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Four years into NextGenerationEU: what impact on the euro area economy?

With inputs from the Monetary Policy Committee and its sub-committees (Working Group on Forecasting and Working Group on Public Finance)

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Contents

Abstract 2

Non-technical summary 3

1 Introduction 11

2 Taking stock of RRF implementation 12

2.1 RRF borrowing, payments and expenditure 12

Box 1 What can be inferred from country-specific granular information? The case of Italy 30

2.2 RRF-linked structural reforms 32

3 Transmission channels, models and scenarios 43

3.1 Transmission channels 43

3.2 Models and tools used 45

3.3 Assumptions and scenarios 46

4 The impact of the RRF on the euro area economy 48

4.1 Impact on GDP and inflation 49

4.2 Impact on potential output and institutional quality 52

Box 2 The impact of the RRF on institutional quality: a tentative empirical assessment 54

4.3 Impact on public debt and quality of public finance 56

Box 3 The impact of the RRF on the quality of public finances 59

5 Conclusions 63

6 References 65

Abstract

This paper takes stock of the implementation of the NextGenerationEU (NGEU) programme in the euro area four years after its inception, focusing on its principal instrument, the Recovery and Resilience Facility (RRF). The paper provides an updated quantitative assessment of its past and future impact on the euro area economy, using a set of models and scenarios to account for the uncertainty that still surrounds the implementation of this programme. The public expenditures and structural reforms linked to the RRF have the potential to increase the level of euro area gross domestic product (GDP) by around 0.4-0.9% by 2026 and 0.8-1.2% by 2031, depending on capital productivity and the degree of absorption of RRF funds. The contribution of structural reforms to these output effects is expected to increase over time, while the initially prevailing impact of RRF-funded public expenditures fades away. We provide tentative empirical evidence that reforms have started to modestly improve the growth outlook of some euro area Member States by increasing their institutional quality. The expected long-run increase in output is in turn a key factor behind the decline in the government debt ratios we project for the main NGEU beneficiary euro area Member States. At the same time, we estimate that NGEU will have a limited impact on euro area inflation. Compared with previous ECB staff analysis published in 2022, the macroeconomic impact of NGEU, particularly on GDP and government debt ratios, is expected to shift over time due to widespread delays in the implementation of NGEU-linked expenditures and reforms. It is crucial that euro area Member States address implementation challenges over the remaining lifetime of this programme to fully reap its benefits.

JEL codes: C54, E02, E22, E62, F45, H87, O52

Keywords: NGEU; RRF; public investment; structural reforms

Non-technical summary

Four years into the implementation of NGEU, the time has come for an updated assessment of its economic, fiscal and structural effects. Following an initial assessment[1] that ECB staff published shortly after the start of this programme, this paper focuses on the *impact of the RRF – the principal NGEU instrument – on the euro area economy*.[2] Among the euro area countries, particular attention is paid to Italy and Spain as the main recipients of RRF funds in absolute terms.

We provide quantitative estimates[3] of the impact of the RRF on economic activity, inflation, potential output and public debt, as well as on institutional quality and the quality of public finance. Currently, these effects mainly occur through two interconnected channels of transmission of NGEU: (1) the *fiscal channel*, which works through RRF-funded expenditures in each EU Member State (amounting to almost half a trillion euro in the euro area); and (2) the *structural reform channel*, which operates via the national reforms on which RRF payments are conditional. The euro area countries have indeed committed to implementing more than 3,000 "milestones and targets" related to investments, and about 1,700 related to structural reforms.[4] In the short-to-medium run, the expected positive effects of the RRF operate mostly via the fiscal channel, whereas the expected positive longer-term effects mainly arise through the reform channel.[5] The reforms are, overall, more frontloaded than the investments. This frontloading is designed to enhance the effectiveness of RRF funding, while also underscoring its conditional nature.

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1 See Bańkowski et al. (2022).

2 Three main matters fall outside the scope of this paper. First, we do not include the effects of NGEU on the EU Member States outside the euro area. Second, we do not provide a qualitative assessment of the progress made in the attainment of the RRF's general objectives, identified in Article 4 of Regulation (EU) 2021/241 of the European Parliament and of the Council of 12 February 2021 establishing the Recovery and Resilience Facility (OJ L 57, 18.2.2021, p. 17), known as the RRF Regulation. Third, we do not elaborate on the legislative, procedural, governance-related and political economy aspects of NGEU. Please see European Commission (2024a) and European Commission (2024c), where all these matters are addressed.

