

# I. An overview of the economics of the Recovery and Resilience Facility

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The Recovery and Resilience Facility (RRF) is the centrepiece of Europe's recovery plan, NextGenerationEU, financed by a temporary increase in the EU's budget (the multiannual financial framework, 2021-2027). The macroeconomic package covers both structural reforms and public investment aiming to mitigate the economic and social impact of the COVID-19 crisis and make European economies and societies more sustainable, resilient and better prepared for both the challenges and opportunities of the green and digital transitions. Economic modelling indicates that the RRF will have a sizeable and persistent positive impact on overall EU GDP and will promote convergence. Spillover effects benefit open economies with smaller grant allocations and growth helps reduce debt, also in the long term. In addition to these simulated effects of the fiscal impulse, structural reforms can substantially support medium-term and long-term growth by increasing labour market participation, enhancing allocative efficiency or improving the business environment. The adoption of the RRF - combined with other policy action - has also generated additional benefits by reducing risk premia and by stimulating consumer spending and investment. For Member States to fully benefit from the projected growth effects, the planned high-quality investments must be made swiftly and in a way that amplifies current national public investment plans. It is also essential that Member States meet the ambitious commitments to structural reforms they made in their recovery and resilience plans to reap the full benefit of the RRF <sup>(1)</sup>.

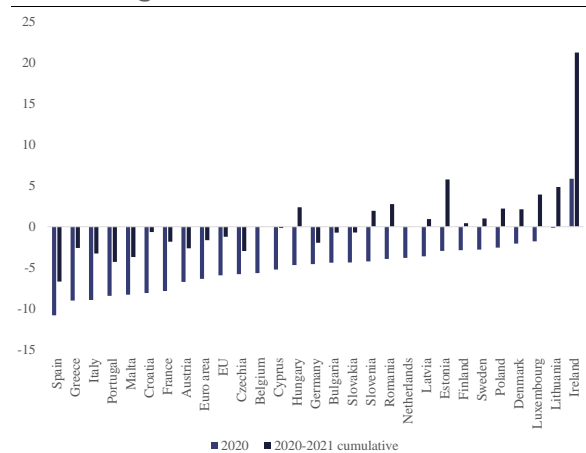
## I.1. The COVID pandemic: an unprecedented crisis with a deep and asymmetric impact

Ten years after the Great Financial Crisis and the subsequent euro-area sovereign debt crisis, the COVID-19 pandemic swept across the globe leading to loss of lives and major challenges to public health as well as economic and social disruption. The lockdown measures to contain the virus had a huge impact on economic activity; economies came to a standstill in the second quarter of last year. The health crisis thus triggered a major exogenous economic shock affecting all EU Member States. Though the shock itself was symmetric and global, its impact across Member States and regions has been markedly asymmetric. It differed depending on the spread of the virus among the population, the resilience of the healthcare sector, the type and severity of the containment measures, the sectoral composition of the economy and the strength of the economic policy response to the loss in output.

In 2020, GDP fell by over 10% in Spain, by almost 9% in Italy and by 6% on average across the EU. Despite upward revisions in the Commission's most recent growth estimates, GDP levels are

expected to remain (well) below pre-crisis levels in 16 of the 27 EU Member States in 2021 (Graph I.1).

Graph I.1: 2020 and 2020-21 cumulative real GDP growth



Source: European Commission, Autumn 2021 Forecast

## I.2. Policy action: crisis repair, containment and prevention

A successful control of the health and economic crisis in any country can be seen as a common good that benefits an integrated economy such as the EU due to integrated value chains, the single market and the monetary union.

<sup>(1)</sup> The authors wish to thank colleagues for useful comments, and in particular Alexandru Ciungu and Ruben Kasdorp for their contributions. This section represents the authors' views and not necessarily those of the European Commission. The cut-off date for this section is 17 November 2021.

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The initial phase of the crisis was characterised by a high degree of uncertainty and worries that the abrupt halt in economic activity in large parts of the economy could risk triggering a wave of bankruptcies, mass unemployment and possibly stress in the financial sector. Policy makers and financial markets were also concerned that pre-existing fragilities could exacerbate the crisis and deepen economic divergence in the euro area.

The EU monetary and fiscal policy response to contain these risks and the immediate social and economic crisis impact was unprecedented, at both national and EU level. The European Central Bank stepped in to provide large-scale liquidity and the Commission relaxed its State-aid rules and activated the general escape clause in the fiscal governance framework to enable Member States to provide immediate budgetary support at national level. The comprehensive and decisive policy action provided a fast and substantial impulse to EU economies. At European level, the Coronavirus Response Initiative and React-EU led to a fast deployment of available EU funds, while the newly created SURE instrument provided loans to Member States at attractive conditions to fund short-time work schemes and similar measures to safeguard employment. Together with the national support measures, SURE contributed to protecting jobs <sup>(2)</sup>. Unemployment in the EU 27 went up, but by substantially less than what could have been expected given the fall in domestic production.

Despite these decisive actions to contain the immediate impact of the crisis, concerns remained that some Member States with little or no policy space would be ill-equipped to meet the economic and social needs of their people and risked getting stuck in a situation of prolonged sluggish growth, high unemployment and a permanently weakened business sector. For the EU as a whole, the crisis entailed high fundamental risks that the level playing field created by the single market could become permanently uneven and that the gap in living standards could widen. Increased divergence within the monetary union would also put at risk the process of economic integration and convergence.

