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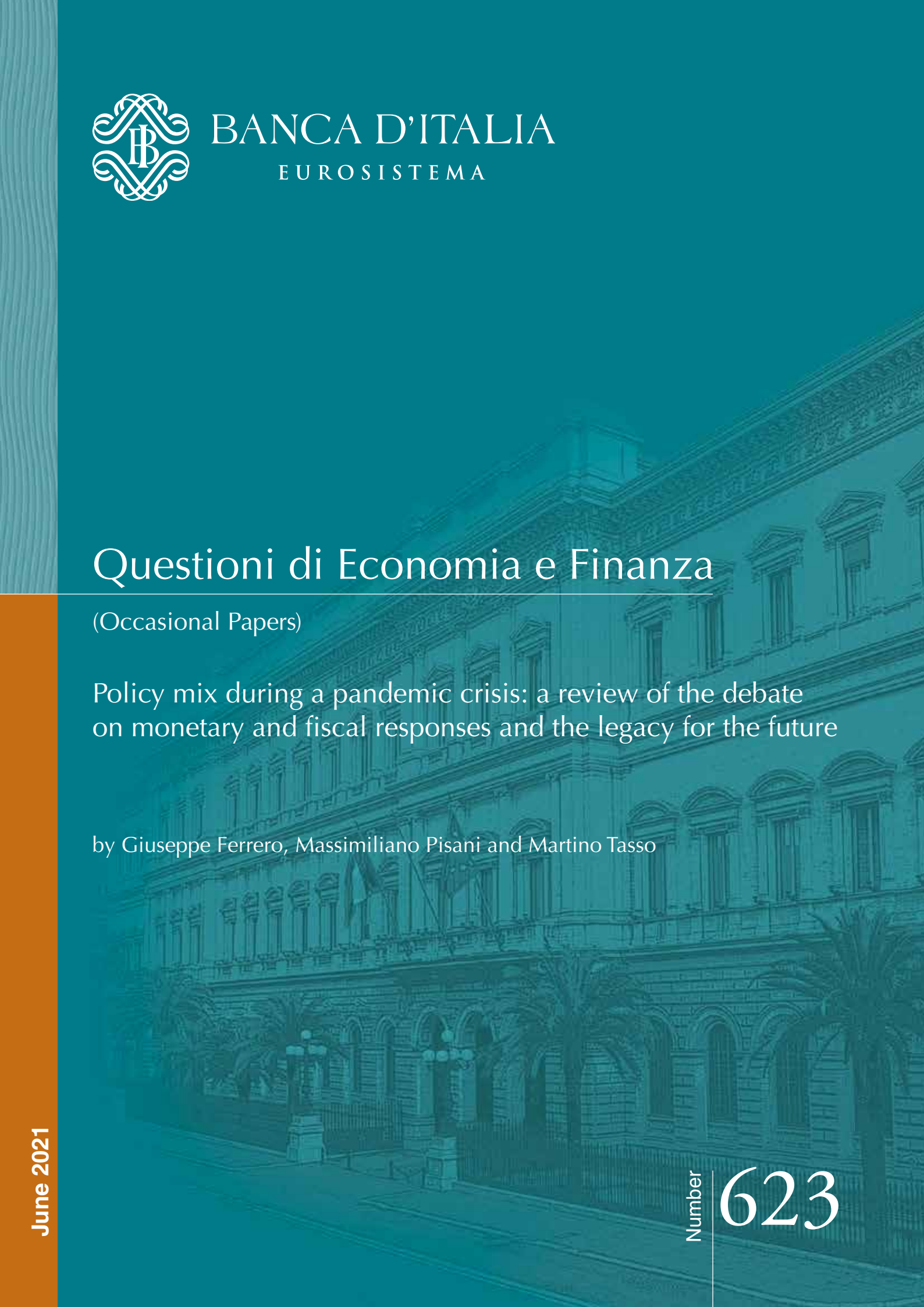

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(Occasional Papers)

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by Giuseppe Ferrero, Massimiliano Pisani and Martino Tasso

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POLICY MIX DURING A PANDEMIC CRISIS: A REVIEW OF THE DEBATE ON MONETARY AND FISCAL RESPONSES AND THE LEGACY FOR THE FUTURE

by Giuseppe Ferrero* Massimiliano Pisani* and Martino Tasso*

Abstract

We review the debate on the monetary and fiscal policy measures that were adopted in response to the pandemic shock in advanced economies, as well as others that could be taken in the near future, once the health emergency is over. The pandemic is an exceptional global health shock, which has negatively affected the income, liquidity, and financial conditions of households and firms worldwide. Policy responses adopted in advanced economies in 2020 – based on extraordinary large-scale, swift, targeted monetary and fiscal measures – were appropriate to sustain liquidity, income, and aggregate demand and, thus, helped to avert a devastating financial crisis. Once the health emergency is over, the legacies of the shock will be a recovery of uncertain strength and timing, a low interest rate environment, and high corporate and public debts. Support measures should be removed with caution. A cross-country coordinated policy mix based on (i) accommodative monetary policies (if consistent with central bank objectives), (ii) public investments and (iii) a gradual rebalancing of government accounts, could be effective in sustaining a strong global recovery and reduce private and public debt.

JEL Classification: E52, E58, E62, F01.
Keywords: COVID 19, secular stagnation, monetary policy, fiscal policy.
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Contents

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EXECUTIVE SUMMARY

The pandemic shock is a worldwide health crisis with disruptive economic effects in all countries. It broke out in a global macroeconomic environment that was already heading toward a "new normal": structural changes in technology, preferences, and demographics contributed to the secular reduction of real interest rates and growth of economic activity to historically low levels.

The COVID-19-induced recession has a sectoral composition: firms operating in the contact-intensive sectors and workers' belonging to the low-skilled, female, and youth categories have been the most affected. The pandemic is likely to reduce the accumulation of physical and human capital and knowledge because of high uncertainty, major obstacles to the normal operation of schools and universities, and job destruction. Thus, the shock can have negative long-run effects on potential output (hysteresis or "scarring" effects).

During the emergency phase, the joint response of monetary and fiscal policies across advanced economies is key to sustaining aggregate income, liquidity, and therefore aggregate demand. It can also increase resilience, in particular of those categories of firms, workers, and households hit the most. The multi-front policy response prevents the drying-up of liquidity and a credit crunch and, thus, a financial crisis. The policy measures currently in place should be removed gradually and only once the emergency phase is over and the reach of the vaccine is sufficient at the global level.

Once the acute stage of the crisis is over, the appropriate global policy mix to achieve a strong recovery worldwide should take into account that the economic environment in the new normal will be characterized by low real interest rates and high levels of private and public debt. This mix should be based on accommodative monetary policy measures, which are expected to remain consistent with the central banks' target for some time, and on the re-modulation of public spending towards public investment in infrastructure, human capital, and research and development, which can benefit from low interest rates while effectively challenging the high uncertainty that is discouraging private enterprise. Higher public investment leads not only to high multipliers in the current situation, but also has the capacity to enhance sustainable growth potential by improving health, digitalization, and environmental conditions worldwide.

The increase in both private and public borrowing in response to the pandemic was unavoidable. A solid recovery will favour private sector deleveraging. Once the recovery is firmly under way, those governments facing a large public debt and little fiscal space should implement, gradually, plans to achieve primary budget surpluses, and exploit the high growth rate of the economy and low interest rates to curb public debt. Given the different levels of national public debt and the different degree of fiscal space, international coordination is necessary to maximize global growth and minimize global financial risks.

1. Introduction and main policy messages[1]

At the beginning of 2020, COVID-19 started spreading around the world. The consequences of the global health crisis have been dramatic. So far, more than 150 million people have fallen ill and about 3.2 million have died. The pandemic and the related lockdown measures enforced by governments depressed both aggregate demand and supply. In most countries, economic activity fell sharply in the first half of 2020, triggering severe increases in unemployment, a collapse of business sales and severe liquidity strains, which disproportionately affected small and medium-sized enterprises and brought important financial market segments to the verge of collapse (Visco, 2020). GDP partially recovered in the summer of 2020, as restrictions on economic activity and mobility were progressively eased, but it decreased in the final part of the year. At the time of writing this paper, the shock is not over yet. Even if vaccines continue to be rolled out during 2021, the uncertainty is still high and constitutes a drag on a sustained recovery in the near future.

The extraordinary worsening of the economic outlook required policymakers to intervene in a timely and comprehensive manner. Governments introduced measures to relieve household and firm liquidity needs – such as debt moratoriums and temporary wage supplementation schemes – and to facilitate their access to new financing – such as loan guarantee programmes. The crisis came at a time when interest rates were persistently low in all the advanced economies, thus leaving limited scope for conventional monetary policy to counter deep deflationary shocks. Central banks dusted off and extended, both qualitatively and quantitatively, the toolkit developed during the global financial crisis and, in the euro area, the sovereign debt crisis. To support the essential role of banks in financing the real economy, bank supervisors used the flexibilities embedded in regulation and accounting standards to allow banks to use the capital and liquidity buffers.

The need to contrast the economic effects of the pandemic sparked an intense public debate, focusing on two questions: what are the most appropriate responses of monetary and fiscal policy in order to preserve income, consumption, investment, employment, production and price stability in the short and medium term? What are the implications of the measures adopted, in terms of independence of monetary policy, financial stability, and sustainability of public debt in the medium to long term?

The objective of this paper is to review the debate on the measures taken in response to the pandemic shock and the implications these measures could have for central banks and governments in the future. In doing this, we take into account how the previous crises – the global financial crisis and, in the euro area, the sovereign debt crisis – had already shaped the academic and policy debate about the role of monetary and fiscal policy.

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[1] The views expressed in this paper are those of the authors and do not necessarily reflect those of the Bank of Italy. We would like to thank Fabrizio Balassone, Andrea Brandolini, Fabio Busetti, Giacomo Caracciolo, Francesco Caprioli, Paolo Del Giovane, Silvia Delrio, Pietro Rizza, and Stefania Zotteri for their useful suggestions. All remaining errors are our own. The cutoff date for data used in this paper is April 2021. Lucia Esposito, Sergio Santoro, and Stefania Villa contributed to the boxes contained in this paper. Email addresses: giuseppe.ferrero@bancaditalia.it; massimiliano.pisani@bancaditalia.it; martino.tasso@bancaditalia.it.

Our logical starting point is that the worldwide macroeconomic environment was already changing toward a "new normal", when the COVID-19 crisis broke out. Both (i) structural changes in technology, preferences, and demographics and (ii) factors related to the global financial and the sovereign debt crises in Europe contributed to the progressive reduction of real interest rates and, especially in the last decade, to historically low growth and inflation rates in many advanced economies.

According to the empirical evidence and rapidly growing theoretical literature, the COVID-19 pandemic adds further downward pressure on aggregate demand and, thus, economic activity, income, inflation, and interest rates. Firms and households could face binding income and liquidity constraints, which would greatly limit their investment and consumption choices, respectively. Moreover, uncertainty about epidemiological developments and therefore economic prospects, fuelling households' and firms' anxiety, reduces their propensity to consume and invest and increases their precautionary savings. The longer the contraction in employment and investments lasts, the higher the probability that hysteresis effects materialize: the slowdown in human and physical capital accumulation may persistently reduce aggregate supply, productivity and, thus, potential output and the natural interest rate (which could be defined as the real short-term interest rate that equates the demand and supply of funds when output is at its potential).

Several policy messages can be inferred from the literature and from the analysis of the macroeconomic effects of the pandemic shock.

First, the combined effort of monetary and fiscal policies across the advanced economies was a key element of the emergency phase of the COVID-19 crisis in order to limit the economic damages by sustaining aggregate income, liquidity, and, thus, aggregate demand. These policies also set the stage for a subsequent recovery. The multi-front policy response to the COVID-19 crisis prevented the drying-up of liquidity and a credit crunch that could have led to a large wave of defaults, thus warding off a deflationary spiral with probable profound consequences for economic and financial stability.

Second, within their respective mandates, both fiscal and monetary authorities have an interest in cushioning the blow of the crisis and fostering the recovery. Thus, their incentives are currently aligned. This is reinforced by important complementarities. As discussed in the text of this paper, for example, the liquidity provided by central banks and the government loans guarantees programmes reinforce each other, supporting the flow of credit to hard-hit firms. Expansionary monetary policies, implemented with the aim of countering deflationary risks, avert market tensions and reduce funding costs not only for households and firms but also for governments. Therefore, they indirectly favour bold public supports, which could be properly targeted towards those most vulnerable to the consequences of the health crisis and with tighter borrowing and liquidity constraints.

Third, once the emergency phase is over and the spread of the vaccine is sufficiently wide, the recovery needs to be strong and persistent in order to swiftly reduce unemployment and potential vulnerabilities in the sovereign, financial and corporate sectors. It should be a global recovery that positively affects both aggregate demand and aggregate supply (i.e. potential output). In this phase, fiscal and monetary authorities

should continue to provide support, readily adapting their action to the evolving situation. Withdrawing support too early and failing to act promptly, if needed, could jeopardize the recovery, exacerbate social disruptions and, ultimately, frustrate the efforts made so far to contain the economic damage caused by the pandemic.

Fourth, in order to achieve a strong global recovery, it is crucial that policymakers implement a policy mix based on accommodative monetary policy measures (if consistent with central bank targets) and a re-modulation of public spending towards public investment. The worldwide increase in public investment in infrastructure, human capital, and in research and development is the most effective measure to be implemented, in particular if, as it seems to be the case, real (and nominal) interest rates will remain at low levels for a prolonged period of time. Higher public investment in specific sectors could, among other things, contribute to improving health conditions and help reduce the environmental problems associated with carbon emissions, and favour greater digitalization of the economy around the globe.

Fifth, cross-country fiscal coordination could help to maximize the impact on the global recovery if countries with lower public debt exploit their larger fiscal space to provide additional stimulus to the domestic economy and, via trade spillovers, to the economy of their trading partners.

Sixth, there should not be any complacency about high private and public debt. The increase in both private and public borrowing in response to the pandemic was necessary. A solid recovery will favour private sector deleveraging. Once the recovery is firmly under way, those governments facing a large public debt and little fiscal space should implement, gradually, plans to achieve primary fiscal surpluses, and exploit the high growth rate of the economy and low interest rates to curb public debt. Reducing government current expenditure in favour of higher public investment and lower taxation of productive factors could be an appropriate strategy to induce both an increase in growth and the reduction of public debt. Given the different levels of national public debt and the different degrees of fiscal spaces, international coordination is necessary to maximize global growth and minimize global financial risks.

The remaining parts of the paper are organised as follows. Section 2 focuses on the macroeconomic implications of the COVID-19 shock. Section 3 describes the monetary and fiscal policy responses implemented at global level to increase resilience during the emergency phase. Section 4 discusses the legacy of the COVID-19 shock on the monetary and fiscal policy mix and how this mix should be designed in order to sustain the worldwide recovery once the emergency phase has come to an end. Section 5 concludes.

2. Macroeconomic effects of the COVID-19 global health crisis: its sectoral propagation and hysteresis effects

The COVID-19 shock is a global health crisis that has simultaneously and abruptly affected all countries, causing a large contraction in economic activity.

A key distinctive factor of the COVID-19-induced recession is its sectoral composition, because the pandemic negatively affects some sectors more than others.

Moreover, it is likely to reduce accumulation of human capital and knowledge, because of both the job destruction and of the obstacles to the normal operation of schools and universities to contain the diffusion of the virus. Because of slower knowledge and capital accumulation, the shock, even if it is transitory, can have negative long-run effects on potential output (hysteresis or "scarring" effects) and the natural interest rate. These effects can slow down the return to the pre-crisis macroeconomic conditions.

In what follows it is initially described how the COVID-19 shock propagates from the most hit sectors to the rest of the economy. Subsequently, possible hysteresis mechanisms induced by the pandemic are illustrated.

2.1 Cross-sector propagation of the COVID-19-induced recession

The contact-intensive services sectors have been greatly hit by the pandemic, in particular those associated with mobility and social gathering (e.g., tourism, transportation services, catering). This is due to contagion fears and social distancing measures imposed by the authorities.

Nevertheless, the recessionary effects are confined to the services sector only in the very initial phase. They spread to the rest of the economy via cross-sector interlinkages. Guerrieri et al. (2020) show that the immediate effect of a lockdown is to stop activity in contact-intensive businesses. Subsequently, the recession spreads to the rest of the economy if the complementarity relationships across sectors are strong enough, because lower spending in the contact-intensive services would imply lower spending for complement goods and services. Moreover, if financial market are incomplete and income cannot be fully insured, workers in shut-down sectors face a reduction in their income and, thus, reduce spending for other sectors' products. Thus, there are negative spillovers between the supply and the demand side of the economy: negative supply shocks may cause demand shortage when they trigger changes in aggregate demand larger than the shocks themselves. Closing down contact-intensive sectors (i.e., through public health policies) and providing full insurance payments to affected workers can achieve the first-best allocation for the utilitarian social planner.

The sectoral dimension of the shock and its spreading to the rest of the economy is also emphasized by Baqaee and Farhi (2020). They model COVID-19 as a combination of supply and demand shocks in a multi-sector New Keynesian model. These shocks propagate through supply chains, causing different sectors to become demand-constrained or supply-constrained. The contraction of the demand generates a large slack, initially concentrated in certain sectors of the economy. Income support to credit-constrained households can limit the drop in aggregate demand and output.

2.2 Lower knowledge and capital accumulation

There is large pre-COVID-19 literature showing that temporary recessionary shocks can produce permanent damages to the economy through long-run "scarring" (or hysteresis)

effects.[2] These effects of the pandemic shock can be non-trivial as well, given that the pandemic shock affects, directly and/or indirectly, workers, students, and firms.[3]

Recessions can have long-lasting effects on unemployment by slowing human capital accumulation. There is evidence that poor market conditions at labour market entry cause workers to accept lower paid jobs, and that this has permanent effects for the careers of some. This could be true in the case of the pandemic shock, given that it has negatively impacted services, which are more labour-intensive.[4]

Unemployment has a negative impact on human capital accumulation, as unemployed workers' skills could deteriorate and their attachment to the labour force may weaken. The slower human capital accumulation could have negative long-lasting feedback effects on unemployment. Before COVID-19 shock the literature provided some attempts to quantify the impact of these scarring effects on future employment. Arulampalam et al. (2001) and Tumino (2015) find, for unemployed, a lasting wage penalty and an employment penalty, relative to workers with similar characteristics.

