, as Bénassy-Quéré and Wederdi Mauro (2020) point out, this has not been the case at the euro area level, since the ECB does not have a fiscal counterpart to coordinate with, while the ECB has enabled national governments to focus on short-term unemployment and keeping firms alive, purchasing mainly national government bonds.

As the EU, including the euro area, has a highly heterogeneous political structure and the ECB lacks a fiscal counterpart, it would strengthen central bank independence by interacting with various national governments. Heterogeneous political structures have stronger central bank independence because it offers an incentive to delegate monetary authority to prevent conflicts (de Haan and Eijffinger, 2016). Hence, the emergence of a more coordinated EU fiscal policy could weaken the independence of the ECB. On the other hand, the independence of the ECB might be undermined because it mainly purchases the national government bonds of Member States. According to Hall and Reis (2015), the ECB faces a default risk on holdings of sovereign bonds in the periphery – a risk that has increased as the ECB has expanded its balance sheet and shifted to direct holdings of bonds, such as the QE with the public sector purchase programme (PSPP), increasing the risk of instability. As the balance sheet of central banks expand to very high levels, their financial risk increases, while fiscal authorities may push monetary authorities to use monetary policy to reduce debt through inflation (de Haan and Eijffinger, 2016).

Expansion of the balance sheets of central banks means money creation that adds liquidity to the economy, which allows productive investments in the economy. However, Gaffard et al. (2018) point out that the increased supply of credit due to QE has not been matched by a corresponding demand for credit, partly due to the low demand expectations of firms and households (further depressed by fiscal austerity policies) and partly because of the increasing financialisation in recent decades. Excessive financialisation hampers economic growth, reduces innovation, contributes to inequality, and may cause financial instability (Battiston et al., 2018). Broad money growth – the growth rate of M3 – reflects the growth of credit in the economy, as it includes credit money created by banks. Table 1 shows the increase in M3 growth due to COVID-19 (i.e. the injection of liquidity into the economy to promote recovery), comparing the period March to August 2020 with three preceding periods.

Table 1: M3 growth rates

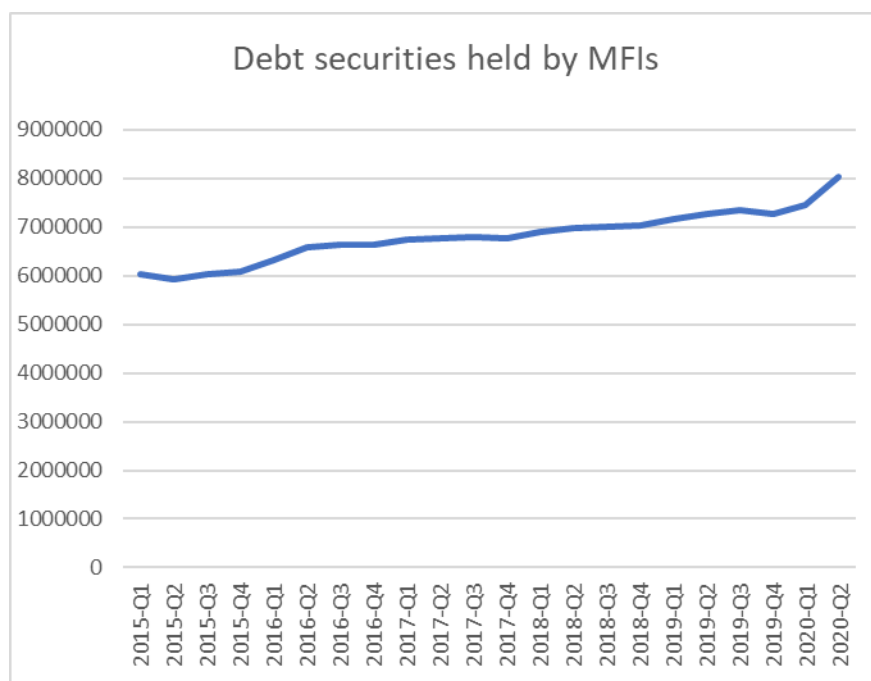
	March 2020 to August 2020	July 2019 to February 2020	January 2019 to June 2019	January 2018 to December 2018
Average	8.92%	5.45%	4.50%	3.97%
Maximum	10.1%	5.8%	4.8%	4.6%
Minimum	7.5%	4.9%	3.8%	3.5%

Source: ECB Statistical Data Warehouse.