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<sup>(2)</sup> See McDonnell, C., Boussard, J., Justo, I., Mohl, P., Mourre, G. and K. Stovicek (2021), ‘The SURE instrument – key features and first assessment’, *Quarterly Report on the Euro Area*, Vol. 20 No 2, pp. 41-49

Within this context the European Council on 23 April 2020, agreed to work towards the establishment of a recovery fund, tasking the Commission to “analyse the exact needs and to come up with a proposal that is commensurate to the challenges we are facing”. The Council insisted that “this fund shall be of a sufficient magnitude, targeted towards the sectors and geographical parts of Europe most affected”. In May 2020, just a few months after the outbreak of the pandemic in Europe, the Commission proposed the legislative package for NextGenerationEU, including the Recovery and Resilience Facility, to set in train a sustainable recovery, provide support for productivity enhancing investment and reforms, to facilitate the green and digital transition, and to support cohesion and convergence. In total, NextGenerationEU will provide up to EUR 750 billion in 2018 prices over the years 2021-2026, with the RRF accounting for the lion’s share (almost 90%; EUR 312.5 billion for grants and up to EUR 360 billion for loans) <sup>(3)</sup>.

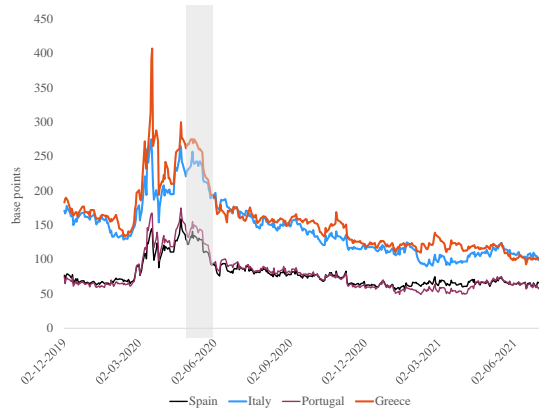
The agreement on NextGenerationEU and the Recovery and Resilience Facility is testament to Member States’ commitment to European solidarity. Together with other policy action at both national and European level, the agreement strengthened trust in the monetary union and helped restore confidence and calm financial markets, as evidenced by the bond spreads narrowing (Graph I.2.). The ensuing economic rebound in the second half of last year, supportive policies in the Member States and the adoption of Recovery and Resilience plans (RRPs) gave a further boost to investor confidence <sup>(4)</sup>.

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<sup>(3)</sup> The respective RRF amounts in current prices are EUR 338 billion for grants and EUR 385.8 billion for loans.

<sup>(4)</sup> On 13 July 2021, the Council adopted implementing decisions on the Recovery and Resilience Plans (RRPs) of Austria, Belgium, Denmark, France, Germany, Greece, Italy, Latvia, Luxembourg, Portugal, Slovakia and Spain. On 28 July, Croatia, Cyprus, Lithuania and Slovenia also received approval for their plans. On 8 September, the Council adopted Czechia’s and Ireland’s plans. On 29 October, the Council has adopted the plans from Estonia, Finland and Romania.

Graph I.2: 10 year government bond yields against German bonds



Source: Macrobond

### I.3. RRF rationale: an instrument with innovative features

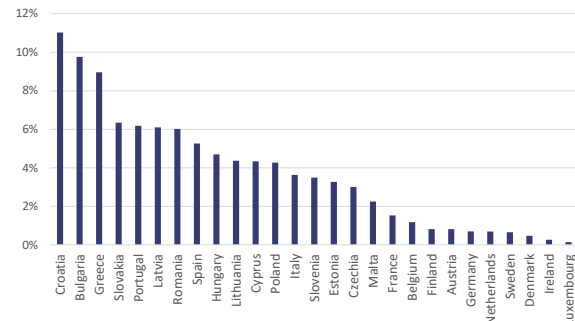
The Recovery and Resilience Facility is a performance-based instrument. In contrast to conventional EU instruments, which reimburse past costs incurred, the RRF provides financing via grants and loans for investments and reforms based on cost estimates. Following an initial pre-financing payment of up to 13% of the total grant and loan envelope, the Facility will only pay out once the agreed milestones and targets related to specific investments and reforms are met. This set-up strengthens incentives to implement major economic, social and environmental reforms. It also ensures that framework conditions are improved in parallel, increasing the effectiveness of the investments.

The Facility stimulates economic convergence via an asymmetric allocation of grants. 70% of all support Member States are entitled to is allocated on the basis of the Member States' unemployment record from 2015-2019, inverse GDP per capita and population share. For the remaining 30% of the total budget, the impact of the crisis is taken into account based on the drop in real GDP in 2020 and, in equal proportion, the cumulative loss in real GDP over 2020 and 2021 <sup>(5)</sup>. This means that poorer economies, with a high rate of unemployment and which suffered a deep negative impact of the crisis will receive a relatively large

<sup>(5)</sup> See for the detailed calculation the Annex I-III in the RRF Regulation (<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021R0241&qid=16139839230651&from=EN>)

amount of grants, while richer economies with a more robust growth record will receive comparatively less (Graph I.3 and I.4).