The long-run consequences for hardly-hit workers' human capital can be dramatic not only because of unemployment but also because the job loss can imply a possible mismatch of competence and skills. Human capital is job-specific and it cannot be taken for granted that in the new job the worker will be as productive as in the lost one.[5]

Human capital accumulation is also negatively affected by lower education, because governments have been forced to close schools to limit the spread of the virus. There is some evidence suggesting that a relatively short period of missed school will have consequences for skill growth of young cohorts. Carlsson et al. (2015) show that even just ten days of extra schooling significantly raises scores on tests of the use of knowledge by 1% of a standard deviation.[6]

Moreover, the impact of the pandemic has been uneven among workers, with job losses concentrated mainly in low-skilled and low-paid areas of the workforce and it is especially severe on women and the young people.[7]

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[2] See Cerra et al. (2020).

[3] Jordà et al. (2020) study major pandemics using the rates of return on assets stretching back to the 14th century. Significant macroeconomic after-effects of pandemics persist for decades, with real rates of return substantially depressed. Their results are consistent with the neoclassical growth model: pandemics may induce relative labor scarcity and/or a shift to greater precautionary savings.

[4] Manufacturing-led recessions can also induce hysteresis effects; Ruggles et al. (1977) report evidence based on US data; Oreopoulos et al. (2012) that evaluate evidence based on Canadian data; Brugiavini and Weber (2014) assess the longer-term consequences of the Great Recession on the European economy.

[5] See Portes (2020).

[6] Burgess and Sievertsen (2020) discuss how the global lockdown of education institutions is going to cause major (and likely unequal) interruption in students' learning.

[7] Mongey et al. (2020) use US data to show that employees in lockdown sectors typically have lower levels of education, lower incomes, and lower savings than employees outside of the sectors directly affected by these measures. ILO (2020) states the danger of a "lock-down generation": young workers are also concentrated in sectors which are most heavily impacted by the economic recession provoked by the pandemic; moreover, as new vacancies are heavily restricted, young jobseekers are facing increasing difficulties to transition to decent jobs. According to Georgieva et al. (2020), COVID-19 had disproportionate effects on women because they are more likely than men to work in social sectors "such as services industries, retail, tourism, and hospitality" that are hit hardest by social distancing and mitigation measures. In particular,

Unequal access to education worsens the impact of the shock among young generations, in particular among the poorest students. Unequal access can be magnified by the fact that some teaching has moved on line and not all student have equal access to digital technology (e.g., availability of high-speed connection and computers at home).[8]

Moreover, persistent changes in consumption composition (for example, lower consumption of tourism services) or in labor organization (e.g., a structural increase in working-from-home arrangements) could make past investments non-productive. High debt and financial constraints can induce firms to reduce spending in investment. Similarly, corporate debt overhang may create "zombie firms", which have lesser incentives to invest in productive capital.

Low demand may have scarring effects on the economy by inducing firms to reduce investment in innovation. Fornaro and Wolf (2020) show that there are complementarities between aggregate demand and aggregate supply. High expected growth in the future induces more consumption and employment now, due to inter-temporally optimizing households; more consumption and employment today induce more firm investment and therefore more growth. In this economy, the coronavirus shock might reduce aggregate supply to such an extent that multiple equilibria become possible. The context of secular stagnation and liquidity trap might imply that the COVID-19 shock ends up triggering "stagnation traps induced by pessimistic animal spirits" and persistent underinvestment, which can lead to a lower natural rate and a ("L" like) non-recovery. According to these authors, to avoid such stagnation trap there is little that conventional monetary policy can do, but fiscal policy – most notably, productive public investment – can be of help.[9]

2.3 Main takeaways

There are several important takeaways from the literature on the macroeconomic effects of the pandemic shock.

First, the pandemic transmission mechanism to the overall economy has a relevant sector-specific component: it directly and mainly affects some sectors and workers'

pandemics put women at greater risk of losing human capital. Alon et al. (2020) use US data to show in a macroeconomic model that during the pandemics the ratio of labour hours supplied by women relative to men falls much more sharply than in "normal" recessions.

[8] UNICEF (2020) suggests that inherent inequalities in access to tools and technology threaten to deepen the global learning crisis (that already existed before COVID-19 hit). European Commission (2020a) reports that children who lack resources and support were already lower performers before the crisis and they are likely to have lost further ground during the COVID-19 school closures.

[9] The pandemic shock can not only induce pessimistic expectations but also raise uncertainty simultaneously in every country. Ercolani (2020a) points out that since the outbreak of COVID-19 the marked increased in uncertainty regarding the developments of the pandemic has determined an unprecedented spike of household savings in many advanced economies. Improved accessibility and efficiency of health systems not only enhance the health and quality of life of citizens, but can also attenuate the precautionary savings associated with increased uncertainty regarding health outcomes and hence spur households' demand. Dietrich et al. (2020), using a survey of US households interviewed on the 20th of March 2020, show that the average expected 12-month output loss amounted to 6.8%, surrounded by a high level of uncertainty with answers spanning from 1 to -15%. According to Ercolani (2020b), in the US most of the accumulated saving during the pandemic shock was undoubtedly generated by the social distancing and lockdown measures imposed by the government; however, part of it may also have been driven by precautionary motives due to grim labour prospects.

categories (young and women in particular) and propagates to the rest of the economy via the increase in unemployment and (across-sector) complementarity relations. i.e., lower aggregate demand by households and firms in some sectors could negatively affect other sectors and, thus, the overall economic recovery. The negative shock on the demand side of the economies will likely dominate the negative shock on the supply side, and add disinflationary pressures on top of those due to the secular stagnation.

Second, the COVID-19 shock can produce costs also in the long run, given the interaction between cyclical and long-term growth factors (i.e., hysteresis effects on human capital and knowledge accumulation).

Third, from a policy perspective, non-standard monetary policy, liquidity-support measures, and targeted fiscal policy measures to sustain households' and firms' income can greatly help to alleviate the COVID-19-induced crisis.

All in all, the pandemic is a global health shock with deflationary effects affecting simultaneously all countries and, within each country, different households and firms in different ways, introducing large pessimism and uncertainty waves. Even if the multifaceted nature of the shock implies that its ultimate impact on the economic system is very difficult to predict (Caracciolo et al., 2020a,b; Locarno and Zizza, 2020), the risks associated with the shock-induced recession are extremely serious. Uncertainty and pessimistic expectations could give rise to negative spillovers between real and financial conditions in the economy. Uncertainty about the recovery from the pandemic, as it will depend on the virus resurgence, could induce households to increase their precautionary saving and, similarly, induce firms to exit from the market, in particular if they are overburdened with high debt. A muted recovery could have negative implications for financial conditions, given the high level of both public and corporate debt. A liquidity crisis could evolve into a solvency crisis. The deterioration in corporate creditworthiness could reduce the ability of firms to borrow funds. Without appropriate policy responses, a perverse and harmful loop between real and financial conditions could emerge and negatively affect macroeconomic conditions.

Being the COVID-19 a health shock simultaneously affecting all countries, it is rather implausible that some economies can exit from the emergency if, at the same time, some other do not. According to Biancotti et al. (2020), international coordination in the policy response to COVID-19 is key. Disagreements between countries as to the measures to be adopted to contain the spread of the virus and mitigate the economic costs, as well as any uncertainty about the way out of the crisis, risk worsening the negative impact of COVID-19 from both a healthcare and an economic standpoint.

These considerations can be used to assess the mix of measures adopted by fiscal and monetary authorities across the world in response to COVID-19 during the emergency phase and to design policy measures to support recovery once the emergency phase is over.

3. Policy responses to the COVID-19 shock: the monetary and fiscal policy mix in the short-term

According to large part of the economic literature, in a "*normal*" environment, the roles of monetary and fiscal policies are clearly distinct, with the former having the task of preserving macroeconomic stability and the latter with the objective of maximizing long-term growth, subject to an intertemporal budget constraint, and implementing redistributive policies (see *Box 1 - Monetary and fiscal interactions: a conceptual view*).

However, as described in the previous section, the COVID-19 pandemic is a global health crisis and, thus, it is not a "conventional" contractionary shock. The shock itself, the shutting down of businesses and the limits to mobility determined by the containment measures have a negative direct impact on economic activity. Moreover, they have a negative impact also through higher uncertainty. Households are uncertain about future employment and wage dynamics, firms are uncertain about future demand for their products and face weakened balance sheets, leading to cancellations and delays in investment plans (Lane, 2020). Economic activity in many sectors contracts and precautionary savings increase, regardless of the level of the interest rates.

Box 1 - Monetary and fiscal interactions: a conceptual view[10]

History and economic literature have taught us that the role and the interactions of monetary and fiscal policy depend on the economic environment (Bassetto and Sargent, 2020). This, in turn, is determined both by *structural factors* that tend to remain relatively fixed over time, or change at a very low frequency, and by *temporary factors,* that make main macroeconomic variables fluctuate along long-run trends.

Structural factors concern, for example, technology and technological progress, consumer preferences, the institutional structure, the distribution of households and firms in terms of age, labour participation, wealth and income, and productivity. All these factors contribute to determine potential growth, the level of long-term real interest rates and employment, the transmission of monetary and fiscal policy decisions within the economy.

Temporary factors, on the other hand, originate from unexpected changes in the economic environment (economic shocks), which tend to temporarily affect the demand or the supply of goods, services, credit, and financial assets and the degree of uncertainty that agents face when they have to take economic decisions. These factors determine economic fluctuations of both real and monetary variables.

Sometimes changes that initially appear temporary become permanent, due to *hysteresis effects* (see also Section 2). For example, economic shocks that lead to an increase in unemployment or a reduction in the supply of credit may determine a permanent reduction in income, economic growth, and technological progress. Workers who become unemployed may have difficulty in finding a job similar to the one they had and for which they had accumulated human capital. The longer this difficulty lasts, the greater the loss of human capital that had been accumulated and the more difficult it will be to find a job similar to the one that has been lost. Innovative and young, and therefore risky, firms may

[10] Prepared by G. Ferrero and S. Santoro.

find it difficult to obtain bank credit, especially when a crisis hits the economy. The longer this difficulty persists and the fewer firms of this type are able to obtain funds, the less technological innovation and future economic growth.

Temporary factors and structural factors characterize "*normal*" and "*changing*" economic environments in different ways. The former is characterised by a relatively stable economic structure and contained economic fluctuations, which do not generate hysteresis phenomena. To describe the movements over time of the main economic variables in the "normal" environment, the economic theory refers to cyclical changes around a steady state (or long-run equilibrium). A "*changing*" economic environment, instead, can originate from strong unexpected variations originated in the financial sector (for example, the global financial crisis and the sovereign debt crisis) or in the real sectors (for example the pandemic crisis), or from structural changes in the economy. Structural changes may involve the demographic structure of the society (i.e., in terms of dependence ratio), the process of technological innovation (i.e., the transition to the digitalization of society), preferences (i.e., in terms of risk aversion of households), the institutional environment (i.e., the appearance of new business models that replace the old ones). When the changing environment is caused by a large strong shock, hysteresis effects may occur and the economy achieves a new long-run equilibrium (the "new normal" equilibrium), after the temporary effects fade away. In a changing environment, economic agents may need time in order to adapt to the "new normal".

The distinction between these two environments ("*normal*" and "*changing*") is important because it also affect the role that monetary and fiscal policy play within the economy.

According to large part of the economic literature, in a "*normal*" environment, the roles played by monetary and fiscal policies are clearly distinct. Monetary policy, not being able to permanently influence long-term real variables, should counteract cyclical fluctuations, specifically to preserve price stability and to keep growth in line with potential. On the contrary, counter-cyclical discretionary fiscal policies are considered ineffective (Eichenbaum, 1997, Feldstein, 2002). Two main reasons motivate this position. First, discretionary fiscal policy inevitably suffers from implementation lags and thus may not be the most appropriate policy tool in the midst of a "normal" recession. Second, theory and available econometric evidence on the effect of a fiscal stimulus in "normal times" point to fiscal multipliers below one: in other words, increasing public deficit by one euro begets less than one euro of additional output.[11] One of the prominent explanations of this finding is related to households being forward-looking: when deciding how much to consume and save, they take the flow of all their expected future incomes into account. Hence, if they receive a higher net transfer from the government today, they understand

[11] In a survey on the pre great financial crisis literature, Ramey (2011) concluded that the empirical evidence on US temporary, debt-financed, increases in government purchases would have pointed to multipliers between 0.8 and 1.5. Blanchard and Perotti (2002) in a study based on post-WWII data find US peak multipliers around one; Hall (2009), studying the effects of government purchases during war episodes, finds values ranging from 0.7 to 1.0; Mountford and Uhlig (2009) find peak effects of public expenditures around 0.7. Also estimated structural DSGE models for the case of a temporary stimulus and no monetary policy accommodation pointed to rather low multipliers (in the range of 0.3 to 0.5; Coenen et al., 2012).

that it has to be backed by a lower net transfer at some point in the future, to ensure that the government fiscal policy remains sustainable. Consequently, households do not consume all the additional resources (this is the so-called *Ricardian equivalence* result). As in "normal times" a relatively higher fraction of households have access to credit than in a deep financial crisis, the concept of Ricardian equivalence offers a more realistic, albeit stylized, picture of their behaviour. An additional reason behind muted fiscal multipliers is related to the crowding-out of private investments: if the government increases its debt, it would need to pay a higher interest rate on it to induce investors to buy it, hence making the financing of private investment plans less attractive. Fiscal policy, instead, must be concerned with maximizing long-term growth and implementing redistributive policies, in such a way that debt sustainability is always preserved (or, in a more formal way, fiscal decisions are subject to the intertemporal budget constraint of the fiscal authority). Furthermore, economic theory and practice attribute the conduct of the two policies to two separate and independent institutions.

In a "*changing"* environment, this distinction might not be clear-cut. In some extreme circumstances the effectiveness of monetary policy in supporting the aggregate demand is put to the test, while some fiscal measures that redistribute resources across time become more effective since the Ricardian equivalence becomes less relevant even if firms and households are perfectly aware that today's higher fiscal deficit implies negative net transfers in the future.[12] The difficulties for conventional monetary policy in managing demand stem from the combination of different factors, both temporary and structural. A prominent example is given by the interaction between the reduction of real interest rates (arguably due to structural factors) and the presence of an effective lower bound on nominal interest rates. When policy rates reach their effective lower bound, they cannot be deployed to counteract the effects of a recession. Hence, unconventional instruments such as large securities' purchase programmes and forward guidance can be necessary to further lower interest rates in the economy and stimulate consumptions and investments. However, also these unconventional measures could result less effective than necessary. The high uncertainty about the "new normal" is an additional feature of a "changing" environment that may make the private sector less respondent to measures that mainly operates through interest rate changes.[13] In this environment, the limits to monetary policy effectiveness raise the concern that hysteresis effects can materialize, converting a temporary

[12] Households can be severely constrained in their possibility to access credit, distorting their saving decisions in the direction of consuming more of fiscal transfers than they would do otherwise; high uncertainty might compress firms' investments below what would be warranted, hence requiring public investments to step in, reducing the risk of a crowding-out effect.

[13] Moreover, in a changing environment in which structural factors modify the behaviour of households and firms, the probability of rapidly reaching the effective lower bound may increase even if the changes do not affect the natural rate of interest. This is related to the fact that, in this context, also the policymakers could be uncertain about some aspects of the economic structure. In a "normal" environment in which changes occur very slowly and the shocks affecting the economy are not very persistent, the literature has shown that the central bank should adopt the so-called "Brainard principle", whereby policy responses should be relatively more gradual and prudent. Instead, in an environment of rapid changes and where the effects of shocks are more persistent, the Brainard principle may be reversed (Ferrero et al., 2019b). A gradual reaction would increase the risk of de-anchoring of long-term inflation expectations, and so it pays to be more aggressive. As a result, the effective lower bound is reached quickly even in those cases in which the level of official rates is initially relatively high.

recessionary shock into a long-lasting stagnation. To avoid this outturn, fiscal policy should temporarily extend its role above the redistributive and the long-term growth ones.[14]

Moreover, the shock has materialised in an environment in which most economies were characterised by historically low nominal and real interest rates, low inflation, and growth (the so-called "low interest rate environment").

The trend decline of nominal interest rates started (at least) in the eighties. It was part of a global phenomenon and coincided with the slow but persistent decline in real interest rates, a structural reduction of inflation in many advanced countries and a period of low macroeconomic volatility (the "Great Moderation"; Kim and Nelson, 2001, and McConnell and Perez-Quiros, 2000).[15] According to the economic literature, a number of demand and supply factors have led to structural imbalances between the demand for investment and the supply of saving at a global level and consequently to lower global equilibrium real rates. Factors include: (*i*) demographic developments, such as the increase in life expectancy and the decline in population growth (Carvalho et al., 2016, Ferrero et al., 2019a; Aksoy et al., 2019); (*ii*) falling (relative) price of investment goods (Karabarbounis and Neiman, 2014; Thwaites, 2015); (*iii*) lower pace of technological innovation (Gordon, 2016); (*iv*) increase in wealth and income inequality (Summers, 2014); (*v*) rising savings rates in developing countries and the consequent increase in the demand for assets issued by advanced economies (Bernanke, 2005).

The decline accelerated with the outbreak of the global financial crisis and, in the euro area, with the sovereign debt crisis. Compared with a "normal" recession, in a "balance sheet recession" (Koo, 2008), such as the one that characterised the global financial crisis, monetary policy needs to be more accommodative, as traditional transmission channels that operate through intertemporal substitution turn out to be less effective (Mian and Sufi, 2014). Moreover, the increase of risk aversion and precautionary savings lead to the scarcity of relatively safer and long-term assets (Vayanos and Vila, 2020; King, 2019), further compressing the term premiums, inflation expectations and real and nominal interest rates.

Even though the debate on the overall effects of the COVID-19 shock on economic behaviours is still open, a consensus is emerging on the view that the contraction of the demand of investment and consumption and the increase of precautionary savings will exacerbate the low interest rate environment (see *Box 2 - COVID-19 and the low interest rate environment*).

[14] An additional argument in favour of a more active role for fiscal policy when the probability that policy rates reach the effective lower bound is relatively high is related to the existence of multiple equilibria: sharp drops in aggregate demand, driven by self-fulfilling pessimistic prophecies of households and firms, can trap the economy in a "bad" equilibrium, featuring low growth and inflation. Under these circumstances, having a fiscal policy that stands ready to adjust government spending can help avoiding the pessimistic beliefs to be confirmed.

[15] For a description of the low interest rate environment, its causes, and its implications for monetary policy see Ferrero and Neri (2018).