Note: M3 growth rates for euro area for the COVID-19 period from March to August 2020 and three preceding periods.

However, financial stability may decrease when the ECB balance sheet expands due to unconventional policy instruments. The balance sheets of monetary financial institutions (MFIs)<sup>3</sup> should expand given QE. Figure 1 shows there is expansion in the holdings of debt securities of MFIs, especially for the two first quarters of 2020 before the major monetary measures, such as PEPP, were announced.

Figure 1: Debt securities as long-term assets of MFIs



Source: ECB Statistical Data Warehouse.

Unconventional monetary policy instruments include refinancing operations as well as QE. However, there seems to exist a refinancing channel from QE to refinancing improving credit availability and lowering interest rates from affected households (Di Maggio et al., 2020). We may consider the unconventional monetary policies as a whole.

<sup>3</sup> MFIs include credit institutions, money market funds, euro area national central banks, and the ECB.

Box 1 shows the unconventional monetary policy instruments used by the ECB: pandemic emergency longer-term refinancing operations (PELTRO) and longer-term refinancing operations (LTRO) as well as TLTRO, APP, and PEPP which were mentioned earlier. While LTRO provides liquidity, TLTRO is targeted to induce banks to lend to the real economy. PELTRO and PEPP are directly linked to COVID-19, PELTRO being a refinancing operation like LTRO, while PEPP is an asset purchase programme. Hence, there will be more unconventional measures expanding the ECB balance sheet which could increase the exposure of long-term commitments. However, PEPP is supposed to be rolled over to avoid interference with monetary policy in the future, and there are high liquidity injections in the refinancing operations supporting bank lending to households and firms within TLTRO, but monetary policy measures since March 2020 are subject to adjustment to make sure inflation moves towards its target (ECB, 2020a). This is in line with the main objective of the ECB to support price stability to safeguard the value of the euro, as specified in the TFEU, Articles 119 and 127, which, together with Article 123 that prohibits overdraft and credit facilities to the government as well as the direct purchase of government bonds from the government, provide a legal foundation also for the unconventional monetary policy.

Box 1: ECB unconventional monetary policy measures

**LTRO:** In recent years, regular operations have been complemented by two liquidity-providing long-term refinancing operations in euro with a three-year maturity (maturing on 29 January 2015 and on 26 February 2015) as well as by US dollar liquidity-providing operations.

**PELTRO:** On 30 April 2020, the ECB's Governing Council decided to conduct a series of seven PELTROs to provide liquidity support to the euro area financial system and ensure smooth money market conditions during the pandemic period.

**TLTRO:** These are Eurosystem operations that provide financing to credit institutions for periods of up to four years. They offer long-term funding at attractive conditions to banks in order to further ease private sector credit conditions and stimulate bank lending to the real economy.

**APP:** Since 2009, several programmes of outright asset purchases have been implemented with the objective of sustaining growth across the euro area and in consistency with the aim of achieving inflation rates below, but close to, 2 percent over the medium term.

**PEPP:** On 18 March 2020, the ECB's Governing Council announced a new pandemic emergency purchase programme with an envelope of EUR 750 billion. The temporary programme was designed as a response to the coronavirus emergency to address the unprecedented situation faced by the monetary union.

Source: ECB.

Although a central bank creates digital money through QE with the aim of increasing spending in the real economy, there is a crucial difference between QE and debt monetisation, as the former only gives a temporary increase of the monetary base, which would increase money supply only if banks also increase their lending, while the latter gives a permanent increase in the monetary base to fund the government. Under QE, government bonds eventually mature and have to be paid back according to bond maturity. Hence, the duration of the temporary increase in the monetary base with QE depends on what maturities the bonds have. These must be kept short to avoid excessive liquidity. Longer maturity, which gives a more durable increase in the monetary base, seems to cause volatility. According to Hollmayr and Kühn (2019), monetary-fiscal interactions with longer average maturities

give higher volatility to the economy because the portfolio rebalancing effect in the banking sector following from government bond purchases is more elaborated, so yields must fall more to induce banks to sell their government bondholdings.