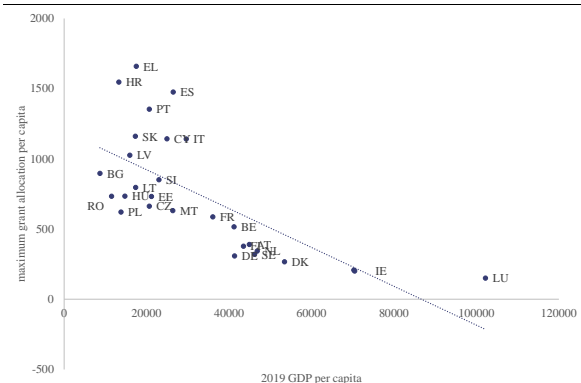
Graph I.3: RRF grants (% of pre-crisis GDP)



(1) RRF grant allocation as indicatively based on the European Commission's 2020 Autumn Forecast

Source: European Commission

Graph I.4: Maximum financial contribution and GDP per capita



Source: European Commission

To request RRF support, EU Member States are required to develop national Recovery and Resilience Plans with several components, reflecting coherent packages of reforms and investments. To ensure they make a contribution to a sustainable recovery, which also benefits the green transition and the digital transformation, the national plans must meet a number of criteria, set in the RRF Regulation agreed by Council and Parliament which the Commission then assesses <sup>(6)</sup>. For instance, to make sure that the

<sup>(6)</sup> The Commission assesses the RRFs on completeness, eligibility of planned investments, and on quality, considering the relevance, effectiveness, efficiency and coherence of each RRF along eleven criteria set out in Regulation (Article 19(3) and Annex V). The 11 criteria are: balanced response; addressing the country specific recommendations; impact on growth, resilience & social impact; the principle to do no significant harm; the green transition; the digital transformation; achieving a lasting impact; monitoring and

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reform dimension is well covered, national recovery plans must effectively address all or a significant subset of the challenges identified in the relevant country-specific recommendations adopted by the Council (7). They must also contribute effectively to strengthening the growth potential, to job creation, and to boosting the economic, social and institutional resilience of the Member State. These contributions are to be demonstrated with a detailed impact assessment. On the green transition and the digital transformation, the Regulation sets quantitative expenditure targets: 37% of the total estimated costs of the plan should be allocated to climate action (8), and 20% of the total estimated costs of the plan should contribute to the digital transition.

In addition to the 37% climate target, each individual measure must meet the 'do no significant harm principle' in relation to the environmental objectives as defined in the EU taxonomy and the related acquis. For each measure, the Member State must carry out and present in the plan a detailed assessment based on technical guidance provided by the Commission. This will ensure that the plans are in line with key aspects of climate change adaptation, climate change mitigation, pollution control, water, biodiversity and circular economy principles.

Since payment for results instead of certification of expenditures puts an additional strain on the national audit- and control systems, effective and

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implementation; cost and impact; control systems; and coherence of the plan. The overall assessment is reflected in the Commission's proposal for a Council Implementing Decision (CID), which approves the assessment of the RRP. Though the RRF Regulation requires the plan to be assessed as a whole, some criteria require assessments of individual measures. In particular for the assessment of 'do no significant harm', the green and digital tagging, and to assess the plausibility of costs estimates.

(7) As part of the regular economic policy surveillance and coordination cycle (the 'European Semester'), each year the Council issues country-specific recommendations (CSRs) on the basis of a Commission proposal. Following a comprehensive analysis of the economic performance of the Member States, these CSRs identify the most pressing reform and investment priorities for next 12 to 18 months. Compared to the usual CSRs, the recommendations issued in 2020 were more narrowly focused on immediate short-term priorities linked to the pandemic and the recovery from it. Therefore, during the assessment of the RRFs, the Commission also looked at how Member States had taken up the 2019 CSRs identifying medium-term structural challenges.

(8) The climate tracking methodology is based on the Rio marker system, which was developed by the OECD. It is the same methodology that is being used to track climate spending under the general EU budget, strengthened by adding some elements from the Taxonomy Regulation

efficient internal control systems are required to prevent, detect and correct irregularities. In some cases, the Commission identified risks related to internal control systems, which were addressed during bilateral discussions before the plans were submitted. Where manageable risks remain, specific milestones linked to the control and audit systems need to be fulfilled by the Member States before they make the first payment request.

To facilitate the RRF implementation, the Commission engaged in intensive and constructive policy discussions with the Member States before they submitted their respective plan. The aim of these discussions was to jointly identify the most impactful investments and reforms, while facilitating timely implementation. During these informal discussions and the assessment phase after the plans were formally submitted, due attention was paid to issues such as additionality and the sequencing of reforms and investments to maximise economic impact. The Commission and the Member States also jointly agreed on a detailed set of milestones and targets against which they would monitor progress in the implementation of the various reforms and investments.

#### **I.4. A bird's-eye view on the Recovery and Resilience Plans**

As indicated above, the RRF Regulation comprises a set of legally-binding criteria against which the Commission assesses the content of the plans, including, for example, the green and digital expenditure targets, compliance with the 'do no significant harm'-principle and the requirement that the plans effectively address all or a significant subset of the relevant country-specific recommendations. Using these assessment criteria, the Member States designed the specific content of their national plans. Taking into account their country-specific circumstances and policy priorities, they chose the reform and investment packages for which they wish to benefit from funding support from the RRF. As a result, the RRFs that have so far been submitted differ both in terms of scope and focus. Nonetheless, there are some common features in the plans.