Box 2 - COVID-19 and the low interest rate environment[16]

A number of factors and mechanisms set in motion by the COVID-19 shock may strengthen the downward trend of nominal and real interest rates in advanced economies. As long as the negative effects on aggregate demand are larger than those on aggregate supply, inflation is expected to decline, thus putting downward pressure on nominal interest rates (since the central banks would react by lowering policy rates, as long as they are not constrained by the effective lower bound and implementing quantitative and qualitative easing measures). To the extent that expected inflation does not decline by as much as nominal interest rates, real interest rates also fall (McKibbin and Fernando, 2020). Moreover, the presence of market frictions and borrowing and liquidity constraints, which limit the degree of completeness of financial markets, would exert downward pressure on equilibrium real interest rates even when the size of the supply shock initially dominates the size of the shock on aggregate demand (Guerrieri et al., 2020). The population slowdown and social distancing measures reduce the effective labour supply and, according to the neoclassical growth model, lessen investment demand, thus depressing the real natural rate (Rachel and Smith, 2017). At the same time, increased uncertainty over the pace and timing of the recovery may induce households to react to the shock by increasing saving, either to replace wealth used up during the peak of the calamity (Jordà et al. 2020) or through the surge in precautionary motives that is common in bad and uncertain times (Malmendier and Nagel, 2011). The precautionary saving boost could become particularly persistent when it is reinforced by "scarring of beliefs", i.e. a persistent change in the perceived probability of an extreme, negative shock in the future (Kozlowski et al., 2020).

Other factors, however, may exert a positive effect on real interest rates and thus avert (or limit) a further downward trend. First of all, if negative effects on aggregate supply are larger than those on aggregate demand, inflation would be expected to increase over the medium term horizon. Nominal interest would increase at short maturities because of the increase in policy rates that would likely be implemented by the monetary authorities in response to higher inflation. At longer maturities, higher nominal yields are driven by savers and investors who would require higher compensation for their funds to compensate for higher (expected) inflation (Goodhart and Pradhan, 2020); the effect on real interest rates would depend on the relative size of the increases in expected inflation and nominal interest rates. However, real interest rates may increase even in a scenario in which aggregate demand falls by more than aggregate supply. In particular, if the effective lower bound on nominal interest rates became binding and asset purchase programmes were ineffective in lowering long-term nominal interest rates, inflation expectations could decrease more than nominal interest rates (Fornaro and Wolf, 2020). The issuance of large amounts of safe government debt to finance government expenditure and mitigate the consequences of the pandemic crisis may reduce the saving surplus, and thereby, lead to a rise in interest rates (Rachel and Summers, 2019; Goy and van den End, 2020). If the expansion of government expenditure is directed toward structural reforms and investments in technology, the transformation into a digital economy could raise

[16] This box is largely based on the ESRB-ECB Report on "Lower for longer - Macroprudential policy issues arising from low interest rates", to which Giuseppe Ferrero contributed.

productivity growth, exerting a positive effect on real interest rates in the long-run. Moreover, the high level of uncertainty created by pandemic shocks should put upward pressure on the risk premia component of interest rates (McKibbin and Sidorenko, 2006).

Overall, most of the analyses that use very long time-series to trace back to episodes similar to those of the COVID-19 pandemic, or model in a more structured way the economic interactions driven by the pandemic shock and the policy responses to it, conclude that the COVID-19 shock has added further downward pressure on the market real interest rates and the natural real rate of interest – which could be defined as the real short-term interest rate that equates the demand and supply of funds when output is at its potential, unemployment is at its natural rate and inflation is on target.

For the time being, advanced economies are still fighting the COVID-19 pandemic, so it is not possible to have sound empirical evidence on its long-term macroeconomic effects. As a consequence, recent analyses on the issue rely on academic research based on models of previous similar pandemics. Jordà et al. (2020) use a very long time series for Europe (starting in the 14th century) to estimate the effect of a pandemic shock on the natural real rate using a local projection model. The authors conclude that following a pandemic, the natural real rate of interest declines for years, reaching a minimum about 20 years later, with the natural real rate about 150 bps lower than if the pandemic had not taken place. About four decades later, the natural real rate returns to the level it would be expected to have reached if the pandemic had not taken place. The effect is still significant but smaller in the estimates of Holston et al. (2020), which modify Holston et al. (2017) to take into account the particular characteristics of the COVID-19 shock (which is not a Gaussian shock).

In a low interest rate environment the ability of the central bank to fulfill its mandate using policy rates may be frequently constrained by the presence of the effective lower bound on policy rates, which would be reached more frequently the lower the natural rate of interest.[17] In this case monetary policy should turn toward other instruments to lower interest rates in credit and financial markets.

The peculiar macroeconomic environment implies that monetary policy should not be "the only game in town", as it has been in the past in some countries (see Box 3 - *Measuring the degree of fiscal and monetary accommodation*). As illustrated in the following sections, a stimulating role for both monetary and fiscal policies is required to stabilise and sustain macroeconomic conditions (Bartsch et al., 2020). Thus, in the current circumstances, the incentives of monetary and fiscal authorities – within their respective

[17] The possibility of holding cash, whose nominal yield is zero, prevents the nominal yield on any financial asset from going significantly negative. When this constraint – the effective lower bound– binds, real interest rates are determined solely by inflation expectations. Once the effective lower bound is reached, the central bank is no longer in a position to counter the decline of inflation below the objective by lowering official interest rates. In these circumstances there may be a heightened risk of a de-anchoring of inflation expectations from the central bank's objective and of a further increase of real interest rates. The probability of a deflationary spiral or at least of a prolonged period of low growth both in economic activity and in prices increases (see Casiraghi and Ferrero, 2015).

mandates – are aligned. Moreover, as we will discuss in the next sections, some important complementarities arise too.

Box 3 - Measuring the degree of fiscal and monetary accommodation[18]

It is widely accepted that since the Great Financial Crisis central banks have displayed an ample degree of monetary accommodation, while fiscal policy has been at times loose, at times tight. This concept is underlined by recent analyses and commentaries stating that in the euro area monetary policy has been the "only game in town" (e.g. Gopinath, 2019). But which are the appropriate instruments to measure the degree of monetary and fiscal accommodation?

The European Commission computes a *monetary condition index*, which is a weighted average of the real short-term interest rate and the real effective exchange rate relative to their value in a base period, where the weights assigned to the two variables reflect their relative impact on GDP after two years. A *financial condition index* is computed, among others, by the International Monetary Fund (IMF), as a combination of interest rates, asset prices, exchange rate and volatility. Fiscal stance is usually measured through the change in the *cyclically-adjusted primary balance* (e.g. by the IMF in percent of potential output). However, until the work by Batini et al. (2020), the literature had not offered a *combined monetary and fiscal index*, that dynamically tracks the policy stance.

In particular, Batini et al. (2020) builds an index that provides an estimate of the overall stance of monetary and fiscal policies in the euro area and its three largest member countries (France, Germany, and Italy), by quantifying the impact of conventional and unconventional monetary and fiscal policies on aggregate demand. Each index is derived by estimating the impact of monetary and fiscal policy on output in a regression based on data obtained by simulating a rich estimated dynamic stochastic general equilibrium model of the EA economy (or of the individual EA member countries), and combining these estimates with historical data. The resulting *Dynamic Monetary and Fiscal Conditions index* (DMFCI) provides a synthetic measure of the stance that can be more easily conveyed to the public, compared to model-centric tools, such as the results of an estimated dynamic general equilibrium model. In addition, the DMFCIs allows assessing the overall degree of policy accommodation/restriction in the euro area and in individual countries, while the two components of the DMFCI (monetary and fiscal) help disentangle the contribution of the area-wide monetary policy and the collection of the individual countries' fiscal policies. It is worth clarifying that while indicators based on monetary and fiscal instruments (e.g. the shadow monetary policy rate and the cyclically-adjusted primary balance) reflect policy actions, the DMFCI captures the effects that these policy actions have on output. Finally, the DMFCI is constructed to represent the joint effect of the two policies, while its dynamic nature takes into account the delays with which policies affect economic activity. In other words, the value of the index for a given quarter also captures policy actions adopted in a relatively recent past. The level of the index shows the degree of tightening or loosening in monetary and fiscal conditions from a given base year.

[18] Prepared by Stefania Villa, co-author of the paper Batini et al. (2020).

The index computed by Batini et al. (2020) co-moves with other existing indices or measures that proxy the policy stance. When they do not, it is because the DMFCI captures some important feature not included in other indices, such as so-called unconventional monetary policies, crucial to provide a more precise assessment of the policy stance.

The main results of the work by Batini et al. (2020) show that the overall policy of the euro area became looser in the aftermath of the global financial crisis, but not before the recession was in full swing, with most of the loosening manifesting itself between 2009 and 2011. The stance was then tightened during the sovereign debt crisis before being loosened again around 2014 when the European Central Bank (ECB) embraced more drastic accommodative policy actions. Moreover, the patterns observed looking at the aggregate euro area DMFCI do not tally one to one with changes observed at the national level, where the evolution of the overall stance since the global financial crisis was, in fact, quite heterogeneous due to different fiscal stances. These results carry the policy implication that, having the ECB played the lion's share of the economic stimulus for several years, a more expansionary fiscal policy – assisted by interventions at the EU level especially in countries with more limited fiscal space – could play an important role in boosting economic activity in the EA. This is particularly relevant for dealing effectively with the economic consequences of the COVID-19 pandemic.

3.1. The monetary policy responses

Monetary policy stepped in, not only to prevent a severe financial crisis in the first months after the shock, but also to stimulate aggregate demand, deploying a wide array of measures. These measures can be grouped into three types: expansionary measures, liquidity provision measures, and currency swap measures (Table 1).

Table 1 – Monetary policy measures for selected countries

		Advanced economies							Emerging market economies					
Type of tools	Measures	US	EA	JP	GB	CA	AU	CH	BR	CN	ID	IN	KR	MX
Expansionary tools	Policy rate cut	X			X	X	X		X	X	X	X	X	X
	Asset purchase programmes	X	X	X	X	X	X				X	X	X	
Liquidity provision	General liquidity provision	X	X	X	X	X	X		X	X	X	X	X	X
	Targeted liquidity provision	X	X	X	X		X	X	X	X		X	X	X
	Asset purchases	X	X	X	X	X	X						X	
International dimension tools	Currency swap measures	X	X	X	X	X	X	X	X				X	X
	FX interventions							X	X		X	X	X	X

SOURCE: BIS (2020), Annual Economic Report and national data; US = United States; EA = Euro Area; JP = Japan; GB = Great Britain; CA = Canada; AU = Australia; CH = Switzerland; BR = Brasil; CN = China; ID = Indonesia; IN = India; KR = Korea; MX = Mexico.

3.1.1. Expansionary monetary policy measures

First, measures aimed at providing the expansionary monetary impulse. Beyond the reduction of policy rates in those countries where policy rates were still above the effective lower bound, expansionary measures include forward guidance and different forms of asset purchase programmes, to lower interest rates in the economy also at the medium-to-long-term horizons and stimulate consumption and investment. Here we briefly describe the main channels through which those measures operates.

Changes in official interest rates. They mainly affect short-term nominal interest rates. To the extent that nominal prices adjust slowly and short-term inflation expectations are well anchored, short-term real interest rates are also affected. The transmission to households' and firms' consumption, saving, and investment decisions and to inflation dynamics mainly relies on the intertemporal substitution effect and the cost of credit, although recent strands of the literature have emphasised the role of wealth effects (see Kaplan et al., 2018). A decrease in real interest rates affects households and firms decisions also via indirect channels: for example, the net worth and creditworthiness of household and firms can improve, inducing positive balance-sheet effects on the banking sector (Breckenfelder et al., 2016), which help lower lending rates even further. In addition, it can relax firms and households borrowing constraint by increasing the value of assets used as collateral in credit contracts (e.g., for firms, Bernanke and Gertler, 1989; Kiyotaki and Moore, 1997; Caballero and Krishnamurthy, 2003; Brunnermeier and Sannikov, 2014; for households, Eggertsson and Krugman, 2012; Korinek and Simsek (2016), Farhi and Werning, 2016). The fiscal position of sovereign borrowers can also strengthen, making their recourse to debt financing both easier and cheaper. In open economies, an exchange-rate channel also operates, by which current and future expected movements in the domestic interest rate tend to appreciate or depreciate the (nominal) foreign exchange rate and, via short-run price rigidities, the real exchange rate, which affects international trade and, ultimately, economic activity and inflation. Since the pass-through from changes in official rates to long-term interest rates is not complete, the slope of the term structure is also affected. This in turn influences the profitability of financial institutions that operate maturity transformation, their attitude toward risk and the supply of credit.

Negative Interest Rate Policies. When official interest rates are lowered to negative territory, two additional channels put downward pressure also on the longer-term components of the yield curve. The signalling channel, that, by removing the tightening bias, alleviates the substantial upward asymmetry in the distribution of forward rates close to zero, thus reducing also interest rates at longer maturities. The portfolio-rebalancing channel, which investors with strong aversion to negative nominal returns (either because of myopic behaviour or because of institutional constraints) activate by rebalancing their portfolios towards assets with longer maturities and with higher risk.

Forward guidance. It consists of announcements about future settings of policy instruments used to signal the monetary policy stance, in order to modify the current monetary policy conditions. It mainly operates through the signalling channel: by providing information about its future policy stance, the central bank is able to frontload the effects of expected future policy decisions and to lower the medium to longer component of the yield curve. Its effectiveness depend on the degree of commitment perceived by economic agents and the amount (and precision) of information that they already have in their information set when the forward guidance is implemented.

Purchase of public and private securities. Programmes such as the Quantitative Easing (QE) of the Federal Reserve and the Asset Purchase Programmes (APPs) and the Pandemic Emergency Purchase Programme (PEPP) of the European Central Bank (ECB), aim at stimulating the aggregate demand via several channels. The central bank "extracts

duration" from the market (i.e. reduces the outstanding amount of medium and long-term securities in the market) by purchasing assets with medium and long-term maturities (so-called *duration channel*; see Vayanos and Vila, 2020). This, in turn, lowers term premia and medium- and long-term interest rates. The theoretical and empirical literature suggests that the effect on this yield component depends on certain characteristics of the assets, including the maturity and the issuer. Since some investors have a preference for long-term low-risk assets, a reduction in the volume of such assets available on the market will lower the yield that investors demand for holding them. For instance, institutional investors such as pension funds might want to hold a fixed amount of ten-year government bonds in their portfolios. In this case, a reduction in the volume of securities with a ten year residual maturity will generate what can be dubbed a "local scarcity" (*the scarcity channel*). This reduction is transmitted also to other classes of assets by investors who want to maintain a higher return in their portfolios and rebalance their investments into riskier asset classes (*portfolio-balance channel*). The overall effect is a reduction of interest rates also on those assets that are not directly purchased by the central bank. The decline in safer asset returns also reduces banks' cost of funding on wholesale markets, strengthening their ability to lend (*bank-lending channel*). Through these financial effects, QEs and APPs affect households and firms decisions, sustaining aggregate demand and inflation, via a multiplicity of transmission channels, qualitatively similar to those activated by changes on official interest rates.

3.1.2. Liquidity Provision Measures

A second type of measures implemented by central banks in response to the pandemic shock aimed at preventing market dysfunction in order to preserve the correct functioning of the monetary policy transmission mechanism and to support the flow of funds to the economy. Given the different role played by individual segments of financial and credit markets in different countries, these measures have been very heterogeneous across countries and include asset purchase programmes targeted to specific segments of financial markets, emergency liquidity facilities, as well as funding facilities to support the essential role of banks in financing the real economy. In some countries, measures taken to ensure firms' liquidity have been more direct, in others less so. For example, in the United States, the Federal Reserve introduced the Paycheck Protection Program (PPP) Lending Facility and the Mainstreet Lending Program (MLP) in order to sustain liquidity to small and medium sized firms, non- profit organizations and self-employed workers. Both programmes operate by providing funding to financial institutions that evaluate the financial soundness of the debtors. The MLP provides that the Federal Reserve buys 95% of new or existing loans to qualified employers, while the issuing bank will keep 5% to discourage irresponsible lending. In exchange for the loan, employers must make reasonable efforts to maintain payroll and retain workers.

In the euro area, where the banking system plays a central role in financing businesses, the ECB has taken measures qualitatively similar to those implemented in recent years to counter deflationary risks, such as the Targeted and the Pandemic Emergency Long Term Refinancing operations (T-LTRO and PELTRO). Those measures provide favourable conditions in terms of both the maturity and the cost that banks pay for

the liquidity in the refinancing operation, albeit conditional to satisfying some lending requirements. By binding its benefits to the fulfilment of certain requirements on lending performance these measures enhance the transmission of the favourable conditions of banks' funding to the credit supply and ultimately to aggregate demand.

3.1.3. The Global Dimension of monetary policy measures

A third type of measures, crucial to address the global liquidity dimension of the crisis, are the currency swap lines between central banks. Given the international role of the dollar, the Fed expanded its existing swap lines with five other central banks (Bank of Canada, Bank of England, Bank of Japan, ECB, and the Swiss National Bank) and reduced, for these countries, the spread on the swap line over overnight indexed swap (OIS) from 50 to 25 basis points. Moreover, a new program with nine other central banks was created. In addition the Fed announced a new temporary repurchase facility for foreign and international monetary authorities, which allow approved holders to temporarily exchange their U.S. Treasury securities with the Fed for U.S. dollars. The Eurosystem reactivated its previous swap line agreements, and established new precautionary swap lines. In addition, it set up bilateral repo agreements with several other non-euro area central banks and, to further broaden the access to the Eurosystem's liquidity arrangements, it established the Eurosystem repo facility for central banks, which provides a precautionary backstop facility to address euro liquidity needs that might arise outside the euro area.

Two additional considerations could be done on the international dimension of the monetary measures adopted in response to the pandemic crisis.

First, according to some economists the swap network can be viewed as a step in the direction of a global financial safety net (Bordo, 2020). However, on this regard, it should be noted that a number of countries do not have access to the swap network. Some commentators suggested that the International Monetary Fund (IMF) and the World Bank should play a larger role in improving global liquidity and financial conditions. According to O'Neill and Lombardi (2020), Special Drawing Rights should be used to back swap access, while Collins et al. (2020) suggest to increase the IMF's financial resources to fight the pandemic and that the major central banks should link their swap lines to it.[19] According to Levy Yeyati (2020), the IMF should act as the dealer between the funding central bank and the borrowing country. Velasco (2020) suggests that the IMF, the World Bank, and the regional development banks should establish a special purpose vehicle that would issue bonds to be purchased by leading central banks to prevent an emerging market meltdown.