3 The cut-off date for the quantitative estimates in this paper is 26 August 2024, unless otherwise specified.

4 Each RRF disbursement is subject to the completion of a fixed set of qualitative milestones and quantitative targets, which reflect the reform and investment objectives identified in the Recovery and Resilience Plans of the Member States. This ensures progress in the implementation of the plans, but also means that any delay in one or more milestones or targets might delay an entire payment request or lead to the suspension of part of the payment. It should be noted that, while there are milestones and targets that only mark the start of a project, the majority track implementation, meaning that they follow implementation rather than precede it.

5 In Bańkowski et al. (2022) we also assessed a "confidence" or "risk premium" channel. This third channel played a key role in the early months of the COVID-19 pandemic, i.e. immediately after the NGEU initiative was announced in the spring of 2020. Together with the Pandemic Emergency Purchase Programme (PEPP) and the other measures taken by the European Central Bank (ECB) in 2020 – on top of the national fiscal policy responses adopted at that time – the announcement of NGEU was the "game changer" that restored confidence in the most vulnerable euro area economies. In the wake of the pandemic shock, these economies were recording sizeable net portfolio outflows and widening sovereign bond spreads. While the PEPP played a crucial role in stabilising financial markets after its launch on 18 March 2020, the Franco-German initiative of 18 May 2020, which was the forerunner of NGEU, contributed to a significant decline in the sovereign bond yields of vulnerable economies in the euro area. Other, less important channels are discussed in Section 3.1 of this paper.

Our estimates cover both the realised outcomes of the investments and reforms already implemented and those still projected. This means that, taking into account the lagged effects of investments and reforms on the economy, our estimates stretch until 2031-33, i.e. well beyond the lifetime of the RRF, which is scheduled to expire in 2026.

During the first half of the six-year implementation period of the programme (2021-26), the estimated impact of RRF-funded expenditures on euro area GDP fell short of expectations. By 2023, the RRF is estimated to have added between 0.1% and 0.2% annually to the GDP level of the euro area, compared with around 0.5% initially expected, assuming the timely execution of the original national Recovery and Resilience Plans (RRPs).

This was due to a combination of several factors, of which two stand out: (i) shortcomings in the administrative capacity of national and/or local governments and (ii) the amendment or downscaling of RRF-related procurement contracts in response to the supply-side bottlenecks and higher inflation that materialised after major external shocks.[6] These factors led Member States to revise their RRPs during 2023 and 2024. Since this phase of major RRP modifications is by now virtually over, the European Commission, in its latest Annual Report on the implementation of the RRF, published in October 2024, was positive about expectations of an acceleration in the implementation of the RRPs going forward.[7]

Looking ahead, although we are halfway through the life cycle of the RRF, the midpoint in terms of its economic impact is still several years away. About half of the RRF fund entitlements have not yet been disbursed to euro area countries and many countries still have to implement more than half of their planned reform measures. While the potential impact on the euro area economy is still estimated to be significant, it is also uncertain and subject to the interplay of several factors.

On the positive side, the implementation of the EU's country-specific recommendations (CSRs) has improved since the RRF's inception in 2021. This suggests that the RRF has been instrumental in incentivising structural reforms that are aligned with the CSRs. In this respect, structural reforms could be expected to offer synergies with the planned investments in the coming years.

From a public expenditure perspective, RRF spending is gaining traction and most of it is additive in nature. While it took time to revise the RRPs and define the procurement procedures and each single call for tenders or grants to be allocated to RRF-spending entities, this preparatory phase is largely over in the euro area.

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6 Delays were also due to the need to integrate REPowerEU chapters in the RRPs, the underestimation of the time needed to implement certain measures and uncertainties regarding implementation rules (such as the "do no significant harm" principle).

7 As European Commission (2024c) illustrates, by end-August 2024 just over 40% of the available RRF funds had been disbursed to EU Member States. If the current pace is maintained, the Commission expects to have disbursed more than EUR 300 billion by the end of 2024. 85% of the milestones and targets due by the first quarter of 2024 have either been assessed by the Commission as fulfilled or self-reported by Member States as completed. Milestones and targets that are due to be completed between Q2 2024 and Q1 2025 have mostly been reported as "on track", with 9% of them reported as "delayed".