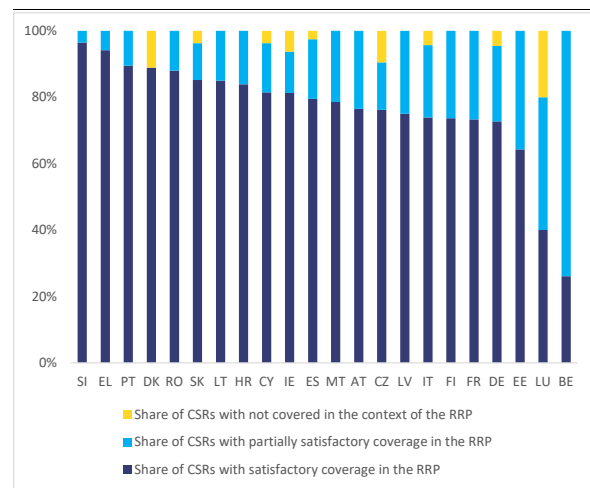
**Box I.1: How is the RRF financed?**

To finance NextGenerationEU, the European Commission, on behalf of the EU, borrows on the capital markets. Thanks to the EU's high credit rating, the Commission is able to borrow at advantageous conditions. The Commission passes this benefit on to the EU Member States directly when providing them loans or to the EU budget in the form of low interest rate payments on borrowing to finance recovery spending. The borrowing is concentrated between mid-2021 and 2026. All borrowing will be repaid by 2058, loans via repayments by the borrowing Member States; grants will be repaid by the EU budget. To help repay the borrowing, the Commission will propose new 'own resources' (sources of revenue) to the EU budget, such as a carbon border adjustment mechanism, the Emissions Trading System and a digital levy, to top up its current resources. The repayment of the Union's debt is guaranteed within the ceilings of own resources, by a dedicated compartment which may only serve that purpose and by additional provisions under which the Member States commit to make available resources up to the maximum amount of borrowing stipulated in the Own Resources Decision, the combined effect of which will constitute an irrevocable, definitive and enforceable guarantee of payment.

The size of NextGenerationEU enables the Commission to borrow up to roughly EUR 150 billion per year on average between mid-2021 and 2026, which will make the EU one of the largest issuers in euro. Given the volumes, frequency and complexity of the borrowing operations, the Commission follows the best practices used by sovereign issuers, by means of a diversified funding strategy. By using diverse funding instruments and funding techniques, the Commission expands the investor base for EU securities, facilitate the smooth repayment of borrowed amounts, and provide all funding required at the most advantageous terms for EU citizens. By end-October the Commission raised EUR 71 billion in long term funding. The long term funding is further complemented by short-term EU-Bills.

All 22 RRP that have been adopted by mid-November 2021 effectively address all or a significant subset of the reform and investment challenges identified in the country-specific recommendations. As shown in the chart overleaf, the extent to which the challenges are indeed taken up, however, varies across Member States (Graph I.5). A breakdown by policy area shows that challenges in the areas of research and innovation, education, skills and life-long learning, energy and climate change as well as transport and the business environment are well covered in the plans. Member States' plans are less in general ambitious in policy areas related to taxation or to the long-term sustainability of public finances. However, this could mean that they are addressing these challenges under different programmes or measures, not under the RRF.

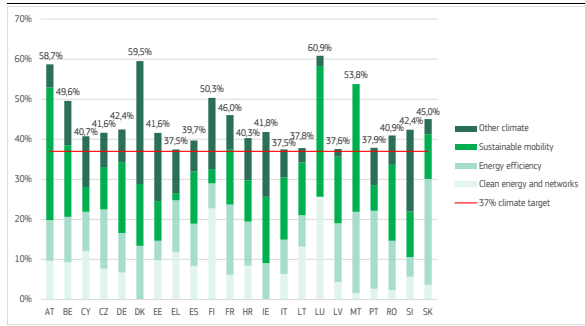
**Graph I.5: Overview by Member State of the extent to which relevant CSRs are addressed in the RRP**



(1) The graph shows the share of 2019 and 2020 CSRs that is addressed (unsatisfactory, partially satisfactory or satisfactory) in the RRP of the 22 Member States for which the Council Implementing Decisions have been adopted.

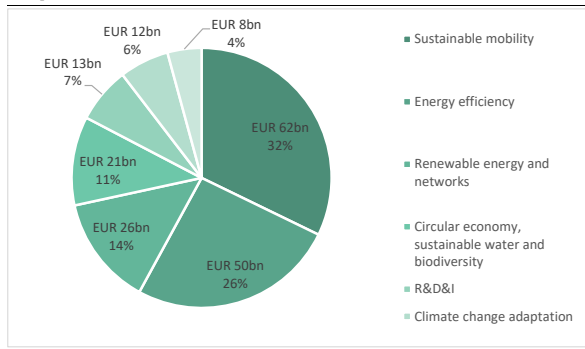
**Source:** European Commission

**Graph I.6: Climate expenditure (% of allocation)**



Source: European Commission (Mahieu, forthcoming)

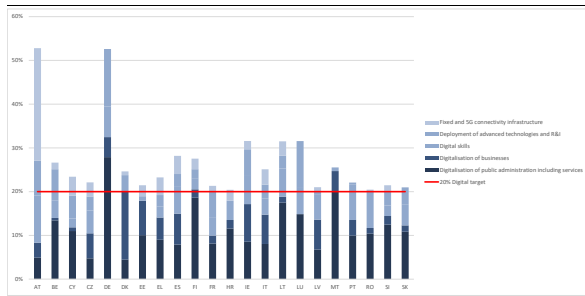
**Graph I.7: Green areas (% of total green expenditure)**



(1) Green includes both climate and environmental expenditures

Source: European Commission (Mahieu, forthcoming)