Second, non-standard monetary policy measures produce non-trivial international spillovers. Large asset purchase programmes (such as the QE in the US and APP in the euro area) have large and persistent effects on the exchange rate. According to Dedola et al. (2020), the announcement by the ECB of a LSAP, which increases the relative size of the balance sheet of the Eurosystem by about 20%, implies a persistent depreciation of the €/$ exchange rate by about 7%. The same effect is obtained in the $/€ exchange rate if the programme is announced by the Fed. However, the macroeconomic international spillovers

[19] See also Reis (2019) on the cooperation between IMF and central banks to resolve financial crises.

of unconventional monetary measures are not only transmitted through the exchange rate channel of monetary policy (Bluwstein and Canova, 2016). The impact on output and inflation of unconventional policies adopted by the ECB or the Fed are larger in foreign countries with more advanced financial systems. According to Dedola et al. (2013) under a high degree of financial integration country-specific shocks with a financial origin result in a much greater degree of macroeconomic synchronization across countries than real shocks.

All in all, central banks have had a crucial role in the response to the pandemic emergency, by providing global liquidity and by further enhancing monetary and financial conditions, to avoid a liquidity and financial crises of devastating dimensions and to contribute to sustain aggregate demand at worldwide level.

Box 4 - A review of the debate on (quasi-)fiscal monetary policies[20]

In the weeks after the first wave of the COVID-19 pandemic, there has been an intense debate on what monetary policy can do in response to a shock such as the COVID-19 one. Two responses emerged from the debate: we will call them the "*orthodox*" and the "*heterodox*" view.

According to the "*orthodox*" response central banks should immediately intervene (and, in fact, they did) by dusting off (and in some cases extending both qualitatively and quantitatively) the armamentarium developed during the global financial and the sovereign debt crises. The type of measures considered are those described in Section 3.1.

Against this view, more "*heterodox*" proposals have re-emerged (helicopter drops, MMT, MP3, SEFF, etc.).[21] These proposals differ one from the other for important *institutional aspects*, but they start from the same *premises* and reach similar *general conclusions*. The first premise is that in response to the COVID-19 shock the effectiveness of monetary policy measures that rely on the interest rate channels are ineffective in stimulating aggregate demand. The second one is that expansionary fiscal policies financed in deficit by issuing and selling government bonds to the private sector may result *unsustainable* in the medium term and *ineffective* in increasing aggregate demand in the short term. While the former is related to the fact that when the crisis will be over governments will find themselves with much higher public debt than before the crisis, with possible negative effects in terms of the cost of debt and limits to the ability to pursue expansionary fiscal policies in the future (Giavazzi and Tabellini, 2020), the latter is due to Ricardian equivalence effects: "*people may be more inclined to save rather than spend tax cuts (or monetary transfers) when they know that the cuts and transfers increase future government interest costs and thus raise future tax payments for themselves or their*

[20] This Box is largely based on Bank of Italy (2020), "COVID-19 and Economic Analysis: a Review of the Debate", Literature Review Issues 1 and 2, to which Giuseppe Ferrero contributed.

[21] Modern monetary theory (MMT), Monetary Policy 3 (MP3) and Standing Emergency Fiscal Facility (SEFF) are different proposals, appeared in the economic debate in the recent years, to implement monetary financing in order to stimulate aggregate demand. For a description of MMT see for example, Wray, L. Randall (2015). MP3 has been promoted by Ray Dalio, founder and CIO of Bridgewater investment fund. See for example Dailo (2019). The SEFF has been promoted by Elga Bartsch, Jean Boivin, Stanley Fischer and Philipp Hildebrand, who wrote a report for BlackRock Investment Management Company. See Bartsch et al. (2019).

children" (Bernanke, 2003). The conclusion is that in order to "*strengthen the effects of fiscal policy, by breaking the link between expansionary fiscal actions today and increases in the taxes that people expect to pay tomorrow*" (Bernanke, 2003), expansionary fiscal policies should be financed with a State liability that does not expire, public money (e.g. monetary financing).

While originally the expression 'helicopter drop' was coined by Friedman in 1969,[22] the policy prescription of a fiscal expansion financed by printing money in order to fight deflationary risks became popular with a speech of Ben Bernanke in 2002. Since in most countries the Treasury and the Central bank are two distinct institutions, the implementation of this policy would reduce to the following steps: to finance its expansionary fiscal policy the government issues irredeemable bonds that are purchased by the central bank, which returns the yields on those bonds to the Treasury in the form of seigniorage. From an accounting perspective, there is no difference between the direct distribution of money by the Central bank to economic agents and its indirect distribution channeled through the Treasury[23].

The COVID-19 crisis has spurred again the debate on helicopter drops and on different ways to implement it. The debate revolves around what mostly affects its effectiveness (Ricardian equivalence, targeted transfers and the role of price rigidities), what are usually considered as the main limits (legal feasibility and central bank credibility/independence) and, finally, what are the differences between asset purchase programmes (such as QEs and APPs) and helicopter drops.

Ricardian equivalence. In order to have real effects on the economy (in terms of aggregate output and employment), it is not sufficient that the expansionary policy is financed by issuing money. It is also necessary that people spend the money they receive. According to some economists it is, therefore, necessary that agents perceive that the money injection is permanent, in the sense that money transfers will not be reversed in the future by the central bank or by the government. To this end, some claims that governments should issue a perpetuity and the central bank should buy it (Tabellini 2020); others that the central bank should commit to permanently rollover government bond purchases once the bond matures (Barwell et al. 2020); some others that the central bank should credit directly the Treasury account and contemporaneously reduce its net worth (Galì, 2020a).

Targeted transfers. Many economists stress that in order to be effective such transfers should be targeted to groups of households and firms that face tighter constrains

[22] Friedman proposed the following experiment: a helicopter flies over an economy that is growing at its potential dropping bills so that each citizen suddenly (and unexpectedly) has twice the cash he held before. A crucial assumption is that this is a unique event, which will never be repeated, and citizens know it. According to Friedman since the economy was already at its long-run equilibrium economic agents would not decide to save this additional amount of money: they will just spend it. Moreover, since the economy is running at its potential, there is no idle production capacity: production remains unchanged. The result is that after a transition period, the only change observed would be in terms of prices, which would double, without a permanent change in any of the real variables.

[23] A similar proposal, the "overt money finance", was proposed among others by Turner (2013), former Chairman of the UK Financial Services Authority, in response to the deflationary risks coming from the global financial crisis and the sovereign debt crises.

in terms of consumption, investment and production (Gaspar and Mauro, 2020; Simmons et al. 2020).

Price rigidities. The impact on prices and output would depend on the slope of aggregate supply, which in turn is affected by the degree of price and nominal wage rigidities. In the extreme case in which they are fully flexible (and this would be the case when the economy is growing at its potential), a shift in aggregate demand would merely imply a one-off jump in the price level; should output be below its potential, instead, a boost in aggregate demand would translate into an increase in output and inflation. To this end, Galì (2020b) compares quantitatively helicopter drops to conventional debt-financed stimulus in a New Keynesian model. The main results are: (i) helicopter drops provide a way to boost economic activity effectively, as long as prices are reasonably sticky, since "*when prices are sticky, aggregate demand and output are a function of current and expected real interest rates, which in turn are affected by the paths for the money supply and nominal interest rates. Those paths differ across financing methods* (money-financed vs debt-financed)"; (ii) money-financed tax cuts also appear to be more effective countercyclical policies than their debt-financed counterparts when the effective lower bound on policy rate is binding.

Legal feasibility. Reichlin and Schoenmaker (2020) stress that the main limit of helicopter drops still remains, especially for the euro area, in the institutional framework and claim that "*this [quasi-fiscal monetary policy] poses a problem of legitimacy since the central bank does not directly respond to taxpayers and implies a lack of response by the political authorities. Ultimately, this would harm its effectiveness*". Buiter (2020a) claims, instead, that not implementing the institutional changes necessary to implement helicopter drops would be much more costly than implementing them and "*it would be criminally negligent to allow a design flaw in existing treaties to inhibit the appropriate use of helicopter money at a time of existential crisis*". Others, claim that helicopter drops could be implemented inside the current institutional frameworks (Yashiv, 2020; Tlaib, 2020; Bartsch et al., 2019).

Central bank credibility issues. Some authors focus on the credibility issue and the risks that once a central bank enter into helicopter drops, it will lose control over price stability in the future. Goodhart and Pradhan (2020) argue that since COVID-19 is mostly a supply shock which does not affect the future amount of capital in the economy, once the effects of the shock will be over, the effects of expansionary policies will remain and inflation will surge; Farmer (2020) stresses that if such a measure is temporary such a risk does not exist ("*This is a temporary helicopter drop that will, and should, cause a once and for all price increase. As long as it is temporary and does not lead to a permanent money financed deficit, it will not lead to inflation*").

Quantitative easing (QE) vs Helicopter drops (HD). From an accounting point of view, there is no difference if the central bank purchases the government bonds in the primary or in the secondary markets[24]. But if the purchases are made in the secondary market, what would differentiate a helicopter drop measure from a quantitative easing one?

[24] See for example Barwell et al. (2020).

Differences are not in term of their final goals: both measures aim at stimulating aggregate demand. The differences lie in (i) the main channels which are activated, (ii) the degree of coordination of the actors involved and (iii) the "duration" of the programmes. QE aims at influencing aggregate demand primarily by reducing medium and long-term interest rates. To do so, the central bank buys low-risk securities (such as government bonds) with medium and long-term maturities. By making them relatively scarce it is able to increase their price and reduce, as a consequence, their returns. The reduction of the returns on the asset purchased is then transmitted to other financial assets and activates other channels that indirectly stimulates households' consumptions and firms' investments[25]. The duration of the programme is temporary and there is no need of "formal" coordination between the central bank and the government.

HD aim instead at influencing aggregate demand directly. What matters is not that the purchased securities become relatively scarce, but that the money created by the central bank is transferred by the government to households and firms that effectively use it to increase their consumptions and investments. Its effectiveness, therefore, rests on one of two (sufficient) conditions. Either (i) agents perceiving the money injection as permanent (money transfers will not be reversed in the future by an equivalent increase in taxes), or (ii) if such injections will be reversed in the future, they should be targeted to agents with a relatively low discount factor (i.e. who care relatively little about future disbursements, either because of their preferences or because they are currently facing liquidity or borrowing limits). Given these requirements, the recent debate has emphasized two ways to implement HD-like policies starting from existing measures. The first consists in making QE permanent. Permanent purchases of government bonds can occur either (i) by issuing and purchasing irredeemable government bonds or (ii) by issuing redeemable bonds that the central bank (credibly) commits to repurchase every time that they matures. Many economists have been debating about this possibility. Some suggested just converting the bonds that central banks already purchased in QE programmes into irredeemable bonds (Vihriälä, 2020); some say that assets purchased in the context of QE programmes will inevitably be repurchased when they will expire;[26] others say that this is still an open option but the central banks at this stage should remain silent about it (Blanchard and Pisani-Ferry, 2020). The main issue with permanent QE is that it implies a loss of capital for the central bank. While this has no implications in the short term since central banks are not subject to the same rules as private individuals and firms in accounting terms (Buiter, 2020b), if the capital shortfall is sufficiently large and it is not recovered in the medium to long term, the monetary authority could lose credibility in its ability to maintain price stability. Therefore, if the loss of capital is not replenished in the future, it will increase the risk of price instability; this is in fact the main argument against permanent QE according to opponents of this measure (Dowd, 2018). This has led to consider the second possibility, a non-inflationary permanent QE with targeted transfers. The idea is that capital should be

[25] For a description of the main channels activated by quantitative easing programmes, see Cova and Ferrero (2015).

[26] In an article, the editorial board of the Financial Times claims that "*Central bankers say asset purchases under QE are temporary, meaning the newly-created money will one day be removed from the economy. But it is hard to bind the hands of their successors, who could one day make them permanent.*", Financial Times, 6 April 2020.

replenished in the future with the central bank withholding part of the seigniorage that would otherwise have been transferred to the Treasury. The recent proposal by Galì (2020a), for example, suggests a conversion of actual QE programmes into permanent QEs, but at the same time, he suggests that the central banks and the governments agree on "*a permanent reduction in the transfer of ECB profits to governments in proportion to the effective debt cancellation*". However, since the reduction in revenues for the Government would imply a lower spending capacity and, other things equal, an increase in future taxes (Ricardian equivalence), for the effectiveness of such a program it would be crucial that monetary transfers are targeted to agents with a relatively low discount factor.

3.2. The fiscal policy responses in advanced economies

In the course of 2020, fiscal policy across advanced economies operated through three groups of tools: automatic stabilizers, discretionary measures (with an impact on the budget balance), and other instruments to favour liquidity for firms and households. The first two sets of measures explain the extraordinary worsening of primary balances, by almost 9 percentage points of GDP on average, according to the latest IMF's estimates (IMF, 2021). [27]

The deep recession – with an average contraction of real GDP of almost 5 per cent – automatically reduced tax revenues and increased spending related to some income support schemes. According to the April 2021 IMF's estimates, this cyclical component is responsible for about one third of the worsening of primary balances in advanced economies. Additionally, all governments undertook a series of important discretionary support measures. As suggested by the IMF, among others, in the spring of 2020, the size and the characteristics of the shock called for a large, timely, and targeted fiscal support. According to the latest estimates by the IMF, advanced economies indeed implemented expansionary measures worth about 6 percentage points of GDP on average in 2020.[28] Moreover, many governments provided firms with further liquidity support, without an impact on the budget balances, for example in the form of tax deferrals, loans, and equity injections. Finally, in many instances, governments extended their guarantees to loans by commercial banks to businesses. This latter form of intervention is especially relevant in the United Kingdom and in many EU countries (see Box – Fiscal, Monetary and Regulation complementarities: credit provision and public guarantees). In the last few months, as the spread of the virus continued and the need for strict mobility restrictions resurfaced, many governments passed new pieces of legislation to extend significant fiscal support to 2021 as well. In the fall of 2020, the IMF was expecting a relatively rapid unwinding of measures in the current year (IMF, 2020b). On the contrary, it now projects the cyclically-adjusted

[27] Fiscal forecasts in real time in 2020 were surrounded by a relatively high degree of uncertainty. First, they reflected uncertainties related to the infra-annual evolution of the contagions and of macroeconomic variables (Locarno and Zizza, 2020). Second, the implementation of announced new fiscal measures and the normal operating of the public administration may have been slowed down by the pandemic itself. Third, new measures were introduced during the year and might have not been anticipated in previous forecasts.

[28] It should be stressed that the exact quantification of the expansionary fiscal stance for 2020 – especially in real time – is a difficult exercise also because of uncertainties related to the estimation of the output gap.

primary balance for the average of advanced economies to stay broadly constant in 2021 at the level of the previous year (IMF, 2021).

Given the size of the shock and its highly heterogeneous impact across different parts of the population, a bold fiscal stimulus was needed. As described by Elmendorf and Furman (2008), in those cases when a discretionary fiscal action is required, the stimulus should ideally be timely, temporary, and targeted. Timeliness is needed to make sure that the support is delivered at the right moment in time, also to ease liquidity constraints. In principle, a temporary shock requires a temporary response, not to increase the cost of public debt and endanger the balance of the public accounts in the longer term. Finally, proper targeting would be needed to maximize the short-term output effect of any public support. In most cases, this means directing resources towards the most vulnerable, who are also those with the highest propensity to consume out of government transfers.[29] Understandably, in the context of the current crisis, difficulties and constraints often prevented actual policies to adhere to these ideal criteria. Moreover, the need for social distancing to curb the spread of the virus arguably poses new challenges for the design of fiscal measures to sustain consumption and aggregate demand.

While there are many differences in the specifics of the fiscal support measures across countries, some commonalities emerge. In particular, as recognized by the OECD (2020a), many governments resorted to wage supplementation and job retention schemes widely and to an unprecedented extent. Both mandated business closures and the drop in demand for contact-intensive services increased the role of such instruments with respect to normal times or other recessions. In general, through these schemes the governments shoulder some of the firms' labor costs, thus limiting the likely surge in unemployment and the long-term consequences for the career perspectives of workers. Ultimately, by cushioning the fall in net incomes of interested workers, these schemes foster aggregate demand. Firms avoid losing experienced personnel through the recession and both the costly separation and re-hiring processes.

At the same time, targeted liquidity support (in forms of tax deferrals, equity injections, and loan guarantees) are useful in preventing bankruptcies of hard-hit, but otherwise viable, firms reducing the risk of long-term damages for the growth potential of the economies. Obviously, discriminating firms in real time during a crisis could be difficult. In such circumstances, the possibility that government support ends up financing very low-productivity (zombie) firms is a legitimate concern. On the other hand, inaction can have important repercussions too. Indeed, bankruptcy events can have large and

[29] According to the literature, targeted-transfers to liquidity-constrained households can be rather effective in sustaining aggregate demand during a large recession and if the effective lower bound holds. For example, Coenen et al. (2012) find that a 1 percent of GDP increase in targeted transfers raises US output by 1 to 1.5 percent if monetary policy remains accommodative for 2 years, roughly twice as large as under normal conditions. The importance of proper targeting of the government transfers in the context of the current crisis is also highlighted in the work by Bayer et al. (2020). In the framework of a heterogeneous agent (HANK) model, this paper finds multipliers of transfers to unemployed to be in the order of 1 to 2. Unemployment insurance-like transfers are the most effective fiscal policy tool to sustain household consumption also in the two-agent DSGE model by Faria-e-Castro (2020). Thus, there is a strong case for using targeted transfers to mitigate recessions, in particular if the recessions, as the COVD-19-induced one, affects different classes of households and firms in a different way.

cascade effects given the weak macroeconomic conditions. In the midst of the crisis, withdrawing support to any firm could have huge costs, because of possible Keynesian multiplier effects (mainly related to the associated job losses and to the externalities for other sectors). Nevertheless, when the most critical phase of the emergency ends, the risk posed by the possible financing of zombie firms should be addressed. In the recovery phase, public support should prioritize firms with higher chances of long-run viability, while preserving affected workers' livelihood. To this aim, the Group of Thirty (2020) has advised governments to both improve the targeting of their credit-related policies and to design measures to encourage firms' capitalization. For instance, as suggested also by Blanchard et al. (2020), in that phase, governments could consider converting some of their liquidity-support measures into some form of equity.