Moreover, about four-fifths of RRF-funded expenditure in the euro area is deemed to be "additive" in nature. This means that in most countries it provides a genuine boost to GDP and does not merely substitute national funding of projects that would have been carried out in any case. The bulk of these funds is expected to be spent by 2026, with output effects unfolding over a time horizon that will extend well beyond that year.

Most importantly, around 70% of total RRF expenditure in the euro area consists of government investment and capital transfers with relatively higher fiscal multipliers. During the period 2024-26, such government capital spending in the euro area is projected to add 1.6 percentage points cumulatively to the ratio of gross fixed capital formation over GDP. Country-specific studies using more granular information also point to an acceleration in the implementation of the national RRPs since the completion of their revision in 2023-24 (see Box 1 for the case of Italy), and suggest that RRF-related public tenders have positively affected firm-level private investment.[8]

At the same time, implementation risks remain. The positive effects of NGEU on the euro area economy will only materialise as anticipated if RRF funds are spent in full and all reforms are implemented, with sufficient focus on quality. In this context, the possible materialisation of the following risks calls for caution when anticipating the economic effects of NGEU:

- **First, a lack of administrative capacity.** As discussed in European Commission (2024a), the first, and possibly most important, risk arises from the persistence of institutional constraints in (some segments of) the public administration, ranging from unreasonably complex procedures to human resource bottlenecks that impinge on the ability to effectively implement investments and reforms. One case in point is the actual spending capacity of certain entities to which the RRF funds have been assigned. For example, the local authorities in some of the less advanced regions of the euro area may be more likely to spend the funds too slowly or inefficiently. In this case, adequate technical assistance and controls in the years ahead may be warranted and helpful.

- **Second, incomplete or ineffective implementation.** To reap all of the benefits of the programme, ambitious and decisive implementation efforts are still required. Incomplete implementation may arise if Member States fail to implement all the agreed milestones and targets by August 2026. At the same time, it is key that Member States prioritise quality of implementation over speed. If they were to "rush through" any projects, the RRF's effectiveness might be undermined.

- **Third, the emergence of major new shocks.** This may complicate the roll-out of the RRPs. The first four years of the RRF have shown that it is costly to modify national investment and reform plans in response to major unforeseen developments. The energy crisis is a case in point. In the event of further

8 See González, Khametshin and Veiga (2025, forthcoming).

economic shocks in the remaining lifespan of the RRF, the euro area countries would either have to use scarce administrative resources to modify the national plans, or risk the plans no longer being aligned with actual reform and investment needs. Moreover, such shocks might pose new challenges for the implementation of the existing RRPs: for example, investment projects might become more costly or supply-side bottlenecks might again occur.

These risks and the related uncertainties are reflected in our analysis of the effects of the RRF on the euro area economy. *First*, to make the results more robust, we use and compare two distinct macroeconomic models: a large-scale dynamic stochastic general equilibrium (DSGE) model with forward-looking rational expectations, and a semi-structural model with backward-looking expectations. *Second*, we implement different fiscal multipliers to different RRF-funded expenditure items, in keeping with the existing economic literature. *Third*, we account not only for a scenario characterised by a high degree of spending of the RRF funds in the residual lifetime of NGEU, but also for the possibility that the absorption of such funds continues to be as low as in 2021-23. *Fourth*, we assume different possible scenarios for capital productivity: a central scenario with medium productivity, and two corner scenarios with high and low productivity. *Fifth*, we complement the findings in our models with qualitative assessments of the risks surrounding our estimates.

To quantify the impact of RRF-funded expenditures via the fiscal channel, we use a unique dataset developed by the Working Group on Public Finance (WGPF) of the European System of Central Banks (ESCB). This dataset captures the time profile of RRF-funded expenditure and its composition, as well as how much such expenditure adds to, or merely substitutes, already planned expenditure.

Based on this methodology and data, we estimate that RRF-funded expenditure will increase the level of euro area GDP via the fiscal channel by between 0.3% and 0.8% in the period to 2026, and between 0.2% and 0.6% in the period to 2031. The output effects in Italy and Spain are, however, significantly larger: for the period to 2026, they are 1.3-1.9% in Italy and 1.2-1.7% in Spain. The substantial effects in these two countries are primarily due to the fact that RRF-funded expenditure makes up a high proportion of overall GDP. It should also be noted that similarly marked effects can be found in some of the smaller euro area countries, such as Greece and Croatia.