**Graph I.8: Digital expenditure (% of allocation)**



Source: European Commission

In terms of investments, all the adopted plans meet the quantitative climate target; in some cases by a large margin (Graph I.6).<sup>(9)</sup> Investment supporting sustainable mobility and energy efficiency count for almost 60% of green

<sup>(9)</sup> For some Member States, like Austria, this also relates to the fact that the plan is relatively ambitious compared to the available allocation (the size, measured by total estimated costs, is far larger than the allocation, implying that the green and digital expenditures weighed by the corresponding estimated costs are also relatively high compared to the final allocation of the plan).

expenditure in the adopted plans (Graph I.7). Also in terms of their contribution to digitalisation, all the adopted plans meet the quantitative target (Graph I.8), with most emphasis put on digitalising public services and businesses. Other typical investments focussed on rolling out cross-border 5G corridors, or investing in digital skills.

In terms of reforms, the 22 plans for which a Council Implementing Decision was adopted, vary greatly, as could be expected, based on the different country-specific recommendations, and policy preferences. On public finances and taxation, a number of Member States intend to make more systematic use of spending reviews to improve the composition and efficiency of their public finances (BE, FR, IT). Others plan to use RRF support to bring in environmental tax reforms (AT, DK) or to streamline their tax systems and improve tax collection (IT, CY, LT, SK), including by beefing up the fight against aggressive tax planning (CY, MT, IE)<sup>(10)</sup>. On education, labour market and employment policies, noteworthy reforms include the reorganisation and strengthening of public employment services (FR, AT), the rationalisation of employment contracts (ES) and the reform of unemployment benefits to boost incentives to work (FR, SI) as well as education systems reforms, including with respect to early childhood education and care (RO) and revamping school curricula (SI). This comes in addition to investments in education as well as training and skills development which are included in the vast majority of the plans. On public administration and business environment, a number of plans include measures to reduce red tape and to modernise the functioning of the public sector, with some including reform of state-owned enterprises (DE, CY, IT, LV, LT, PT) or reforms to liberalise regulated professions (HR). Other plans comprise reforms of public procurement practices to stimulate private sector investment (IT) and/or measures to tackle anti-money laundering and corruption (EE, EL, LV, FI, SE).

So far, out of the 22 RRFs, seven have also requested loans on top of the grant allocation. Italy, Romania and Greece have requested the maximum loan allocation of EUR 122.6 billion, EUR 14.9 billion, and EUR 12.7 billion

<sup>(10)</sup> Despite these measures, only a few Member States have addressed the country specific recommendations in the area of taxation, in particular on reducing the tax burden on labour and broadening tax bases to a satisfactory extent.

respectively, whereas Poland, Portugal, Slovenia and Cyprus requested less than the maximum <sup>(11)</sup>.

### I.5. A stylised quantitative assessment of NGEU investment:

To produce a quantitative assessment of NGEU's macroeconomic impact, this section summarises the stylised simulations described in Pfeiffer et al. (2021) <sup>(12)</sup> using a model based on the Commission's QUEST model <sup>(13)</sup>. QUEST incorporates the main features relevant to fiscal policy transmission, such as Keynesian price and wage rigidities and liquidity-constrained households. We extend this core framework along three main dimensions. First, we incorporate the key features of the NGEU: grant allocations, favourable RRF loan conditions and new debt issued by the EU with stylised (but explicit) repayment assumptions. Second, we include detailed public investment dynamics and factored in construction delays <sup>(14)</sup>. Finally, we embed the model into a large-scale multi-country structure, where rich trade linkages and financial markets (e.g. exchange rate movements) connect each of the 27 countries and the rest of the world to all other economies. This approach enables us to make a careful assessment of spillover effects in the EU's highly integrated economy.

Modelling the impact of NGEU requires making several basic assumptions. (i) The total simulated package amounts to around 4% of EU GDP. Expressed in 2019 prices, EUR 396 billion is in grants with country-specific shares mostly following the RRF allocation key <sup>(15)</sup>. The

simulations account for 166 billion in RRF loans, based on requests by the afore mentioned seven Member States. (ii) The analysis looks at two set time profiles, a four-year "fast" scenario (2021-2024) and a six-year scenario (2021-2016) for all Member States. (iii) The use of all NGEU grants and half of the loans for additional productive public investment compared to the baseline without NGEU, with productivity assumptions in line with the literature <sup>(16)</sup>. (iv) All Member States repay the EU-wide debt from 2027 to 2058 based on current GDP shares. Member States receiving RRF loans repay them from 2031 to 2050 <sup>(17)</sup>. (v) Importantly, this assessment concentrates on the fiscal stimulus alone and does not factor in the positive impact of reforms on potential growth, which is expected to boost GDP further and in a permanent way (see below).

Based on these assumptions, the simulations highlight the substantial growth effects of NGEU investments, as reported in Graph I.9. Under the fast NGEU scenario (four years), with evenly distributed spending between 2021 and 2024, we find that the level of annual real GDP in the EU can peak around 1.5% higher than it would have without NGEU investments (in 2024). As public capital is productive, the additional investment boosts aggregate demand and increases potential growth. The latter supply-side effects last beyond the implementation phase and may lead to high long-term multiplier effects. Even in 20 years' time, EU GDP could be around 0.5% higher than it would have been without NGEU <sup>(18)</sup>.

<sup>(11)</sup> The maximum loan allocation is 6.8% of 2019 Gross National Income.