It is probably too soon to properly empirically assess the effectiveness of many of the governments' programmes implemented in the early stages of the crisis. Nevertheless, thanks to the availability of high quality high frequency data, some authors have attempted some preliminary analysis. Baker at al. (2020) study the marginal propensity to consume of a large sample of US recipients of cash transfers from the federal government (through the so-called CARES act). They find that the stronger responses are those of households with lower incomes, greater income drops, and, in particular, lower levels of liquid assets, thus confirming the importance of the proper targeting of the support in the first phase of the crisis. While both Autor et al. (2020) and Chetty et al. (2020) find that the US loan program for small business which maintain their labor force through the recession (the Pandemic Paycheck Program) had a positive impact on employment, the size of the effect (and thus, ultimately, the desirability of the scheme) is still contentious. According to the ECB (2020a), government guarantees on loans played a crucial role in supporting the financing needs of firms in the early phases of the crisis. In this respect, as argued by Gobbi et al. (2020), the exit from the emergency phase should be carefully planned to avoid a possible loan foreclosure wave.

As far as Italy is concerned, there is some evidence that some of the policy measures adopted by the government in 2020 played a significant role in reducing the additional liquidity needs caused by the pandemic for corporations (De Socio et al., 2020). This extraordinary support to firms together with the adoption of a special wage supplementation scheme and of a layoffs abeyance is assessed to have been instrumental in avoiding about 600,000 layoffs in the last year (Viviano, 2020). Nevertheless, the shock – while attenuated by these policy measures in 2020 – is likely to have some negative carryover effects also in the medium run. For example, according to some estimates by Giacomelli et al. (2021), the size of the downturn in the past year, the only gradual recovery expected for 2021-22 and the delayed effects of the crisis in 2020 could significantly increase the annual number of firms' bankruptcies in the medium run.

A special mention should be devoted to the euro area. Being a common currency area without a central fiscal capacity, the euro zone has been particularity put to the test by the pandemic. Indeed, in normal circumstances, the governance framework of the area assigns the bulk of the burden of macroeconomic stabilization to the common monetary policy and to the proper functioning of de-centralized automatic stabilizers, while national-

level fiscal authorities are expected to be somewhat constrained in their discretionary actions. Moreover, the EU-wide budget is neither meant to support demand at the aggregate level, nor is large enough for it. The shock induced relevant changes, in terms of the size of the fiscal response, of the degree of coordination among countries and of the creation of new shared instruments. First, the so-called general escape clause of the Stability and Growth Pact (i.e. the set of fiscal rules) was activated to allow individual countries to implement additional support measures in both 2020 and 2021. Second, European authorities and governments agreed on the institution of a new set of common tools to provide financial support to hard-hit countries in the European Union. This list includes a centralized loan-based program to provide financing for country-level wage supplementation and short-term work schemes (SURE), an enhancing of the European Investment Bank fund for small and medium sized enterprises, and the creation of a new precautionary financial assistance facility with the European Stability Mechanism (the Pandemic Crisis Support). Most importantly, in July 2020 the European Council agreed on a common exceptional temporary recovery instrument, the so-called "Next Generation EU" (NGEU). To this aim, the European Commission will issue bonds worth up to 750 billion euros on behalf of whole Union and will use the resulting resources to provide loans and grants to individual countries in 2021-26. While the specific uses of the program and the exact timing of disbursements are not fully specified yet, the program has the potential to provide a non-negligible macroeconomic support for the area as a whole. Moreover, the grant component of the scheme is particularly valuable for high public debt beneficiaries, by providing fiscal support without directly weighting on national budget balances. The fact that the euro area managed to arrange for a common response is important not only for its intrinsic political meaning, but also for the likely non-negligible cross-country spillovers of fiscal measures. Bartocci et al. (2020) simulate a two-region monetary union model of the euro area. They find that if one country responds to the pandemic shock by raising lump-sum fiscal transfers to "poor" households then the recessionary effects of the pandemic shock are reduced, both domestically and abroad via trade channel in the euro area.

3.2.1. COVID-19, the design of automatic stabilizers, and public safety nets

The size of the recessionary shock due to the pandemic and the highly heterogeneous effects of the crisis across economic sectors call for an assessment of the functioning of fiscal automatic stabilizers and the appropriate design of the public safety nets in terms of both generosity and coverage.

Indeed, the first fiscal line of defense in case of a downturn is obviously what can be automatically triggered by the swings of the economy, without the need for (possibly long) decisions. Even before the COVID-19 crisis, the proper design of automatic stabilizers in the presence of aggregate shocks was indeed the subject of a series of theoretical studies (Landais et al., 2018; McKay and Reis, 2016; McKay and Reis, 2021). While this literature is vast and hence difficult to reduce to a few homogenous messages, in general the presence of aggregate risks increases the optimal degree of generosity of some safety-net measures, in particular of the unemployment insurance schemes.

The mobility restrictions introduced to fight the spread of the virus and the drop in the demand for contact-intensive services increase the heterogeneity of the impact of the crisis. They also pose new challenges for the social safety nets of many advanced economies. People with temporary employment contracts, in general with low education levels, or those employed in sectors interested by lockdown measures clearly suffered higher-than average consequences (e.g. Bitler et al. 2020, Blundell et al. 2020, Casarico and Lattanzio 2020, Rondinelli and Zanichelli 2020, Carta and De Philippis, 2021). The pre-existing safety net is not always and not everywhere adequate to cope with this new environment. As found by the OECD (2020a), in many countries social protection schemes in general work much better for employees with stable work histories than for the rest of the population. Indeed, a common element of much of the government intervention in many advanced economies has been the extension of the coverage of social protection schemes to previously un-protected groups, such as the self-employed.

In order to draw firm conclusions, more data are needed on the distribution of the economic distress brought about by the pandemic, the actual implementation of support measures, and the medium-term effect on inequality. Nevertheless, the COVID-19 crisis is likely to push for a rethinking of public safety nets in many countries in terms of magnitude, coverage and timeliness (e.g. Moffitt and Ziliak, 2020 for a series of proposals for the United States).[30]

Box 5 – Fiscal, Monetary and Regulation complementarities: credit provision and public guarantees [31]

While the lockdown measures do not affect directly the credit market, they indirectly do so. The fall in economic activity and the heightened uncertainty have a strong and negative effect on both demand and supply of credit through different channels, as shown in Figure I. In advanced economies a bold mix of measures undertaken by the governments, the central banks, and the micro- and macro-prudential authorities have contrasted the transmission of the shock to the credit market.

Following a shock like the COVID-19 pandemic, credit demand by non-financial corporation increases in the short term and falls in the medium term. The lockdown measures determine a strong contraction in economic activity, a deterioration of firms' liquidity conditions, and a halt of investments. While the liquidity shortage implies an increase of credit demand by firms, the reduction of investments is associated with a

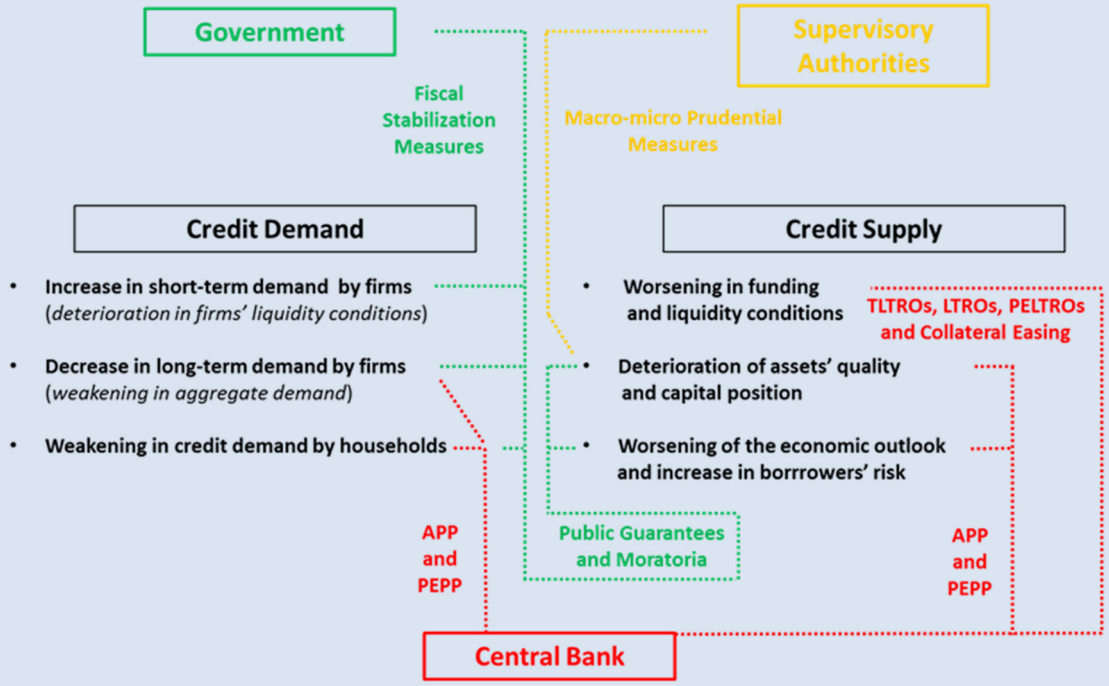
[30] The size and the length of the current shock is likely to renew the policy debate on the most adequate form of the safety net. On the one hand, different options to close the coverage gaps uncovered by crisis will probably be discussed. On the other hand, the possible difficulties of proper targeting income support in the midst of the crisis might reignite calls for unconditional and universal transfers (Francese and Prady, 2018). Weighting pros and cons of different structures for a hypothetical renewed social safety net, *once the crisis is over*, would be an interesting topic, but it is outside the scope of the current report.

[31] Prepared by L. Esposito.

contraction in credit demand. In the short term the positive effect of the former likely dominates the negative effect of the latter.[32] In a longer perspective, the opposite holds.

Credit demand by households for mortgages and consumer credit weakens in the short term reflecting the fall in consumer confidence, the contraction of spending on durable goods, and the deterioration of housing market prospects; households' demand recovers only when the uncertainty related to their financial conditions decreases.

Figure I – Impact of COVID-19 shock on credit demand and supply and measures adopted by the authorities



As for credit supply, the COVID-19 shock hinders banks' willingness to lend through three main channels:[33] (*i*) Borrowers' risk increases. The contraction in revenues caused by the lockdown measures and the associated drop in aggregate demand hamper firms' financial position and creditworthiness. Households' financial conditions also weaken as a consequence of the drop in disposable income and wealth stemming from the fall in financial assets' prices.[34] (*ii*) Banks' assets' quality and capital position deteriorates. The reduction in firms' and households' ability to fulfil current obligations

[32] Firms' needs to build long-term liquidity buffers in light of the ongoing uncertainty (Backer et al., 2020) and to refinance and restructure their debt sustain credit demand.

[33] The impact of the COVID-19 shock on credit demand and supply is likely to be heterogeneous across borrowers and banks. The impact on the demand will depend on firms' initial liquidity buffers, on their funding mix (bank or market based), the intensity of relationship lending, households' disposable income, borrowing constraints, and financial wealth; for banks the impact will vary depending on the intensity of relationship lending, on bank's business model and collateral availability.

[34] More generally, the COVID-19 shock causes a sharp deterioration in growth prospects. Furthermore, the subsequent recovery of the economic activity hinges, besides the duration of the pandemic, on a number of uncertain variables: the repercussions on people's confidence and spending decisions, the trend in households' propensity to save, the capacity of firms to stay in the market despite the losses suffered while their activity was suspended (see Box *The transmission of the effects of the pandemic to the Italian economy*, Bank of Italy Economic Bulletin, N.2/2020).

increases the expected flow of non-performing loans (NPLs) in banks' balance sheets. Furthermore, expectations of a rapid worsening of public finance balances, due to the massive fiscal measures undertaken, reduces government bonds prices and increases banks' losses on their portfolio. Both NPLs and government bonds depreciation erode bank capital. (*iii*) Banks' funding and liquidity conditions become vulnerable. Financial market tensions, mainly stemming from the spike in uncertainty, determine an increase of the cost of borrowing for banks. Share prices fall sharply, bond yields rise and credit default swap (CDS) premia increase.[35]

At the end of February 2020, financial market tensions caused a deterioration of banks' funding conditions. Such developments in financial markets were mitigated by the timely implementation of monetary policy measures, such as the pandemic emergency purchase programme (PEPP) announced by the ECB on 18 March. In general, in absence of prompt policy interventions by national and international authorities, the COVID-19 shock would have likely generated on impact a shortage of credit supply in most countries, especially those where the supply of funds is intermediated by banks, and the leading in the medium term to a generalised weakness of credit dynamics. The rationale behind the policy measures undertaken was twofold: i) sustaining firms' and households' liquidity conditions (both directly and by supporting banks' willingness to lend) in response of the extraordinary increase of liquidity needs due to the lockdown; ii) contrasting the deterioration of the economic outlook, thus sustaining credit demand and supply both in the short and in the medium term. To fully achieve these objectives and counteract the pervasive impact of the COVID-19 crisis on the economy, policy responses were built to mitigate not only the direct impact of the shock but also the endogenous risk stemming from possible amplification effects, spirals, run, and non-linearities (Brunnermeier and Sannikov, 2016)[36]. To this end, the following features of the policy mix were crucial: (*i*) they were aimed to support the economy decisively in the short term and committed to do so in the medium term; (*ii*) they were coordinated to gain efficacy and safeguard financial stability.

Crucially, public guarantees and central banks' liquidity provision feature a high level of complementarity. On the one hand, the provision of liquidity by the central bank is ineffective in absence of a broad-based public guarantees scheme because banks' willingness to lend would be constrained by the increase in perceived borrowers' riskiness. On the other hand, public guarantees are ineffective if banks' funding and liquidity conditions deteriorate. At the same time the success of these complementary

[35] Retail funding could also record a halt. While wealthy households may decide to rebalance their portfolios towards more liquid assets, poorer households and SMEs' deposits may fall reflecting their liquidity constraints.

[36] In particular, spirals may stem from the presence of strategic complementarities between borrowing and lending decisions (Albertazzi and Esposito, 2017). These complementarities may weaken considerably credit dynamics generating a self-fulfilling loop in which the weakest side of the credit market creates a persistent demand/supply shortage. In general, the COVID-19 shock has the potential to trigger a self-fulfilling spiral where aggregate supply and demand suddenly fall (Galeotti and Surico, 2020; Fornaro and Wolf, 2020). Furthermore, when goods are not too close substitutes across sectors, the COVID-19 shock might look like a "Keynesian supply shock" where aggregate demand contracts more than the initial supply shock, creating a supply shortage (Guerrieri et al., 2020).

measures and the pursuit of financial stability is underpinned by the central banks public sector purchase programmes, which help to counter the spreading of pessimistic expectations about the sustainability of public debt, especially in countries with limited fiscal space. Public guarantees – as compared to other categories of public spending – have the advantage of being state-contingent liabilities. As such, they have an indirect and limited impact on government debt.[37] Nevertheless, if financial markets coordinate on a bad equilibrium, which reflect investors' self-fulfilling expectations of debt unsustainability, the resulting increase in sovereign spreads would reduce ex-ante the efficacy of public guarantees in unlocking banks' credit supply, thus failing to address firms' liquidity needs and prevent their default. Moreover, if such equilibrium materializes, the increase in sovereign spreads would increase ex-post the riskiness of banks' assets, possibly activating an adverse sovereign-bank nexus.[38] In this context, monetary policy measures that ensure ordinate liquidity conditions in the sovereign market become a crucial instrument to preserve an efficient transmission of expansionary policies.

4. Looking Forward: the legacy of the COVID-19 on monetary and fiscal policy and the road to the global recovery

4.1. High public debt and contingent liabilities

During 2020 governments of advanced economies acted boldly to counteract the effects on the economic activity of the pandemic and of the ensuing mobility restrictions. A strong discretionary fiscal support was indeed needed. Nevertheless, the combined effect of the stimulus and the recession will inevitably leave most economies with a much higher level of government debt.

Across advanced economies, average general government debt stood slightly above 100 percent of GDP at the end of 2019. According to the October 2019 IMF Fiscal Monitor this ratio would have followed a broadly flat profile in the following five years. The COVID-19 crisis dramatically changed this picture. Indeed, according to the April 2021 edition of the Fiscal Monitor, the average debt-to-GDP ratio in advanced economies should have increased by about sixteen percentage points in 2020 and should stay at similar, elevated, levels in the medium term too (Figure 1). While any forecast is surrounded by considerable uncertainty at this point in time in particular because of the unknown epidemic

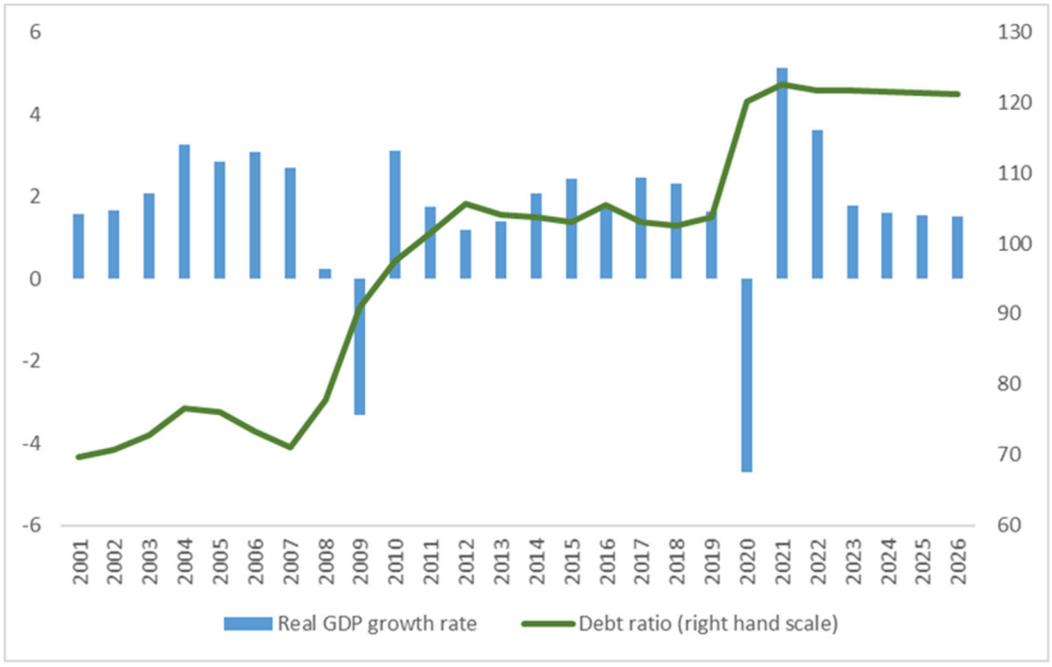
[37] According to the European framework for national accounts (ESA2010), in the case of 'standardised' guarantees - i.e. issued in large numbers, usually for fairly small amounts, along identical credit lines – the impact of guarantees on government deficit should be recorded at inception depending on the probability of default of the debtor.