Unconventional monetary policy may have shifted the monetary-fiscal policy interaction from monetary dominance with independent central banks to fiscal dominance, where the central bank is forced to support fiscal policy and where fiscal dominance is measured by the fraction of government debt that needs to be backed by monetary policy (de Haan and Eijffinger, 2016). Under fiscal dominance, QE puts downward pressure on inflation due to a reduction of household wealth, but under monetary dominance, QE increases inflation as short-term interests are decisive (Hollmayr and Kühn, 2019). However, QE in itself does not imply fiscal dominance. A central bank may pursue a monetary policy, in which QE is an instrument, that is consistent with fiscal policy without formally being dictated by it, expanding the balance sheets of central banks with increasing holdings of government bonds, as long as the motive is to address monetary transmission problems.

Regarding the concerns that QE would be monetisation of public debt due to fiscal dominance, Isabel Schnabel (2020a), a Member of the Executive Board of the ECB, states that the ECB “is not keeping interest rates low to make it easier for governments to finance their debt [...] The euro has been built on the principle of ‘monetary dominance’ [...] The public debt ratio in the euro area is notably lower than it would have been in the absence of the bond purchases.” About the fiscal policy response to COVID-19, Schnabel (2020a) argues that it “strengthens the effectiveness of monetary policy and mitigates the long-term costs of the pandemic”, while with “targeted, forward-looking investment, not least under the umbrella of the EU Recovery Fund, governments can foster sustainable growth, increase long-term competitiveness and facilitate the necessary reduction of the debt ratio once the crisis has been overcome.”

Hence, during the COVID-19 crisis, there is a strong complementarity between fiscal policy, using NGEU, and monetary policy, using PEPP and TLTRO. However, the ECB remains committed to its price stability mandate, while using QE, acknowledging the importance of targeted investments for sustainable growth. Does a strong complementarity suggest fiscal dominance or a monetary-fiscal nexus? Not necessarily, because the COVID-19 crisis is something both monetary and fiscal policy need to address, so what seems like a nexus are monetary and fiscal responses to the COVID-19 crisis. In a complex, evolving economy, considering the production structure, complementarity between monetary and fiscal policy is essential to economic performance. Schnabel (2020b) points out that “in a low interest rate environment, there are strong complementarities between fiscal and monetary policy that can help lift the euro area economy out of the current low-growth, low-inflation trap.” Behind the decline in the interest rate that equals saving to investment, Schnabel (2020b) sees “lower trend productivity growth, an ageing society and global excess savings”, which means that “ever-lower interest rates are needed to stimulate growth and investment” and that “that years of weak aggregate demand and price pressures have forced central banks worldwide to find additional instruments that could provide policy accommodation when their main policy rates were approaching zero.” This is an adaptation to structural change. Provided the NGEU promotes innovation through the green and digital transitions, making fruitful public investments that would crowd in private investment, it would be reasonable to expect future productivity growth, absorbing the liquidity injected. However, public debt as well as private debt will increase through liquidity injections and need to be addressed.

As a monetary response to COVID-19, Schnabel (2020b) points out in particular PEPP and TLTRO, which “prevented the health crisis from turning into a full-blown financial crisis at a time when markets started to panic and price action became highly destabilising”, but a fiscal response was necessary, “[f]iscal expansion is then indispensable in order to sustain demand and mitigate the long-term costs of the



crisis." In times of uncertainty, quality public investment can increase GDP growth and employment, crowding in private investment, particularly in industries critical to resolve the health crisis and to promote recovery, giving new investment in healthcare, social housing, digitalisation, and environmental protection (IMF, 2020). Crowding in of private investments due to public investment is supported by Dosi et al. (2015). Using fiscal and structural policies wisely may support price stability and central bank independence, such as the NGEU on green and digital investments (Schnabel, 2020b).