<sup>(12)</sup> See Pfeiffer P., Varga J. and in 't Veld J. (2021), Quantifying Spillovers of NGEU investment, *European Economy Discussion Papers*, No. 144.

<sup>(13)</sup> See Burgert M. et al. (2020), 'A Global Economy Version of QUEST: Simulation Properties.' *European Economy Discussion Papers*, No. 126.

<sup>(14)</sup> In particular, this approach follows Leeper et al. (2010), reflecting that government investment is not immediately productive (e.g. building a bridge takes time) and that not all projects are shovel-ready due to contracting delays. See Leeper, E.M., T.B. Walker, and S.C.S. Yang, 2010, 'Government Investment and Fiscal Stimulus', *Journal of Monetary Economics*, Vol. 57, pp. 1000–12.

<sup>(15)</sup> Besides the RRF grants, the total NGEU grant volume includes other instruments such as ReactEU and the Just Transition Fund (JTF). The allocation across Member States follows the current RRF maximum grant allocation. For ReactEU and the Just Transition Fund, we apply the specific allocation key based on current information. For the other instruments (Horizon Europe,

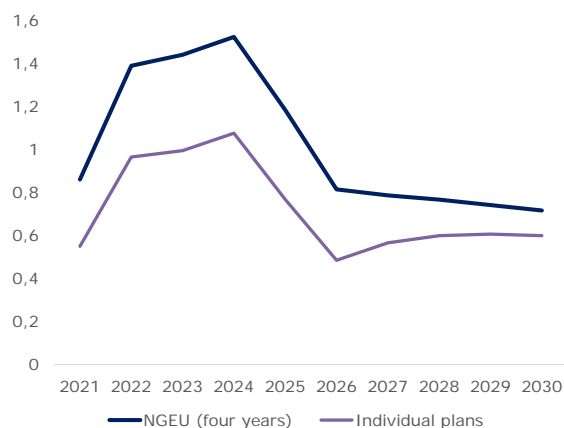
InvestEU, Rural Development, RescEU), we applied the 70%-RRF allocation key.

<sup>(16)</sup> In the simulations, non-additional loans finance general spending (which would take place anyway) but are repaid in full (i.e. they are not financed via new national debt), thereby reducing the debt burden eventually. Concerning the productivity assumptions, the main scenarios calibrate the output elasticity of public capital based on a meta-study (0.12). The sensitivity analysis also looks at a lower productivity scenario. See, Bom, P., and Ligthart, J. (2014). 'What Have We Learned From Three Decades Of Research On The Productivity Of Public Capital?' *Journal of Economic Surveys*, Vol. 28, pp. 889-916.

<sup>(17)</sup> All repayments follow a linear schedule and are based on lump-sum contributions.

<sup>(18)</sup> Despite differences in the modelling approach, these results are broadly in line with previous Commission estimates using the QUEST model, indicating a substantial positive impact on overall EU growth. See, European Commission (2020a), 'Identifying Europe's recovery needs', SWD (2020) 98 final; and European Commission (2020b). European Economic Forecast Autumn 2020, *European Economy Institutional Paper*, 136. Similarly, the ECB's analysis based on the EAGLE model finds that NGEU could

Graph I.9: EU real GDP effects of NGEU for 4 years spending profile (%)



(1) This graph reports the level of real GDP in per cent deviation from a no-policy change (no-NGEU) baseline assuming a high productivity of public investment and under the fast NGEU profile (over four years). The dark purple line shows the results of the modelling for a simultaneous investment stimulus (NGEU). The light purple line indicates a synthetic EU-wide GDP (weighted average) obtained by aggregating stand-alone 27 simulations with unilateral stimulus in each country (on the basis of individual plans).

Source: Pfeiffer et al. (2021).

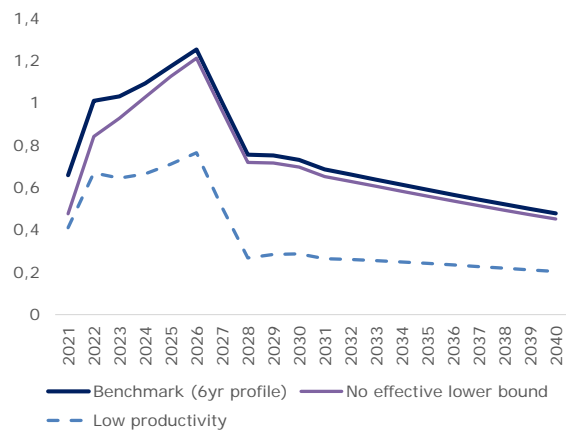
Improved labour market conditions go hand in hand with favourable GDP dynamics. During its period of operation, NGEU investment is estimated to increase employment by up to 1%, compared to the no-policy change baseline. In the medium-term, substantial and persistent real wage gains reflect improved labour market conditions and productivity gains (around +0.8% in 2030).

What are the reasons for these significant expansionary effects? Importantly, by design, NGEU represents a coordinated expansion. Thus, a considerable part of the expected impact is due to spillover effects, indicative of the benefits of joint action. Simultaneous investment increases the effectiveness of this policy: since all countries are set to grow, this will generate an increase not only in imports but also in exports. According to the modelling, spillover effects could account for around one third of the total growth impulse. Simply aggregating the individual effects of Member State' plans would thus substantially underestimate the macro effects of the NGEU (see

increase real GDP in the euro area by around 1.5% over the medium term. Both studies have underlined the importance of productive public investment to generate persistent growth effects. See, Bańkowski et al. (2021), The macroeconomic impact of the Next Generation EU instrument on the euro area, *ECB Occasional Paper* No. 2021/255

the light purple line in Graph I.9 and the breakdown in Graphs I.11 and I.12 below) <sup>(19)</sup>.