[38] Following the collapse of Lehman Brothers in September 2008, a great many, in particular European, countries also issued guarantees but, at that time, they were adopted against default on bank bonds to help banks retain access to wholesale funding. Between 2009 and 2012, as argued by many authors, because of bank liabilities' guarantees, a negative feedback loop between sovereign and banking risk materialized and became the distinctive feature of the financial instability that spread out in the periphery of the euro area (Cooper and Nikolov, 2013; Acharya et al., 2014; Konig et al., 2015; Leonello, 2017;).

path and the strength of the recovery, there is little doubt that the current crisis will have deep and long-lasting effects on public finances across the world. While the extent of the worsening of public accounts in 2020 was heterogeneous across countries, only a few large advanced economies escaped a double-digit increase in their debt ratios, also because of the decline in the nominal product.

Moreover, as described above, many governments reacted to the COVID-19 crisis with the extension to the private sector of extremely large amounts of public guarantees on loans. As argued before, the rationales for this kind of intervention rely on its possible rapid implementation, its limited short-term costs for the public purses, and its effectiveness in mitigating liquidity issues for firms. By shielding private lenders from a share of the risk, these programmes can be instrumental in avoiding the occurrence of a credit crunch in a moment when many firms lack cash flow. The extent of the impact of these measures on the public accounts in 2020 is very heterogeneous across countries and depends, inter alia, on the specifics of the guarantee programmes and their actual use. In general, though, only a portion of the expected costs of these programmes has an immediate impact on the public accounts. For the most part, these measures thus constitute a contingent liability for governments. The timing and the extent of the transformation of these contingent debts into actual ones will depend on the speed and strength of the recovery. Thus, at this juncture, they are both surrounded by large margins of uncertainty.

Figure 1 – Debt ratio and growth rate of real GDP in advanced economies



Source: IMF, World Outlook Database, April 2021.

The increase in public indebtedness – either in an explicit or in a contingent way – adds to already elevated risks for government accounts in many countries either because of the legacy of the Great Financial and Sovereign Debt crises or because of the expected effects of ageing populations. While long-term projections are notoriously difficult to make and are highly sensible to assumptions, in many countries debt-to-GDP ratios were

expected to be on an upward trend even before the COVID-19 crisis hit. For instance, according to the Congressional Budget Office's 2019 long term budget outlook, the US federal debt held by the public would have increased from slightly less than 80 percent of GDP in 2019 to about 145 percent in 2049 (CBO, 2019). According to the European Commission 2019 Debt Sustainability Monitor, member states in the Union (including the United Kingdom) would have had to increase their primary structural balance by about 2.4 percentage points of GDP on average, just to guarantee the stability of their debt-to-GDP ratios by 2070 in the face of expected mounting ageing-related expenditures. The computed required adjustment for the euro area on average stood instead at 1.8 percentage points of GDP (European Commission, 2020b). [39]

High public debt ratios will thus most likely be the norm for the foreseeable future across many advanced economies. Even when governments fulfill their intertemporal budget constraints and, thus, in the absence of any sustainability concern, high public debt ratios can be a source of vulnerability. First, while the empirical assessment of a causal relation between debt and dismal growth performances may be contentious, high levels of public debt arguably can increase both borrowing costs for the private sector and uncertainty in the economy as a whole. They can also reduce the fiscal space for future counter-cyclical policies (Visco, 2017). Indeed, for instance, Romer and Romer (2019), using a panel of 30 OECD economies since 1980, find that countries with lower debt ratios implemented much more expansionary fiscal policies in response to financial crises and suffered less severe economic consequences. Second, a high debt ratio increases the potential for financial stability issues. For example, elevated annual gross borrowing needs exposes countries to increased risks due to the possible volatility in market sentiment. Therefore, while, as recommended by the IMF (2020b), governments should be wary of withdrawing their fiscal support too soon in the current circumstances, they should nevertheless start envisaging a strategy for dealing with high debt and rebalancing the public accounts in future better times.

Risks related to high debt ratios can be partially mitigated by a number of factors, common to major advanced economies. In particular, the current low interest rate environment eases the refinancing costs of public debt. Because of this and because of the expected growth rate of the economies, Blanchard (2019) suggested that, under some circumstances, public debt might even have "no fiscal cost".[40] This paper shows that, when the growth rate of nominal product is larger than the implicit yield on debt, there are instances when the debt can be simply rolled-over without implying the need for increasing the primary balance in the future. Moreover, as shown by the October 2020 Fiscal Monitor

[39] Notwithstanding the effect of the crisis, the most recent update of this analysis, also because of the expectation of a gradual improvement of the primary balance in the aftermath of the pandemic and of more favorable assumptions about the future evolution of real interest rates (based on the experience of the last decades), shows smaller adjustment needs both the EU and the EA (European Commission, 2021).

[40] Blanchard's contribution should not be considered as a normative one. It also explicitly considers the relevance of multiple equilibria in high public debt regimes where investors' expectations about the government's inability to fully repay its debt could foster self-fulfilling crises. This piece of research, delivered as the American Economic Association 2019 presidential address, stirred a large controversy. For example, Lian et al. (2020) note that high debt ratios are empirically associated to a higher probability of an increase in borrowing costs following a fiscal expansion.

(IMF, 2020b), many central banks across the world have largely increased their holdings of public debt securities since the onset of the COVID-19 crisis. From February to the time of the October 2020 Fiscal Monitor publication, the central banks of Japan, the Euro area, the US, and the UK bought marketable securities of their central government for an amount equal, respectively, to 75, 71, 57, and 50 percent of those issued in the same period. Ceteris paribus, this contributes to a further easing of the financial conditions in the short term. The purchases of the last few months accelerated a pre-existing trend since the Great Financial Crisis and further increased the role of central bank as major investors in sovereign debt. According to the OECD, at the end of 2020, the central bank held about 45 percent of national government securities in Japan and Sweden, above 20 percent in most European countries and in the US (OECD, 2021). In Italy, about one fourth of government securities was owned by the national central bank at the end of 2020, up from almost one fifth at the end of the previous year and from almost 6 percent at the end of 2014 (Bank of Italy, 2021).

Three factors drive the dynamics of the debt ratio: the differential between the growth rate of the economy and the implicit interest rate on public liabilities, the primary balance, and any (usually residual) adjustment to the stock of debt. This decomposition suggests a comprehensive approach towards gradual debt reduction over time. Clearly, even if a common theme could be traced, there are important country-specific circumstances that may warrant a somewhat differentiated approach both in terms of appropriate speed of adjustment and of selection of policies (IMF, 2020b).

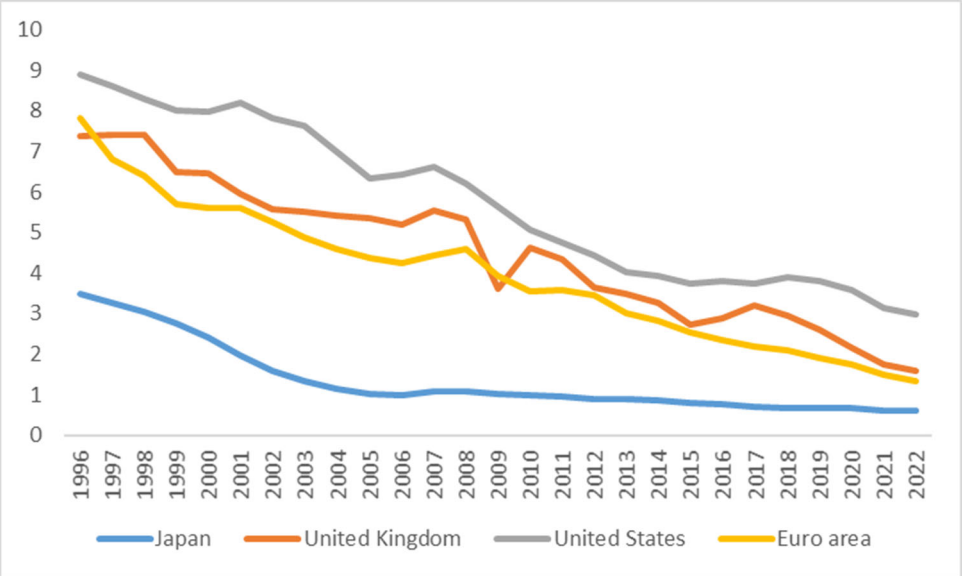
In many countries, the implicit interest rate on debt is expected to keep falling in the next few years as old high-yield securities are gradually replaced by new low-yield ones (Figure 2). Even with increasing yields over time, this reduction process will continue until the cost of the new debt will match the average one. Just as an example, the average implicit interest rate on existing debt in the euro area stood at about 1.9 percent in 2019. At the time of writing Euro-area governments could incur 10-year debts by paying an extremely limited yield on average (close to zero, in many instances). Governments can also take advantage of the current circumstances and adapt their issuance policies. In order to reduce rollover risks and increase resilience against future rate increases, they could lean towards longer-dated securities. Of course, this strategy implies a trade-off between relative costs and hedging features of different maturity structures of new issuances (OECD, 2020b). Indeed, as shown in the October 2020 Fiscal Monitor, advanced economies followed this strategy in the past few years: from 2002 to 2019, the average maturity on government bonds increased by about two years, to around seven on average.

Fiscal policy can also play a role in fostering long-term growth of the economies. First, it can be instrumental to the implementation of structural reforms, by easing possible short-term costs through redistributive policies. Second, it can play a direct role by prioritizing targeted budget measures with the largest multipliers (IMF, 2020b), by removing existing distortions in the tax-and-benefit structures, and by favouring productive investments (see Section 4.2). In general, the return to high rates of growth will be key in putting the debt ratio on a steady downward path. Thus, the quality of the selection of the

public policies for the medium term is extremely important for the longer-term perspectives.

According to April 2021 IMF projections, in 2026 almost all major economies will still record primary deficits.[41] While a favorable interest rate-growth differential can help, after the acute phase of the pandemic has passed and uncertainty about economic perspectives has receded, a gradual rebalancing of the public accounts in high-debt countries appears necessary for a number of reasons. First, it would help to firmly put the debt ratio on a downward path. Second, it would contribute to rebuild buffers for future potential crises. Third, for countries with above-average financing costs among advanced economies, the commitment to sounder public finances could favour a further reduction in the cost of debt. Thanks to the gradual closure of output gaps in the medium term, part of the improvement in the primary balances will take place automatically, mainly through the effect of the recovery on public revenues. This process can be further eased by limiting in the emergency phase the introduction of new budgetary measures with permanent features. As suggested by the IMF, the speed of the budget adjustments can depend on country-specific circumstances, in particular the existing fiscal space and the amount of slack in the economy. The composition of future public finance measures will obviously account for country-specific preferences; ideally, it should preserve growth-enhancing budgetary items. Considered the importance of international spillovers, the global recovery would be easier if countries with larger fiscal space were to slow somewhat the speed of the adjustment of their public accounts.

Figure 2 – Implicit interest rate on government debt in selected advanced economies



Source: European Commission Autumn 2020 fiscal forecast, AMECO database

[41] The expected primary balances are -3.0, -0.6, -2.0, -2.1 percent of GDP respectively for the US, the euro area, Japan, and the UK.

4.2. High debt and the conduct of monetary policy

As reported in previous sections, the monetary policy decisions in reaction to the COVID-19 crisis reinforced the pre-existing trend towards large central banks' balance sheets. Moreover, the monetary authorities in the main economies are now among the largest holders of government debt. While these factors are a consequence of necessary steps to fulfil the monetary authorities' mandates, they nonetheless entail some risks.

First, a large balance sheet can increase interest risks for the central bank. Indeed, when fixed-term long-maturity bonds constitute a large share of the central bank's assets, a hypothetical future rate increase could generate a loss (e.g. Hall and Reis, 2015). In the short-term financial or capital losses are not an issue for central banks, since they are not subject to the same rules as private individuals and firms in accounting terms (see for example Buiter, 2020). However, if the losses and the capital shortfall are sufficiently large and they are not recovered in the medium to long term, the monetary authority could lose credibility in its ability to maintain price stability. Therefore, if the loss of capital will not be replenished in the future, the risk of price instability will increase.

Second, the exit from asset purchase programmes could end up putting some upward pressure on the implicit cost of government debt in many advanced economies. In principle, the concern of damaging debt sustainability or financial stability could influence the conduct of monetary policy once the recovery has terminated and the economic activity is again in line with potential output. Nevertheless, a few considerations can greatly attenuate this fear. While the refinancing costs of governments would be likely higher during the exit from unconventional measures, the relatively long average maturity of government debt can smooth the impact. Moreover, as discussed in section 4.1, while the implicit cost of debt is relevant, the key driver of the debt-to-GDP dynamics is rather the difference between this value and the nominal growth rate of the economy. To the extent that the exit from the current regime of accommodative monetary policy signals improved economic perspectives (including higher inflation), the risks for the path of the debt ratio would be somewhat attenuated.

4.3. Monetary accommodation and financial stability

As highlighted by the October 2020 IMF Fiscal Monitor, even before the COVID-19 crisis, private sector debt as a share of GDP was on the rise, reaching about 150 percent in 2019 across G20 countries. The pandemic obviously worsens this picture and will lead to a significant increase of non-financial firms' indebtedness (Visco, 2020). As discussed above, the extraordinary emergency policy support deployed during 2020 mitigated the liquidity pressures on the corporate sector. Nevertheless, over a somewhat longer horizon, in particular if the recovery is not sustained, firms' potential insolvencies could become an issue (IMF, 2020b). Small and medium sized enterprises, in particular in contact-intensive sectors, appear to be more likely to be relatively less well-equipped to weather the storms of the pandemic and the structural transformation of the economies. Thus, in some instances, corporate debt could have important repercussions both for governments (through the channel of public guarantees) and for banks. This contingency would further

penalize the prospects for banking sector's profitability (ECB, 2020b), and, more in general, for financial stability.

At the same time, a long period of low interest rates could have some downsides too. In an environment in which interest rates remain low for a prolonged period of time, their beneficial effects in terms of reduced funding costs, greater easiness to borrow for consumption and investment, and increased asset prices may be reduced. They could even be dominated by the buildup of vulnerabilities in the financial system due to the presence of "distortions", "imperfections", and "institutional constraints" that may become "active", "economically more relevant" or "binding" when interest rates remain very low for a protracted period of time, favouring the building up of bubbles, excessive risk-taking, inefficient resource allocation, and debt overhang. Vulnerabilities may be favoured by money illusion,[42] myopic behaviour,[43] agency problem, and moral hazard.[44] The possible subsequent impairment of the provision of financial services and credit would affect the path of real economic activity.

In order to avoid the emergence of those financial stability issues, some measures could be taken. First, and foremost, the strength of the post-pandemic output growth is key. The sooner the recovery consolidates and activity returns in line with potential, the less likely the mentioned financial stability risks are to emerge. In such more favorable environment firms' recapitalizations, the reduction of leverage and the rebuilding of buffers against future crises would be easier. In this regard, it is important that the removal of the current expansionary fiscal and monetary policies is gradual and calibrated on the state of the economy (see also section 3.2 on the risks of an early withdraw of support). Second, the use of appropriate regulatory and supervisory instruments will be crucial to limit behaviors by financial intermediaries that could lead to financial instability in the medium term.

4.4. Towards a knowledge-based, "green", and digital global recovery: the role of public investment

As illustrated in previous sections, high public and private debt and an uncertain recovery are the main legacies of the pandemic shocks. To avoid financial instability, public and private finances have to be on a sustainable path in the medium run, and sustained economic growth is a key factor.

A contribution to achieving this goal can come from public investment. Like many other forms of government intervention, public spending in investment has the traditional

[42] Agents focus on nominal variables, even though economic decisions should be based on real variables. Investors are unable to look through inflation and focus on the real return on investment. Agents may feel frustrated by the low level of nominal rates and decide to irrationally overcome these through search for yield

[43] Agents are often short-sighted and focus on the short term, neglecting the future. Low rates may induce households to take on floating-rate mortgages without considering that interest rates could increase in the future, and to borrow excessively

[44] A low interest rate environment may undermine agents' incentives to use resources efficiently, by weakening market controls and reducing the probability of default. Managers benefit from the rents associated with their positions (the agency problem), and have ex ante incentives to manage the firm successfully to maintain their position and to prevent a default: persistently low interest rates by reducing profitability of financial intermediaries operating the maturity transformation could increase moral hazard problems and may lead to a less efficient use of resources.

expansionary effect in the short term. However, an increase in public investment – unlike most forms of current spending – is also expected to positively affect potential output. These positive effects at different horizons depend on many factors. In the short term, implementation lags are an obvious potential treat. Over longer horizons, the growth-enhancing impact of this kind of public expenditure depends on the extent of the untapped potential in the public capital stock and on the complementarity between these initiatives and future private activity (Ramey, 2020). Indeed, public investments can be effective in fostering long-term growth in particular if they are instrumental in favouring private activities (as in the case of some infrastructure, energy, digital economy, and R&D projects) and the accumulation of human capital (including measures for the health sector). Therefore, a careful selection of the projects – while challenging – appears to be key.

The literature suggests that, in the current and foreseeable circumstances, a world-wide increase in public investments could contribute to make the global recovery sustainable and durable, i.e., in restoring the pre-crisis level of output and in improving public and private debt sustainability.[45] The reasons are several.

First, when medium and longer term perspectives are far from clear and when private economic agents may display some lack of confidence in the future, public investments may provide a signal about the recovery. As suggested by the IMF (2020b), in the current circumstances, public investments can encourage firms' hiring and investments plans, which would otherwise be postponed. Of course, public investments and incentives for private ones could also be complement. Nevertheless, in some circumstances and depending of their design, incentives for private activities might fail to stimulate additional investments. Moreover, public investments can directly provide cash flow to firms and indirectly sustain their market value and access to credit markets.

Second, the complementarity between expansionary monetary and fiscal policy measures can be fully exploited to maximize the size of public investment multiplier (see *Box 6 – Public investment multipliers*).

Third, given that the shock is global, a coordinated symmetric cross-country response would generate positive spillovers. There would be no leakages associated with implementation by a single country in isolation. International coordination should also help those countries having greater financial needs. Spillovers would be magnified by the accommodative stance of monetary policy at global level.

While, as just discussed, there are several potential benefits of an increase in public investments, there are risks too. In this regard, it is important to note that the quality and efficiency of the decision processes for public investment projects appear to be crucial to minimize implementation lags in both the programming and actual realization phases. The resulting reduction in the uncertainty could be instrumental in fostering private activity. Conversely, inefficiencies in the selection and the realization of the projects could severely lower their positive output effect.