As Reinhart and Rogoff (2009) point out, crises increase public debt considerably, but that does not necessarily threaten central bank independence. Schnabel (2020a) points out that "[t]here is no evidence of a systematic feedback loop from sovereign debt developments to monetary policy decisions." Furthermore, Schnabel (2020b) states that a sustainable growth path must be reached before public debt is addressed, arguing for a reform of the European fiscal framework: "fiscal rules are too complicated, hard to enforce and procyclical." The procyclical effect of fiscal rules have been pointed out by Dosi et al. (2015) in an evolutionary context with heterogeneous agents and Gaffard et al. (2018) when the economy is viewed as a sequence of disequilibrium sequences. More specifically, Gaffard et al. (2018) point out that budget deficits are not always a problem and the question is for how long and for how much before public spending can be relayed by the recovery of private expenditure. In addition, price stability is crucial to the coordination of markets over time in their disequilibrium process framework.

However, Dosi et al. (2015) find that a dual-mandate monetary policy, a dual-mandate Taylor rule focusing on both price and employment stability, makes the economy perform better, compared to the standard one, focusing only on price stability, especially when there are fiscal rules, but yet the dual-mandate Taylor rule keeps inflation low and stable. Rather than a dual-mandate Taylor rule, Beckworth (2020) proposes a radical change, using nominal GDP level targeting (NGDPLT) rather than inflation targeting to stabilise growth of total spending and thereby growth of income, involving a two-rule monetary policy, one for positive interest rates and one for zero or negative interest rates, and a facility with government securities deposited in the central bank for rule-based helicopter drops, i.e. direct money transfers to households. Rather than using short-term interests or QE to influence the yield curve, this proposal defines an interest rule for positive interest rates and a monetary base rule otherwise. More specifically, Beckworth (2020) uses the nominal GDP gap, which is the percentage gap between the forecasted and target growth rates of nominal GDP, so that if nominal GDP is expected to rise above its target, the central bank should increase its interest rate if interest rates are positive or decrease the growth rate of the monetary base otherwise. The idea of using helicopter money – providing money to households directly – has also been discussed in a European context, but with money transfers to government fiscal transfers related to COVID-19.

### 3.2. European monetary choices

As noted above, the fiscal response NGEU and the monetary responses PEPP and TLTRO are complementary, but various ideas have been discussed, such as Coronabonds and helicopter money. Beck (2020) argues for Coronabonds as a means for debt mutualisation, a sign of solidarity, but also to prevent either too little stimulus in countries most affected hampering recovery in the Single Market or too much fiscal stimulus increasing sovereign debt. Horn et al. (2020) point out that the history of Coronabonds goes back to European Community bonds within the Community Loan Mechanism (CLM) of 1975, where loans obtained by the European Commission were transferred to the oil crisis hit countries through the Bank for International Settlements (BIS), the lesson for today being the importance of the EU budget for European bond guarantee schemes, that the loans were repaid in full and on time, so guarantees were never activated, and that European governments have repeatedly shown willingness to provide rescue funds with substantial guarantees to other members in need.

Today, addressing the challenges posed by COVID-19, the NGEU is doing what the European bonds did, allowing the Commission to borrow up to EUR 750 billion on the markets to be paid back by 2058, out of which EUR 672.5 billion is allocated to the RFF to provide funds to the countries and sectors most affected by the crisis for 2021-2023 and requires Member States to develop national recovery and resilience plans that contribute to green and digital transitions. To what extent NGEU, using a Eurobond-like financial approach, will succeed remains to be seen.