Graph I.10: EU real GDP effects of NGEU (%) - Sensitivity analysis



(1) This graph reports the level of real GDP in per cent deviation from a no-policy change (no-NGEU) baseline for a six-year NGEU profile. The dark (dashed) lines show the results of the modelling for a high (low) productivity calibration; the light line shows the results without effective lower bound-assumptions.

Source: Pfeiffer et al. (2021).

In addition to these spillover effects, several interrelated factors also contribute to the substantial boost to GDP found in the simulations. To help quantify these effects, Graph I.10 presents three additional scenarios as a sensitivity analysis. The first scenario shows that the macroeconomic impact remains substantial for a six-year NGEU plan, reaching 1.2% in 2026 and leading to a similar long-term impact (dark purple line). Second, at the current juncture, the policy interest rate at the effective (zero) lower bound implies at least a partial monetary accommodation, limiting crowding-out effects in private consumption and business investment. <sup>(20)</sup> In 'normal times', away from the lower bound, the short-term output impact would be smaller, according to the simulations (light purple line). Third, assumptions about the productivity of public capital have a high impact on estimates <sup>(21)</sup>. While sizeable effects

<sup>(19)</sup> The simulations do *not* take into account reductions in risk premia or positive confidence effects (as discussed above in Section I.2), which could further increase the growth effects of NGEU. For additional details on the transmission mechanisms captured in the model, see Pfeiffer et al. (2021).

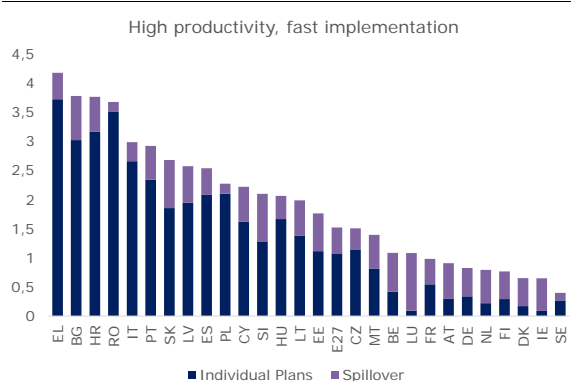
<sup>(20)</sup> The effective (zero) lower bound is assumed to hold for six quarters.

<sup>(21)</sup> This low productivity calibration applies a reduced output elasticity of 0.05 (compared to 0.12 in the high productivity case),



remain even under more pessimistic assumptions, the growth impact appears substantially lower when public investment is allocated to less productive uses (dashed line). This result is particularly visible in the medium to long term when the productivity effects unfold. Because the output effects in this simulation are smaller in each cluster, lower spillover effects imply a further reduction in the overall impact on growth. This underlines the importance of the focus on high-quality investment.

Graph I.11: Peak annual GDP effects of NGEU (%) across Member States – Four year profile



(1) The graph shows peak effects on real GDP in 2024 expressed in per-cent deviation from a no-policy change baseline for a fast NGEU profile spanning 2021 to 2024 under the assumption of high productivity. The dark bars show simulation results for a standalone investment stimulus in each Member State (NGEU). The spillover (light bars) is defined as the difference between the coordinated simultaneous NGEU stimulus in all Member States and the standalone simulations of national plans.

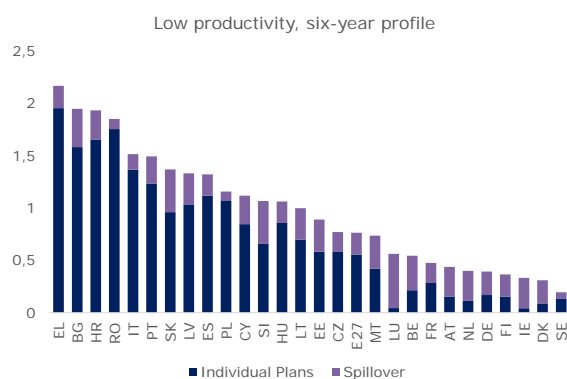
Source: Pfeiffer et al. (2021).

Breaking down the GDP effects into direct effects and spillover effects reveals strikingly different patterns across the Member States, as displayed in Graph I.11 and I.12. By design, NGEU strongly supports convergence within the EU economy, thereby counteracting the divergences that the COVID-19 crisis risks unleashing. Given the allocation key, the strongest growth effects appear in economies with below-average GDP per capita, and those hit hardest by the crisis. For example, using the model for a four-year stimulus with high productivity, the expected annual output gains peak in 2024 at more than 4% in Greece, around 3<sup>3</sup>/<sub>4</sub>% in Bulgaria, Croatia and Romania, and around 3% in Italy and Portugal. For these countries, the

in line with the lower bound considered in Leeper, E., Todd B. W., and Yang, S. S.Y. (2010), *ibid*.

relative role of spillover effects is smaller (light bars) because their main trading partners receive smaller allocations and/or their economies tend to be less integrated into international value chains and trade networks.

Graph I.12: Peak annual GDP effects of NGEU (%) across Member States – Six year profile



(1) The graph shows peak effects on real GDP in 2026 expressed in per cent deviation from a no-policy change baseline for a NGEU profile spanning six-years under low productivity. The dark bars show results for a stand-alone investment stimulus in each Member State (NGEU). The spillover (light bars) is defined as the difference of the coordinated simultaneous NGEU stimulus in all Member States and the standalone simulations of national plans.