[45] For the euro area, the case for higher public investment has been debated at the policy level even before the COVID-19 crisis (Buti, 2020).

At the same time, the decision on which type of public investment that should be implemented is crucial. As discussed above, public investment should not necessarily be directed to increase only the stock of physical infrastructures. For instance, investment in health can be extremely relevant to avoid new waves of the pandemic. Moreover, investment in human capital can be effective too, in particular in some countries featuring low levels of spending in education and in research and development. Finally, investment in "green" economy and in digitalization should also be considered. On the one hand, lowering the carbon footprint of the economic activities would be instrumental in reaching international environmental goals and in paving the way for a more sustainable growth. On the other hand, while the exact direction of the future production structure is hard to predict, a more digitalized economy would undoubtedly offer many new opportunities. While there seems to be some consensus in policy circles around the desirability of these broad priorities for many advanced economies, the selection of the actual projects will be a challenge. A microeconomic perspective based on cost-benefit analyses should support the decision process of allocating the resources among the different possible uses.

In conclusion, it is also important to recall that some of the benefits potentially brought about by new public investments in the fields of health, human capital, digitalization and green economy would likely go far beyond what is captured by the standard metric of GDP. Indeed, whether our measure of domestic product has even been (Bureau of Foreign and Domestic Commerce and Kuznets 1934) or will be the most appropriate proxy for assessing the welfare of a society is an area of very active debate (Stiglitz et al. 2009, Dynan and Sheiner 2018).

Box 6 – Public investment multipliers[46]

Public investment multipliers can be large. This is particularly true during recessions and in periods of high uncertainty, when monetary and financial conditions remain accommodative, under the assumptions that investment projects are carried out efficiently without wastes of resources. Coordinated fiscal expansions can further amplify the effects. The exact definition of public investments used in the literature could differ across studies. Moreover, in practice, public investments could be quite heterogeneous in terms of nature and quality. However, some general lessons could be learned from empirical and simulation-bases inquiries.

According to the October 2020 IMF Fiscal monitor, in periods of high uncertainty, increasing public investment by 1 percent of GDP could strengthen confidence in the recovery and boost output by about 2.7 percent, private investment by 10 percent, and employment by 1.2 percent over a two-year horizon. These responses are contingent on the high quality of the investment projects and on the fact that existing public and private debt burdens do not weaken the response of the private sector to the stimulus.

Similarly, the October 2014 IMF World Economic Outlook reports that public investment shocks have statistically significant and long-lasting effects on output. In countries with high efficiency of public investment, the multiplier can be as large as 2.6

[46] Prepared by M. Pisani and M. Tasso.

after four years (against a multiplier slightly lower than one under the case of low efficiency). The way the stimulus is financed is also relevant. The output effects are larger when public investment shocks are debt financed than when they are budget neutral.

The monetary policy stance matters for the size of the multipliers. According to the model-based simulations reported in the October 2014 World Economic Outlook, in advanced economies when monetary policy rates stay close to zero for two years, a 1 percent of GDP permanent increase in (fully efficient) public investment increases output by about 2 percent in the same year and by about 2.5 percent in the long run. The increase in short-run output would instead be smaller under normal conditions of less slack and with an immediate monetary policy response. Qualitatively similar conclusions are reported in Coenen et al (2012), where public investment multipliers are compared across several different models for different monetary policy responses. For the euro area, Burlon et al. (2017) evaluate the macroeconomic impact of a (temporary) programme for public infrastructure spending under alternative assumptions about funding sources and the monetary policy stance. The quantitative assessment is made by simulating a dynamic general equilibrium model of a monetary union with region-specific fiscal policy. Results suggest that EA-wide stimuli are more effective than unilateral (region-specific) stimuli (Cova et al., 2017 find qualitatively similar results in the case of a simultaneous increase in public investment in advanced economies). Under EA-wide stimulus, the fiscal multiplier is close to 2 if the forward guidance on the short-term policy rate holds. If, in addition, the monetary authority keeps down also the long-term interest rates (with quantitative easing), the fiscal multiplier is even larger. Debt financing of the spending projects, particularly under an accommodative monetary policy stance and if the sovereign spreads do not increase, is more growth-friendly than financing through distortionary taxes. Busetti et al. (2019) stress that the effectiveness of the fiscal stimulus is larger if government spending is directed towards productive goods and its implementation occurs efficiently and without delays.

As in the case of other kinds of fiscal expansion, also an increase in public investments can have beneficial effects for other countries. Some results about these cross-country spillovers are available for the case of the euro area. In't Veld (2016) shows that when monetary policy does not offset the expansion, public investment in some core countries of the EA could have significant positive GDP spillovers to the rest of the Eurozone. If borrowing costs are low, the increase in government debt of core country would be modest, while debt ratios in the rest of the Eurozone could be somewhat improved. These simulations consider the illustrative case of a hypothetical rise in public investment in Germany and the Netherlands of 1 percent of baseline GDP for ten years, while the monetary policy rate is kept constant for two years. This stimulus package increases GDP in Germany and in the Netherlands on impact by about 0.7-0.9 percent, and by about 1.3 percent after ten years. Spillovers to the rest of the Eurozone are non-negligible, as higher demand from the expanding countries and a depreciation of the euro boost output. GDP in the rest of the Eurozone is around 0.3 percent higher. The study finds larger multipliers and spillovers for investment projects with a higher ability to raise the productivity of other productive factors in the economy. Elekdag and Muir (2014) also find

similar results: in the case of the EA, cross-country spillovers of higher public investment are expansionary and non-trivial, in particular if the monetary stance is accommodative.

Alloza et al. (2019) use the EAGLE macroeconomic model of the euro area to simulate an investment-based fiscal stimulus of 1 percent of nominal GDP over two years in one large euro area country. Under the assumption of reactive monetary policy, the spillovers (computed as the ratio of GDP reactions of the destination country to the origin country) are below 0.1 on average in the two years after the shock. Similarly, spillovers in one country from a simultaneous fiscal stimulus of 1 percent of GDP over two years in all the other countries are small. Cross-country effects are instead larger under the assumption that the policy rate is kept constant at its baseline level during the first two years of the simulation. In this second case, for instance, the spillover to the rest of the area from an increase in German public investment is in the order of 0.25.

5. Conclusions

COVID-19 is probably the worst social and macroeconomic shock to be faced by the global economy since WWII. The path towards the recovery is uncertain and will most likely be long. The structure of the economy will probably be affected permanently by this crisis. Some sectors will inevitably suffer more and the transition towards the new equilibrium could imply significant costs.

With their decisions policy-makers can influence both the transition to the new equilibrium and the new equilibrium of the global economy.

Therefore, in the near future, policy-makers will face several tough choices and tradeoffs. Accompanying the necessary changes to the economic structure, while cushioning the blow to the most vulnerable, maintaining macroeconomic stability and avoiding the risks discussed in the paper will indeed be the challenge of the next few years.

The policy mix will be crucial to determine tradeoffs and, at the same time, to foster a sustained recovery and to improve health, environmental, and human capital conditions across the world. International cooperation is key to achieving these improvements in an efficient, effective, and inclusive way.

References

Acharya, V., I. Drechsler and P. Schnabl (2014), "A Pyrrhic Victory? Bank Bailouts and Sovereign Credit Risk", The Journal of Finance, Vol. 69, Issue 6, 2689-2739.

Aksoy, Y., H. S. Basso, R. P. Smith, and T. Grasl (2019), "Demographic Structure and Macroeconomic Trends." American Economic Journal: Macroeconomics, 11 (1): 193-222.

Albertazzi, U. and L. Esposito (2017), "Credit demand and supply: a two-way feedback relation", Bank of Italy Working Paper Series.

Alloza, M., B. Cozmanca, M. Ferdinandusse and P. Jacquinot (2019), "Fiscal spillovers in a monetary union", ECB Economic Bulletin, Issue 1/2019.

Alon, T.M., M. Doepke, J. Olmstead-Rumsey, and M. Tertilt (2020), "The impact of COVID-19 on gender equality", NBER Working Paper Series, Working Paper No 26947, National Bureau of Economic Research, April.

Arulampalam, W., P. Gregg, and M. Gregory (2001), "Unemployment Scarring", The Economic Journal 111(475): F577-F584.

Autor, D., B. Lutz, D. Cho, L. Crane, M. Goldar, W. Peterman, D. Ratner, and D. Villar, (2020). "An evaluation of the paycheck protection program using administrative payroll microdata", mimeo.

Backer, S., N. Bloom, S. Davis, and S. Terry (2020), "COVID-induced economic uncertainty and its consequences", VoxEU.

Baker, S. R., R. A. Farrokhnia, S. Meyer, M. Pagel, and C. Yannelis (2020), "Income, liquidity, and the consumption response to the 2020 economic stimulus payments" (No. w27097). National Bureau of Economic Research.

Bank of Italy (2020), Economic Bulletin N.2/2020.

Bank of Italy (2021), "The Public Finances: Borrowing Requirement and Debt", Statistics series, April.

Baqaee, D., and E. Farhi (2020), "Supply and Demand in Disaggregated Keynesian Economies with an Application to the COVID-19 Crisis", CEPR DP 14743.

Bartocci, A., A. Notarpietro, and M. Pisani (2020). "COVID-19 shock and fiscal-monetary policy mix in a monetary union", Tema di Discussion n 1313 Bank of Italy Working Paper Series.

Bartsch, E., Bénassy-Quéré, A., Corsetti, G., Debrun, X. (2020) "It's all in the mix. How monetary and fiscal policies can work or fail together". Geneva Report on the world economy, 23.

Bartsch, E. J. Boivin, S. Fischer, and P. Hildebrand (2019) "Dealing with the next downturn: From unconventional monetary policy to unprecedented policy coordination", SUERF Policy Note, Issue No 105 (https://www.suerf.org/policynotes/8209/dealing-with-

the-next-downturn-from-unconventional-monetary-policy-to-unprecedented-policy-coordination/html).

Barwell, C., J. Chadha, and L. Grady (2020), "COVID-19 crisis: Fiscal policy should lead and the Bank of England should follow for the duration of the crisis" (https://voxeu.org/article/COVID-19-crisis-fiscal-policy-should-lead-and-bank-england-should-follow).

Bassetto, M., and T. Sargent, (2020), "Shotgun Weddings between Fiscal and Monetary Policies. Annual Review of Economics, vol.12, pp. 659-690.

Batini, N., A. Cantelmo, G. Melina, and S. Villa (2020), "How Loose, how tight? A measure of monetary and fiscal stance for the euro area", Temi di discussione (Economic working papers) 1295, Bank of Italy, Economic Research and International Relations Area.

Bayer, C., B. Born, R. Luetticke, R., and G. J. Müller (2020), "The Coronavirus Stimulus Package: How large is the transfer multiplier?", mimeo.

Bernanke, B (2003), "Some Thoughts on Monetary Policy in Japan", speech, Tokyo, May.

Bernanke, B. (2005) "The global saving glut and the U.S. current account deficit". Remarks at the Sandridge Lecture, Virginia Association of Economists, Richmond, Virginia.

Bernanke, B., and M., Gertler, (1989), "Agency Costs, Net Worth, and Business Fluctuations", The American Economic Review, Vol. 79, No. 1 (Mar., 1989), pp. 14-31.

Biancotti, C., A. Borin, F. Cingano, P. Tommasino, and G. Veronese. "The case for a coordinated COVID-19 response: No country is an island 18 March 2020". Available at: https://voxeu.org/article/case-coordinated-COVID-19-response-no-country-island.

Bitler, M., H.W. Hoynes, and D. Whitmore Schanzenbach. (2020) "The social safety net in the wake of COVID-19". No. w27796. National Bureau of Economic Research.

Blanchard, O. (2019). "Public debt and low interest rates". American Economic Review, 109(4), 1197-1229.

Blanchard O. and R. Perotti (2002), "An Empirical Characterization of the Dynamic Effects of Changes in Government Spending and Taxes on Output", The Quarterly Journal of Economics, Vol. 117, No. 4, 1329-1368.

Blanchard, O. and J. Pisani Ferry (2020), "Monetisation: Do not panic", Voxeu, 10 April 2020, https://voxeu.org/article/monetisation-do-not-panic.

Blanchard O., T. Philippon, and J. Pisani-Ferry (2020), "A New Policy Toolkit Is Needed as Countries Exit COVID-19 Lockdowns", Peterson Institute for International Economics policy brief.

Blundell, R., M. Costa Dias, R. Joyce, X. Xu (2020). "COVID-19 and Inequalities". Fiscal Studies, 41(2), 291-319.

Bluwstein, K., and F., Canova (2016), "Beggar-Thy-Neighbor? The International Effects of ECB Unconventional Monetary Policy Measures", International Journal of Central Banking, International Journal of Central Banking, vol. 12(3), pages 69-120, September.

Bordo, M. D. (2020), "Monetary policy cooperation/coordination and global financial crises in historical perspective". NBER Working Paper, N. 27898, October.

Breckenfelder, J., F. De Fiore, P. Andrade, P. Karadi, and O. Tristani (2016). "The ECB's asset purchase programme: an early assessment," Working Paper Series 1956, European Central Bank.

Brugiavini, A. and G. Weber (2014), "Longer-term Consequences of the Great Recession on the Lives of Europeans", Oxford University Press.

Brunnermeier, M. and Y., Sannikov, (2014), "A Macroeconomic Model with a Financial Sector", American Economic Review, 104 (2): 379-421.

Brunnermeier, M. and Y., Sannikov (2016), "The I Theory of Money", Working Paper.

Buiter, W. (2020a), "The Helicopters Are Coming", Project Syndicate, https://www.project-syndicate.org/commentary/helicopter-money-coronavirus-response-by-willem-h-buiter-1-2020-03.

Buiter, W. (2020b), "Central Banks as Fiscal Players: The Drivers of Fiscal and Monetary Policy Space", Cambridge University Press.

Bureau of Foreign and Domestic Commerce, Kuznets S., (1934), "National Income, 1929-1932", Washington: U.S. Government Printing Office.

Burgess, S. and H. H. Sievertsen (2020), "Schools, skills, and learning: The impact of COVID-19 on education", Available at https://voxeu.org/article/impact-COVID-19-education

Burlon L., A. Locarno, A. Notarpietro, and M. Pisani (2017), "Public investment and monetary policy stance in the euro area," Temi di discussione (Economic working papers) 1150, Bank of Italy, Economic Research and International Relations Area.

Busetti F., C. Giorgiantonio, G. Ivaldi, S. Mocetti, A. Notarpietro, and P. Tommasino (2019), "Capital and public investment in Italy: macroeconomic effects, measurement and regulatory weaknesses", Questioni di Economia e Finanza (Occasional Papers) 520, Bank of Italy, Economic Research and International Relations Area.

Buti M. (2020), "Economic policy in EMU: What role for fiscal and monetary policy? Which has more scope left? How to combine them?", SUERF Policy Note Issue No 124, January 2020.

Caballero, R.J. and A. Krishnamurthy (2003), "Excessive Dollar Debt: Financial Development and Underinsurance", The Journal of Finance, Volume58, Issue2, Pages 867-893.

Caracciolo, G., F. Cingano, V. Ercolani, G. Ferrero, F. Hassan, A. Papetti, M. Savini, and P. Tommasino (2020a) "COVID-19 and Economic Analysis: a Review of the Debate. COVID-19 and Economic Analysis: A Review of Economic Analysis", Banca d'Italia Literature Review Issue no. 3. Available at: https://www.bancaditalia.it/media/notizie/2020/COVID-literature-newsletter-n3.pdf

Caracciolo, G., F. Cingano, V. Ercolani, G. Ferrero, F. Hassan, A. Papetti, M. Savini, and P. Tommasino (2020b), "COVID-19 and Economic Analysis: a Review of the Debate", COVID-19 and Economic Analysis: A Review of Economic Analysis. Banca d'Italia Literature Review Issue no. 1. Available at https://www.bancaditalia.it/media/notizie/2020/COVID-literature-newsletter-n1.pdf

Carlsson, M, G. B. Dahl, B. Öckert, and. D. Rooth (2015), "The Effect of Schooling on Cognitive Skills", Review of Economics and Statistics 97(3): 533–547.

Carta F. and M. De Philippis M (2021), "The impact of the COVID-19 shock on labour income inequality: evidence from Italy", No. 606. Bank of Italy, Economic Research and International Relations Area

Carvalho, C., A. Ferrero, and F. Nechio (2016), "Demographics and real interest rates: Inspecting the mechanism", European Economic Review 88: 208–226.

Casarico, A. and S. Lattanzio (2020), "The Heterogeneous Effects of COVID-19 on Labor Market Flows: Evidence from Administrative Data", COVID Economics 52.

Casiraghi, M. and G. Ferrero (2015), "Is deflation good or bad? Just mind the inflation gap", Questioni di Economia e Finanza (Occasional Papers) 268, Bank of Italy, Economic Research and International Relations Area.

CBO, (2019), The 2019 Long-Term Budget Outlook, June

Cerra, V., A. Fatas, and S. C. Saxena (2020), "Hysteresis and Business Cycles", CEPR Discussion Paper No. DP14531.

Chetty, R., J. N. Friedman, N. Hendren, and M. Stepner (2020), "How did COVID-19 and stabilization policies affect spending and employment? a new real-time economic tracker based on private sector data" (No. w27431). National Bureau of Economic Research.

Coenen, G., C. J. Erceg, C. Freedman, D. Furceri, M. Kumhof, R. Lalonde, D. Laxton, J. Lindé, A. Mourougane, D. Muir, S. Mursula, C. de Resende, J. Roberts, W. Roeger, S. Snudden, M. Trabant, and J. in't Veld (2012), "Effects of Fiscal Stimulus in Structural Models," American Economic Journal: Macroeconomics, American Economic Association, vol. 4(1), pages 22-68, January.

Collins C., S. Potter, and E. Truman, (2020) "Enhancing Central bank Cooperation in the COVID-19 Pandemic", in Maurice Obstfeld and Adam S. Posen (eds) *How the G20 Can Hasten Recovery from COVID-19*, Peterson Institute for International Economics PIIE BRIEFING 20-1, April.

Cooper, R. and K. Nikolov (2013), "Government Debt and Banking Fragility: the Spreading of Strategic Uncertainty", Working Paper.