Developing national recovery and resilience plans is no guarantee to make sure that those liquidity injections are properly allocated, thereby avoiding malinvestment along ABC and financial instability along FIH. Furthermore, the demand for investible funds may remain low in spite of an increased supply of them, while there may exist structural maladjustments, following Haberler ([1937] 2011). National plans need continual evaluation, thus preventing funds from being directed to unfruitful investment projects, to aim at green and digital innovation. Allocation of resources is a bottom-up procedure, where entrepreneurial activity is coordinated through the price mechanism. National plans may disturb the market by imposing allocations, which are harmful for the green and digital transitions, as the capital structure may become inconsistent, while public goods, such as infrastructure, may not be adequately provided. Public investments need to be fruitful and public malinvestment is possible. However, if properly done, there may be crowding in of private firms' investment, as Dosi et al. (2015) find when fiscal policy increases aggregate demand in times of recession.

The NGEU will operate for 2021-2023, and more time may be needed to recover from the crisis, but it takes away the burden from monetary policy. As Bénassy-Quéré et al. (2020) point out, PEPP is a complement to long-term refinancing through TLTRO and PEPP's envelope is substantial and may be adjusted if necessary, but in addition they suggest a long-term credit line through the European Stability Mechanism (ESM). PEPP started with an envelope of EUR 750 billion in March until December 2020, but in June PEPP was adjusted to EUR 1,350 billion until June 2021, while TLTRO III conditions were eased twice in March and April (Lane, 2020). While PEPP solves liquidity problems and prevents immediate runs on public debt, more needs to be done, according to Giavazzi and Tabellini (2020), who suggest irredeemable or very long maturity Eurobonds to fund the very large fiscal support required to counter the effects of COVID-19. Very long maturities would make QE more durable in time, blurring the difference between QE and monetisation, especially when perpetuities are considered. Such bonds would need to be backed by tax capacity. Giavazzi and Tabellini (2020) argue that the very long maturity COVID Eurobonds to be bought by the ECB be backed by the joint tax capacity of Member States. However, very long maturity involves some degree of monetisation, especially if those Eurobonds would be perpetual. Giavazzi and Tabellini (2020) consider monetisation as part of the optimal policy response, since the danger is deflation, while the ECB would maintain its independence if inflation should arise, as the ECB would remain free to reduce its balance sheet if necessary. Consequently, they suggest a monetary policy restricting the ECB's independence through the monetisation of public debt in deflation, while the ECB maintains its independence in times of inflation. This would be worse than the policy the ECB pursues.

The monetisation of public debt accumulated during COVID-19 could be achieved through helicopter money, as suggested by Galí (2020), Kapoor and Buiter (2020), and Yashiv (2020). According to Galí (2020), the central bank would purchase of government debt, to immediately write it off, so it would no longer have any impact on the government's effective debt liabilities, a monetary financing measure strictly restricted to the duration of the emergency measures linked to the COVID-19 crisis. Yashiv (2020) agrees with Galí's idea, arguing that as debt-financed plans are less effective and constitute tax-deferral they are less suitable to meet the COVID-19 shock, emergency legislation allowing central banks to use helicopter money for a limited time of 90 days, that could be extended for another 90-day

period if requested by the central bank. They both stress that it is an emergency procedure, not a rule, which illustrates that they are aware that it would be potentially dangerous, submitting monetary policy to fiscal policy.

Would this violate central bank independence? Yashiv (2020) is very keen to maintain central bank independence, while targeting fiscal expenditures to address crucial COVID-19 problems. In addition of the extension having to be requested by the central bank, a COVID-19 policy committee would be set up to make sure it is an emergency procedure only, thus preserving central bank independence, while targeting fiscal measures to support the budget of health care systems as well as assistance to households, firms, and to maintain the functioning of markets (Yashiv, 2020). Hence, this helicopter money would function strictly as an emergency procedure and may not put central bank independence into jeopardy, but the COVID-19 policy committee would institutionalise a monetary-fiscal nexus, although with external experts as well.

As GDP crumbles and deficits increase, the debt-to-GDP ratios would dramatically increase, leading to counterproductive austerity due to SGP and FC, leaving one way out, the creation of new money through a one-off helicopter drop, cash transfers to the government around 20-30% of GDP to cover public expenditures related to COVID-19 (Kapoor and Buiter, 2020). It makes sense to decrease government debt through a one-time monetisation, as public debt to GDP would otherwise become very high. However, TFEU, Article 123 is usually seen as a prohibition against monetisation of public debt, but Kapoor and Buiter (2020) argue that it only bans credit and overdraft facilities, not helicopter drops, transfers or an extraordinary dividend payment. The ECB cannot buy government bonds directly from the government at any level, but transfers are not mentioned. Nevertheless, in Galí's (2020) helicopter drop proposal, he states that it would be equivalent to the central bank purchasing government debt, to immediately write it off. Hence, the legality is questionable.