Source: Pfeiffer et al. (2021).

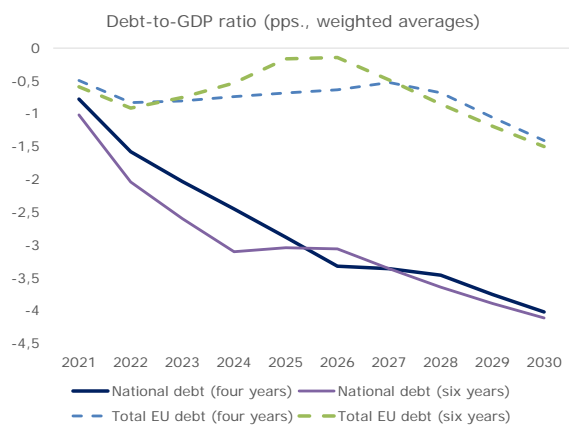
In addition to the direct benefits from their own national allocations of funding, countries will also benefit considerably from the effects of NGEU investments made in other Member States, mainly through trade flows and exchange rate movements<sup>(22)</sup>. Spillover effects are central for small open economies with smaller grant allocations. In these cases, the positive effects coming from other Member States' plans account for the bulk of the GDP impact. For some countries, such as Luxembourg and Ireland, positive spillover effects explain almost all of the total impact in the simulations. However, even for larger economies with deep trade integration, such as Germany, spillover effects account for over half of the sizeable GDP effect. As for the EU-wide results, the GDP impact is lower under a low productivity assumption (Graph I.12).

Graph I.13 shows that governments' fiscal positions improve as the growth stimulus increases tax receipts and reduces the need for financial

<sup>(22)</sup> The trade flows in the model are based on a rich trade matrix, highlighting the role of trade openness and specific trade linkages. See also Table 4.2 (p.28) in Pfeiffer et al. (2021).

support to the unemployed. This reduces the national debt ratios over a longer horizon (solid lines).

Graph I.13: Debt dynamics (EU)



(1) This graph reports the debt-to-GDP ratios in percentage point deviation from a no-policy change baseline. The solid (dashed) lines show the average debt ratios abstracting from EU debt (explicitly including EU debt used for grant financing). Note that these stylised model-based debt projections can differ from the Commission's Debt Sustainability Assessment, which follows a different methodology.

Source: Pfeiffer et al. (2021).

The model accounts for EU-wide debt associated with NGEU, but does not incorporate the inter-institutional agreement that this debt will be repaid by new own resources. Instead, the simulations assume that contributions by the Member States (based on GDP shares) to repay NGEU grants are financed by lump-sum taxation. After an initial accumulation, debt gradually falls as higher growth boosts tax revenues. This scenario shows a small kink after the spending phase ends (denominator effect in 2025 and 2027, in respectively the 4 and 6 year scenarios) but debt will then continue to fall. On average, the EU debt ratio is set to fall every year, as shown in Graph I.13<sup>(23)</sup>.

### 1.6. *Effective implementation of reforms may further boost the positive macroeconomic impact of the NGEU*

In sum, the simulations above underline the significant impact of the NGEU and its potential

to lift Europe's economies onto a significantly better recovery path in terms of both GDP and labour market conditions. If implemented as agreed, with a strong focus on high-quality public investment and additionality, the NGEU is expected to significantly increase GDP in the recovery phase. Though it is to give a substantial boost to the recovery in all Member States, the allocation of financial support ensures that the funds will flow to where they are needed the most. At the same time, positive spillover effects are likely to be the highest in small and open economies with smaller grant allocations, supporting growth broadly across the EU. The economic modelling also indicates that high-quality public investment can significantly boost potential output beyond the implementation period, thereby helping to address medium-term challenges such as climate change and digitalisation.

The analysis presented here does not go into country-specific details contained in the national RRP, leaving these important aspects for future research. The modelling framework does not capture the environmental benefits of the green investment either (for example, to promote biodiversity, the use of renewable energy and more energy-efficient buildings). Last, while the simulations cover NGEU investments in a stylised manner, they do not include the positive impact of reforms on potential growth. This is difficult to quantify, but it can be expected to add substantially more to the GDP and employment effects over the long term. In this regard, a model-based benchmarking exercise shows that carrying out reforms that would result in halving the gap vis-a-vis the best performers (measured in terms of structural indicators) could raise GDP substantially in Member States, on average by 11% in 20 years' time. The gains would be higher in Member States that have the most potential to improve, for instance up to 17-18% higher GDP for Italy and Greece in the long run<sup>(24)</sup>. This illustrates that the overall gains from NGEU including reforms could be even higher than the gains shown above, depending on effective implementation of the reforms that Member States have committed to in their Recovery and Resilience plans.

<sup>(23)</sup> The debt dynamics also depend on the assumed financing of the repayments for RRF loans and grants. We assume that a separate EU budget accounts for the new EU-wide debt, with the repayment assumptions discussed above. Accounting for this EU-wide debt explicitly (based on the Member States' GDP shares), there is an increase in the 'overall' debt ratio for some net contributors. See also the details in Pfeiffer et al. (2021).

<sup>(24)</sup> See Varga, J., and in 't Veld, J. (2014). The Potential Growth Impact of Structural Reforms in the EU: A Benchmarking Exercise. *European Economy Economic Papers*, No. 541.