Cova, P. and G. Ferrero (2015), "The Eurosystem's asset purchase programmes for monetary policy purposes", Banca d'Italia, Occasional Papers N.270

Cova P., P. Pagano, A. Notarpietro, and M. Pisani, (2017), "Secular stagnation, R&D, public investment and monetary policy: a global-model perspective," Temi di discussione

(Economic working papers) 1156, Bank of Italy, Economic Research and International Relations Area.

Dailo, R., (2019), "It's Time to Look More Carefully at "Monetary Policy 3 (MP3)" and "Modern Monetary Theory (MMT)" https://www.linkedin.com/pulse/its-time-look-more-carefully-monetary-policy-3-mp3-modern-ray-dalio/

Dedola, L., P. Karadi, and G. Lombardo, (2013), "Global implications of national unconventional policies", Journal of Monetary Economics, Vol. 60, 66–85.

Dedola, L., G., Georgiadis, J., Gräb, and M., Arnaud, (2020), "Does a big bazooka matter? Quantitative easing policies and exchange rates"; Research Bulletin, European Central Bank, vol. 76.

De Socio A., S. Narizzano, T. Orlando, F. Parlapiano, G. Rodano, E. Sette, and L. Viggiano, (2020), "Gli effetti della pandemia sul fabbisogno di liquidità, sul bilancio e sulla rischiosità delle imprese", Note COVID-19, 13 novembre, Bank of Italy

Dietrich, A., K. Kuester, G. Müller, and R. Schoenle (2020), "News and uncertainty about COVID-19: Survey Evidence and short-run economic impact", mimeo, March 24. Available at https://voxeu.org/article/news-and-uncertainty-about-economic-fallout-COVID-19.

Dowd, K., (2018), "Against Helicopter Money", https://www.cato.org/cato-journal/winter-2018/against-helicopter-money.

Dynan K., and L. Sheiner, (2018), "GDP as a measure of economic well-being", Working paper, 43, The Brookings Institution

ECB (2020a), "Public loan guarantees and bank lending in the COVID-19 period", in Economic Bullettin 6/2020.

ECB (2020b), Financial Stability Review, November

Eggertsson, G.B, and P., Krugman, (2012), "Debt, Deleveraging, and the Liquidity Trap: A Fisher-Minsky-Koo Approach", The Quarterly Journal of Economics, Volume 127, Issue 3, August 2012, Pages 1469–1513.

Eichenbaum, M., (1997), "Some Thoughts on Practical Stabilization Policy", American Economic Review, Vol. 87(2), pp. 236–30.

Elekdag, S., and D., Muir, (2014), "Das Public Kapital: How much would higher German public investment help Germany and the euro area?", WP 14/227, International Monetary Fund.

Elmendorf, D. W. and J. Furman (2008), "If, when, how: A primer on fiscal stimulus", the Brookings Institution.

Ercolani V. (2020a), "Strengthening national health systems and dampening precautionary attitudes," COVID-Note, Bank of Italy, 5 November.

Ercolani V. (2020b), "COVID-Induced precautionary saving in the US: the role of the unemployment rate" COVID-Note, Bank of Italy, 8 July.

European Commission (2020a), Educational inequalities in Europe and physical school closures during COVID-19, Fairness Policy Brief Series, 04/2020.

European Commission (2020b), Debt Sustainability Monitor 2019, January, Institutional Paper 120.

European Commission (2021), Debt Sustainability Monitor 2020, February, Institutional Paper 143.

Farhi, E. and I. Werning, (2016), "A Theory of Macroprudential Policies in the Presence of Nominal Rigidities." Econometrica 84 (5): 1645-1704.

Faria e Castro, M., (2020), "Fiscal Policy during a Pandemic", Federal Reserve Bank of St. Louis Working Paper 2020-006.

Farmer, R., (2020), "COVID-19: Economic Policy Response", https://cfmsurvey.org/users/roger-farmer.

Feldstein, M., (2002), "Commentary: Is There a Role for Discretionary Fiscal Policy?", Rethinking Stabilization Policy, A Symposium Sponsored by The Federal Reserve Bank of Kansas City, Jackson Hole Wyoming.

Ferrero, G., M. Gross, and S. Neri, (2019a). "On secular stagnation and low interest rates: Demography matters," International Finance, Wiley Blackwell, vol. 22(3), pages 262-278, December.

Ferrero, G., M. Pietrunti, and A. Tiseno, (2019b). "Benefits of gradualism or costs of inaction? Monetary policy in times of uncertainty," Economic working papers, N. 1205, Bank of Italy.

Fornaro, L. and M. Wolf, (2020). "COVID-19 Coronavirus and Macroeconomic Policy," CEPR Discussion Papers 14529, C.E.P.R. Discussion Papers.

Francese M. and D. Prady (2018), "Universal Basic Income: Debate and Impact Assessment", No. 2018/273, International Monetary Fund.

Galì, J., (2020a), "Helicopter money: The time is now", Voxeu, 17 March 2020, https://voxeu.org/article/helicopter-money-time-now.

Galì J., (2020b), "The effects of a money-financed fiscal stimulus", Journal of Monetary Economics, Volume 115, Pages 1-19.

Galeotti, A. and P. Surico (2020), "A user guide to COVID-19", https://voxeu.org/article/user-guide-COVID-19.

Gaspar, V. and P. Mauro (2020), "Fiscal Policies to Protect People During the Coronavirus Outbreak", IMF blog (https://blogs.imf.org/2020/03/05/fiscal-policies-to-protect-people-during-the-coronavirus-outbreak/).

Georgieva, K., S. Fabrizio, C. H. Lim, and M. M. Tavares (2020), The COVID-19 Gender Gap. Available at: https://blogs.imf.org/2020/07/21/the-COVID-19-gender-gap/

Giacomelli S., S. Mocetti, and G. Rodano (2021), "Fallimenti d'impresa in epoca COVID", Note COVID-19, 27 gennaio, Bank of Italy.

Giavazzi, F. and G. Tabellini, (2020), "COVID Perpetual Eurobonds: Jointly guaranteed and supported by the ECB", Voxeu, 24 March 2020, https://voxeu.org/article/COVID-perpetual-eurobonds.

Gobbi G., F. Palazzo, and A. Segura (2020), "Unintended effects of loan guarantees during the COVID-19 crisis", VoxEU.

Goy, G. and J. W. Van den End (2020), "The impact of the COVID-19 crisis on the equilibrium interest rate", VoxEU.org.

Goodhart, C. and M. Pradhan, (2020), "Future imperfect after coronavirus", VoxEU.org.

Gopinath, G. (2019), World Economic Outlook, October 2019, Global Manufacturing Downturn, Rising Trade Barriers (Foreword). International Monetary Fund.

Gordon, R. J. (2016), "The rise and fall of American growth: The U.S. standard of living since the Civil War", Princeton: Princeton University Press.

Group of Thirty (2020), "Reviving and Restructuring the Corporate Sector Post-COVID. Designing public policy interventions"

Guerrieri, V., G. Lorenzoni, L. Straub and I. Werning (2020), "Macroeconomic Implications of COVID-19: Can Negative Supply Shocks Cause Demand Shortages?" NBER WP 26918.

Hall, Robert E. (2009), "By How Much Does GDP Rise If the Government Buys More Output?," Brookings Papers on Economic Activity, Economic Studies Program, The Brookings Institution, vol. 40(2 (Fall)), pages 183-249.

Hall, R. E., and R. Reis (2015), "Maintaining central-bank financial stability under new-style central banking" (No. w21173). National Bureau of Economic Research.

Holston, K., T. Laubach, and J.C. Williams (2017), "Measuring the natural rate of interest: International trends and determinants", Journal of International Economics, Vol. 108, Supplement 1, pp. S59-S75.

Holston, K., T. Laubach, and J.C. Williams (2020), "Adapting the Laubach and Williams and Holston, Laubach, and Williams Models to the COVID-19 Pandemic", Federal Reserve Bank of New York Note.

Jordà, O., R. S. Sanjay, and A. M. Taylor (2020), "Longer-run Economic Consequences of Pandemics," Working Paper Series 2020-09, Federal Reserve Bank of San Francisco.

Kaplan, G., B. Moll, and G. L. Violante (2018), "Monetary Policy According to HANK", American Economic Review, American Economic Association, vol. 108(3), pages 697-743, March.

Karabarbounis, L. and B. Neiman (2014), "The global decline of the labor share". Quarterly Journal of Economics Vol. 129: 61–103.

Kim C. J. and C. Nelson (2001) "A Bayesian approach to testing for Markov switching in univariate and dynamic factor models". International Economic Review 42: 989–1013.

King, T. B., 2019, "Expectation and duration at the effective lower bound," Journal of Financial Economics, Vol. 134, Issue 3, 736-760.

Kiyotaki, N., and J. Moore (1997), "Credit Cycles", Journal of Political Economy, Vol. 105, No. 2 (April 1997), pp. 211-248.

Konig, P., K. Anand and F. Heinemann (2015), "Guarantees, Transparency and the Interdependency between Sovereign and Bank Default Risk", Journal of Banking and Finance, Vol. 45.

Koo, R. (2008), The Holy Grail of macroeconomics: lessons from Japan's Great Recession, John Wiley & Sons (Asia).

Korinek, A., and A. Simsek (2016), "Liquidity Trap and Excessive Leverage", American Economic Review, 106 (3): 699-738.

Kozlowski, J., L. Veldkamp, L., and V. Venkateswaran (2020), "Scarring Body and Mind: The Long-Term Belief-Scarring Effects of COVID-19", National Bureau of Economic Research Working Papers, No 27439.

ILO (2020) "The impact of the COVID-19 pandemic on youth, and what to do about it". Available at: https://www.ilo.org/brussels/information-resources/news/WCMS_759403/lang--en/index.htm

IMF (2019), Fiscal Monitor, October.

IMF (2020a), Fiscal Monitor, April.

IMF (2020b), Fiscal Monitor, October.

IMF (2020c), Global Financial Stability Report, October.

IMF (2021), Fiscal Monitor, April.

In't Veld, J. (2016), "Public investment stimulus in surplus countries and their euro area spillovers", ECFIN European Economy Economic Brief 016, August.

Landais, C., P. Michaillat, E. Saez (2018). "A macroeconomic approach to optimal unemployment insurance: Theory". American Economic Journal: Economic Policy, 10(2):152–181

Lane, P. (2020), "The ECB's monetary policy in the pandemic: meeting the challenge", Speech by Philip R. Lane, Member of the Executive Board of the ECB, at the 62nd NABE Annual Meeting "Global Reset? Economics, Business, and Policy in the Pandemic".

Leonello, A. (2017), "Government guarantees and the bank-sovereign nexus", ECB Research Bulletin, n. 35.

Levy Yeyati, E. (2020), "COVID, Fed Swaps and the IMF as Lender of Last Resort", VoxEU March 31, available at https://voxeu.org/article/COVID-fed-swaps-and-imf-lender-last-resort

Lian, W., A. F. Presbitero, and U. Wiriadinata (2020), "Public Debt and r-g at Risk", IMF Working Paper 20/137.

Locarno A., and R. Zizza (2020), "Previsioni ai tempi del Coronavirus", Note COVID-19, 11 maggio, Bank of Italy.

Malmendier, U. and S. Nagel (2011), "Depression Babies: Do Macroeconomic Experiences Affect Risk Taking?", The Quarterly Journal of Economics, Vol. 126, Issue 1, pp. 373–416.

McConnell, M. and G. Perez-Quiros (2000), "Output fluctuations in the United States: what has changed since the early 1980s?" American Economic Review 90: 1464–1476.

McKay, A. and R. Reis (2016), "The role of automatic stabilizers in the US business cycle." Econometrica 84.1 (2016): 141-194.

McKay, A. and R. Reis (2021), "Optimal automatic stabilizers". Review of Economic Studies (Forthcoming).

McKibbin, W.J. and A.A. Sidorenko (2006), "Global Macroeconomic Consequences of Pandemic Influenza", The Australian National University Centre for Applied Macroeconomic Analysis Working Papers, No 26/2006.

McKibbin, W.J. and R. Fernando (2020), "The Global Macroeconomic Impacts of COVID-19: Seven Scenarios", The Australian National University Centre for Applied Macroeconomic Analysis Working Papers, No. 19/2020.

Mian, A. and A. Sufi (2014), "House of Debt", Chicago, University of Chicago Press.

Moffitt, R. A. and J. P. Ziliak. (2020), "COVID-19 and the US Safety Net." Fiscal Studies 41.3

Mongey, S., L. Pilossoph, and A. Weinberg (2020), "Which workers bear the burden of social distancing policies?", COVID Economics, Issue 12, pp. 69-86.

Mountford A. and H. Uhlig (2009), "What are the effects of fiscal policy shocks?," Journal of Applied Econometrics, John Wiley & Sons, Ltd., vol. 24(6), pages 960-992.

OECD (2020a), Supporting livelihoods during the COVID-19 crisis: Closing the gaps in safety nets.

OECD (2020b), Sovereign Borrowing Outlook for OECD Countries 2020, SPECIAL COVID-19 EDITION.

OECD (2021), Sovereign Borrowing Outlook for OECD Countries 2021.

O'Neil, Jim and D. Lombardi (2020), "How to Use the SDR", Project Syndicate, Apr 28, 2020, available at https://www.project-syndicate.org/commentary/imf-sdr-vehicle-to-finance-COVID19-mitigation-by-jim-o-neill-and-domenico-lombardi-2020-04?barrier=accesspaylog

Oreopoulos, P., T. von Wachter, T., and A. Heisz (2012), "The Short- and Long-Term Career Effects of Graduating in a Recession", American Economic Journal: Applied Economics, 4: 1–29.

Portes, J. (2020), "The lasting scars of the COVID-19 crisis: Channels and impacts", available at: https://voxeu.org/article/lasting-scars-COVID-19-crisis

Rachel, L. and T.D. Smith (2017), "Are Low Real Interest Rates Here to Stay?", International Journal of Central Banking, Vol. 13, No 3, pp. 1–42.

Rachel, L. and L.H. Summers (2019), "On falling neutral real rates, fiscal policy, and the risk of secular stagnation", Brookings Papers on Economic Activity Conference Drafts, March 7–8, 2019.

Ramey, V. A. (2011), "Can Government Purchases Stimulate the Economy?", Journal of Economic Literature, American Economic Association, vol. 49(3), pages 673-685, September.

Ramey, V. A. (2020), "The macroeconomic consequences of infrastructure investment", National Bureau of Economic Research, Working Paper, No. 27625.

Randall Wray, L. (2015), "Modern Money Theory: A Primer on Macroeconomics for Sovereign Monetary Systems", Palgrave Macmillan.

Reichlin, L. and D. Shoemaker (2020), "Fault lines in fiscal-monetary policy coordination", Voxeu, 26 March 2020, https://voxeu.org/article/fault-lines-fiscal-monetary-policy-coordination

Reis, R. (2019) "A Solution to Sudden Stops: The IMF and Central banks Should Work Together to Resolve Financial Crises", IMF Finance and Development, June. Available at: https://www.imf.org/external/pubs/ft/fandd/2019/06/imf-and-central-banks-working-together-reis.htm

Romer, C. D. and D. H. Romer, (2019), "Fiscal space and the aftermath of financial crises: how it matters and why" (No. w25768), National Bureau of Economic Research.

Rondinelli C. and F. Zanichelli (2020), "Principali risultati della seconda edizione dell'indagine straordinaria sulle famiglie italiane nel 2020", Note COVID-19, 19 novembre, Bank of Italy.

Ruggles, N. D. and Ruggles, R. (1977), "The Anatomy of Earnings Behavior", in F. T. Juster (ed.), Distribution of Economic Well-Being. New York: National Bureau of Economic Research, 115–62.

Simmons, R., G., Littera, N. Culkin, P. Dini, L. Fantacci, and M. Amato (2020), "Helicopter, Bazooka or Drone?", https://www.politico.eu/article/helicopter-bazooka-drone-economic-policy-coronavirus-crisis-money/

Stiglitz J., A. Sen, and J. Fitoussi (2009), "Report of the Commission on the Measurement of Economic Performance and Social Progress".

Summers, L. H. (2014) "U.S. economic prospects: secular stagnation, hysteresis, and the zero lower bound". Business Economics 49: 65–73.

Tabellini, G., (2020), "Eurobond con cura", Il Foglio, 20 March 2020.

Thwaites, G. (2015), "Why are real interest rates so low? Secular stagnation and the relative price of investment goods". Bank of England Working Paper No. 564.

Tlaib, R. (2020), "Automatic BOOST to Communities Act", https://tlaib.house.gov/sites/tlaib.house.gov/files/Automatic%20Boost%20to%20Communities%20Act%20.pdf

Tumino, A (2015), "The scarring effect of unemployment from the early '90s to the Great Recession", Institute for Economic and Social Research Working Paper 2015-5.

Turner, A. (2013), "Debt, Money and Mephistopheles", speech at Cass Business School, 6 February.

UNICEF (2020), Unequal access to remote schooling amid COVID-19 threatens to deepen global learning crisis. Press release 4 June 2020. Available at: https://www.unicef.org/press-releases/unequal-access-remote-schooling-amid-COVID-19-threatens-deepen-global-learning

Vayanos, D. and J. L. Vila, (2020), "A Preferred-Habitat Model of the Term Structure of Interest Rates," Econometrica, forthcoming. Previously published in 2009 as NBER Working Paper, No. 15487.

Velasco, A., (2020), "Preventing an Emerging-Market Meltdown", Project Syndicate, available at https://www.project-syndicate.org/commentary/international-funding-can-prevent-emerging-market-meltdown-by-andres-velasco-2020-06?barrier=accesspaylog

Vihriälä V., (2020), "Make room for fiscal action through debt conversion" VoxEU, 15th of April.

Visco, I. (2017), "Sviluppo dell'economia e stabilità finanziaria: il vincolo del debito pubblico", relazione presentata al 63° Convegno di studi amministrativi su "La tutela degli interessi finanziari della collettività nel quadro della contabilità pubblica: principi, strumenti, limiti", Varenna, 21 settembre 2017.

Visco, I. (2020), "The G20 under Italy's leadership in 2021". Keynote speech by Mr Ignazio Visco, Governor of the Bank of Italy, at The Global Foundation - Rome Roundtable 2020 "Which way the world after the pandemic? Our inclusive human future", Virtual meeting, 16-17 November 2020.

Viviano E. (2020), "Alcune stime preliminari degli effetti delle misure di sostegno sul mercato del lavoro", Note COVID-19, 16 novembre, Bank of Italy.

Yashiv, E. (2020), "Breaking the taboo: The political economy of COVID-motivated helicopter drops", Voxeu, 26 March 2020, https://voxeu.org/article/political-economy-COVID-motivated-helicopter-drops.