Beckworth's (2020) NGDPLT proposal is different, as direct money transfers are to be made to the households and that the central bank should have a facility to make direct transfers at ZLB, following a monetary rule. Such an arrangement would be more likely to preserve an independent central bank. The helicopter drops proposals as temporary COVID-19 measures express concern for central bank independence, and through this temporary monetisation of fiscal COVID-19 transfers, further increase of public debt leading to austerity after the crisis would be prevented (Galí, 2020; Kapoor and Buiter, 2020; Yashiv, 2020). However, public debt reduction will not be addressed until the economy has recovered and shows stable growth. Nevertheless, the objective is public debt conversion. Vihriälä (2020) proposes another debt conversion approach, although closely related, namely to convert a fraction of public debt held by the ECB, or preferably the ESCB, into zero-coupon perpetuities to decrease the public debt burden instantaneously, which constitutes monetary financing. Such experiments could be highly inflationary and undermine central bank independence.

However, the increased debt burden due to unconventional monetary policy is a crucial problem that needs to be resolved. The ECB combines TLTRO and PEPP to lend to affected firms through countercyclical capital buffers and extended facilities to purchase government and corporate debt (Becker et al., 2020). As Baldwin and Weder di Mauro (2020) argue, COVID-19 requires that we do what it takes, and while the medical shock is transitory, the economic damage may be persistent, and as the shock comes from the real economy, fiscal policy must take the lead and the monetary policy must accommodate. This is achieved through PEPP and TLTRO as major monetary response, while the forward-looking NGEU provides the major fiscal response, in addition to the expansion in MFF for 2021-2027. Miles (2020) argues that while QE is not helicopter money, it is useful. Gaffard et al. (2018) consider QE as a useful tool to shape the supply of credit to the real sector, even in normal times. Hence, QE could have a role to play in the new normal. QE through PEPP and refinancing through TLTRO seem

to have contributed considerably to the growth of M3 in July (ECB, 2020a). The public deficit and public debt will increase, and the public debt burden needs to be resolved. ECB staff estimate the deficit ratio to be 8.8% in 2020 and then to decline to 4.9% in 2021 and 3.6% in 2022, while the public debt-to-GDP is estimated to become 100.7% of GDP in 2020, to decrease slightly to 98.9% by the end of 2022 in the euro area (ECB, 2020a).

The high public debt levels have been developed since the GFC and SDC, causing concerns for future solvency problems, but in addition, corporations and households have not deleveraged substantially since the GFC and SDC, and the corporate debt burdens threaten the economic recovery from COVID-19 (Becker et al., 2020). The new normal will include very high private and public debt initially. There is need for debt restructuring in the future, both in the private sector and the public sector.

Looking at the achievements so far, there has been a strong recovery, although it will take some time and a resurgence of the virus infection rates creates uncertainty. ECB staff estimate that the euro area economy will have recovered half of the decline from the beginning of the pandemic by the third quarter this year and that full recovery will be achieved by the end of 2022, i.e. a fall of 8% this year and a growth of 5% in 2021 and 3.2% in 2022 (Mersch, 2020). The main policy responses are TLTRO and PEPP, for monetary policy and NGEU for fiscal policy. Through TLTRO, the supply of credit has been supported, causing credit growth meeting the demand for liquidity of firms, but also causing prices on financial assets and real estate to increase, and the net injection of liquidity of TLTRO III in June and September was EUR 706 billion (gross nearly EUR 1.5 trillion) while PEPP has helped return inflation closer to the ECB definition of price stability, with fiscal measures, like the NGEU, have been a crucial complement (Mersch, 2020). What can be observed is a strong complementarity between monetary and fiscal policy, but even if that is seen as a nexus, it is temporary and defined by COVID-19. However, the increasing prices of financial assets and real estate suggest that the demand for credit has been saturated and financialisation effects. Credit-creation causing malinvestment along the ABC and financial instability along the FIH become more likely, while firms and households become more highly leveraged, so the liquidity injection should adjust.

As Gaffard et al. (2018) argue, monetary policy must consider disequilibrium market coordination and structural change. However, due to liquidity injections through unconventional monetary policy measures, both private and public debt will be very high in the new normal, after the economy has recovered, and there will be a need for debt restructuring. However, as Dosi et al. (2015) argue, having no fiscal rules with a dual-mandate monetary policy aiming at both price and output stability would be stabilising in the short-run and give economic growth in the long run. Nevertheless, this does not mean a monetary-fiscal nexus and central bank independence remains, as long as the central bank pursues its mandate. However, the debt burden needs to be resolved.

## 4. CONCLUSION

As a response to the COVID-19 pandemic, the ECB has responded with a very expansionary monetary policy, especially through PEPP and TLTRO, which inject liquidity into euro area economies in order to stabilise them, while focusing on its price stability target. The European Council has added a complementary common fiscal response, especially through the NGEU which focuses on the structural change of EU economies to make green and digital transformations. The growing broad money supply reflects this injection of liquidity, which is meant to avoid severe deflation, but this raises concerns about non-performing loans, reflecting malinvestment and financial instability. Given the uncertainty around COVID-19, very strong liquidity injections may cause too optimistic expectations of profit opportunities. A disequilibrium approach of output-inflation dynamics, which focuses on the production structure, is warranted, as unconventional monetary policies, such as the PEPP and TLTRO, help banks and other financial institutions recover, while expansionary fiscal policies, such as the NGEU, are necessary to achieve economic growth. As well as being a fiscal policy, the NGEU is a structural policy to achieve green and digital transitions. A disequilibrium approach to output inflation dynamics involves sequences of coordination among heterogeneous agents and markets with imbalances across markets changing over time. Increasing the liquidity of the banking system would meet a demand for credit during a pandemic up to a point, but the expectations of firms and households matter and liquidity may remain in the financial system due to financialisation.

Production as sequences in stages includes capital that is a heterogeneous structure, whose composition changes over time in a complex, evolving economy where there are many interactions among heterogeneous agents and out-of-equilibrium dynamics. Monetary-fiscal interactions within such a context, which have been considered by means of ABMs in the literature, suggest that fiscal rules are destructive to economic performance, although escape clauses less so, while a dual-mandate Taylor rule gives better economic performance in terms of short-term stability and economic growth. Three studies using ABM for a complex, evolving economy show that fiscal rules are destructive to macroeconomic growth (Dosi et al., 2015; Teglio et al., 2019) and stability (Dosi et al., 2015; Popoyan et al., 2017; Teglio et al., 2019), while monetary policy could benefit by a broader mandate considering inflation and unemployment (Dosi et al., 2015; Teglio et al., 2019), or inflation, the output gap, and credit growth, when considering the link between monetary and macroprudential policy (Popoyan et al., 2017). Fiscal policy has a crucial role, but monetary policy matters, so this does not imply fiscal dominance, but macroeconomic coordination of monetary and fiscal policy, like coordination in markets.

Turning to monetary-fiscal policy interactions during COVID-19, monetary policy in the euro area was first with PEPP and TLTRO in March, while a common fiscal response was wanted until the NGEU arrived as a common EU fiscal response in July. This left room for various proposals such as long-term credit lines through the ESM, Eurobonds, also called Coronabonds, including a zero-coupon perpetuity version, and helicopter drops with direct money transfers to targeted fiscal transfers and a closely related use of zero-coupon perpetuities as some kind of debt conversion. Financially, the NGEU is doing what the European bonds did, allowing the Commission to borrow on the markets. The ECB recognises the crucial role of the NGEU for a coordinated euro area recovery, strengthening economic resilience and convergence among Member States. The fiscal response NGEU is the core of the EU recovery strategy and therefore also of a monetary-fiscal nexus emerging around COVID-19, which illustrates monetary-fiscal interdependence due to COVID-19 rather than an emerging monetary-fiscal nexus threatening central bank independence. COVID-19 provides an incentive to innovate, e.g. in areas such as ICT, where 5G would need public investments in infrastructure. Malinvestment, both private and public, could cause a crisis, so it is important that funds are allocated to structurally sound firms in

sectors that benefit from the structural change imposed by COVID-19, such as digital industries. The NGEU will operate for 2021-2023 to contribute to green and digital transitions through national recovery and resilience plans. Developing national recovery and resilience plans is no guarantee that liquidity injections are properly allocated, thus avoiding malinvestment and financial instability, but research findings suggest that quality public investment can increase GDP growth and employment, crowding in private investment. The national plans need continual evaluation.

There is a strong complementarity between the fiscal policy, such as the NGEU, and the monetary policy, such as the PEPP and TLTRO, during the COVID-19 crisis. However, the ECB is committed to its price stability mandate, while using QE, acknowledging the importance of targeted investments for sustainable growth. Hence, as both monetary and fiscal policy respond to COVID-19, there exists a temporary monetary-fiscal nexus around COVID-19, but the ECB focuses on its price stability mandate, so there is no fiscal dominance threatening central bank independence. The fact that QE expands central bank balance sheets, including their government bond holdings, is not necessarily a sign of fiscal dominance, because QE is a way to inject liquidity with the purpose to reach price stability, defined by an inflation target, and under a dual-mandate monetary policy also output stability. So far, the PEPP and TLTRO seem to have injected liquidity, moving euro area economies closer to the inflation target, in line with the ECB's objective. However, as the ECB injects liquidity into the banking system and banks lend to firms and households – and the ECB may do so excessively causing prices on assets and real estate to increase – firms and households will become more highly leveraged, potentially creating a future problem of high private debt as well as high public debt which would lead to the need for debt restructuring in the new normal. Having no fiscal rules and a dual-mandate monetary policy focusing on both price stability and output stability would be stabilising in the short run and create economic growth in the long run, but it does not establish a monetary-fiscal nexus and central bank independence remains, as long as the central bank independently pursues its mandate. However, the debt burden needs to be resolved.

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## ANNEX

### Treaty on the Functioning of the European Union (TFEU)

#### Article 119 (ex Article 4 TEC)

"2. Concurrently with the foregoing, and as provided in the Treaties and in accordance with the procedures set out therein, these activities shall include a single currency, the euro, and the definition and conduct of *a single monetary policy and exchange-rate policy the primary objective of both of which shall be to maintain price stability and, without prejudice to this objective, to support the general economic policies in the Union*, in accordance with the principle of an open market economy with free competition."

#### Article 123 (ex Article 101 TEC)

"1. *Overdraft facilities or any other type of credit facility with the European Central Bank or with the central banks of the Member States (hereinafter referred to as 'national central banks') in favour of Union institutions, bodies, offices or agencies, central governments, regional, local or other public authorities, other bodies governed by public law, or public undertakings of Member States shall be prohibited, as shall the purchase directly from them by the European Central Bank or national central banks of debt instruments.*"

#### Article 127 (ex Article 105 TEC)

"1. *The primary objective of the European System of Central Banks (hereinafter referred to as the ESCB) shall be to maintain price stability. Without prejudice to the objective of price stability, the ESCB shall support the general economic policies in the Union with a view to contributing to the achievement of the objectives of the Union as laid down in Article 3 of the Treaty on European Union. The ESCB shall act in accordance with the principle of an open market economy with free competition, favouring an efficient allocation of resources, and in compliance with the principles set out in Article 119.*"

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Current developments during the COVID-19 pandemic involve strongly complementary monetary and fiscal policy, but both as responses to COVID-19 and not the outcome of an emergent monetary-fiscal nexus. Therefore, the ECB maintains its independence by using unconventional monetary policy measures to reach price stability, according to its mandate.

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