Regarding euro area inflation, the expected effects of RRF-funded expenditure look rather limited – in the order of a 0.1 percentage point deviation at its peak, compared to the non-NGEU baseline – and their timing uncertain. The findings depend very much on the model and assumptions used, ranging from an initial, limited pick-up in inflation, which then swiftly eases and even enters slightly negative territory, to a gradual, protracted, but very small increase in inflation. Ultimately, they depend on the extent of the disinflationary pressures arising from the impact of RRF-funded investment on productive capacity, as well as the possibility of expenditure becoming very concentrated over short periods of time – a phenomenon that may play a role in the next two years.

Turning to the potential output of the euro area, updated Eurosystem estimates suggest that NGEU will have a positive impact. NGEU is projected to increase the potential output of the euro area by 1.3% by 2033 and boost potential growth by 0.10-0.15 percentage points per annum in the period to 2020-33. Importantly, the NGEU-induced potential output gains projected in the Eurosystem baseline scenario are subject to increased downside risks due to observed delays in the implementation of the national plans. As noted above, these delays – combined with the fixed end date of the RRF in August 2026 – may be a contributing factor in the ineffective or incomplete implementation of the national plans in the remaining two years of the programme. The potential output effects will thus crucially depend on the policy response over the next two years, most notably the ability of Member States to accelerate the implementation of their RRPs.

All in all, combining the fiscal and structural channels of transmission of the RRF to the economy, we find a percentage increase in euro area GDP of between 0.4% and 0.9% in the period to 2026 and between 0.8% and 1.2% in the period to 2031, when compared with a counterfactual scenario without NGEU (see Table A).

Table A

Estimated total impact of the RRF on euro area GDP and inflation

	Impact on GDP (percentage deviation from the non-NGEU baseline)		Impact on inflation (pp deviation from the non-NGEU baseline)
	Up to 2026	Up to 2031	
Fiscal measures	0.3 to 0.8	0.2 to 0.6	0.1
Structural reforms	0.1	0.6	-
Combined results	**0.4 to 0.9**	**0.8 to 1.2**	-

Sources: ECB staff and Eurosystem.
Notes: ECB estimates based on the EAGLE (Euro Area and Global Economy) model and the ECB-MC (Multi-Country) model. The estimates on the structural channel are taken from the national central banks of the Eurosystem. The estimates reported in ranges depend on the assumptions made with regard to (i) capital productivity (medium, high and low) and (ii) the high vs low absorption of RRF funds.

The findings shown in Table A contrast with the more optimistic estimate at the start of NGEU of a GDP increase of up to 1.5% already by 2026 – and this, although the nominal amount of RRF funds that is now expected to be used in the euro area is higher by about €80bn. The difference between the two estimates depends on four factors compared with the previous paper: (1) the aforementioned delays in the implementation of the RRPs, which lead to a temporal extension of the output estimates; (2) a reallocation of part of RRF-funded expenditure to items with lower multipliers, such as loans to the private sector and equity injections; (3) an erosion in the real value of the stimulus caused by the unanticipated inflationary

shock, which occurred after the inception of the programme; (4) accounting for the monetary policy response to such inflation shock[9].

Overall, the revisions to – and temporal extension of – the output estimates constitute more of a reprofiling, rather than a fundamental reassessment, of the long-run effectiveness of NGEU. The programme's real value holds approximately stable through concurrent increases in the price level and in nominal RRF-related grants financing investment in the euro area countries.

The effects of the RRF on government debt ratios are estimated to be favourable and significant, especially for the main beneficiary countries. They operate via four main channels:

(1) A *direct channel* with two opposite effects: (i) a favourable effect over the period of analysis through the RRF grant component (recorded as revenue, with a significant impact on the budget balance of the main beneficiary countries) and (ii) a debt-increasing effect via the additive RRF loans. The latter is the only debt-increasing factor, albeit with a lower marginal cost than if the individual countries, especially the high-debt ones, were to finance themselves on the market.

(2) The *demand-driven stimulative impact of the RRF on the economy*, which leads to higher revenues and a higher denominator in the public debt ratio.

(3) The *effects on the supply side*, i.e. on potential GDP due to investment and reforms.

(4) A *confidence channel* via lower sovereign risk premia and, therefore, lower financing costs.

For both Italy and Spain, the overall debt-reducing impact of the RRF is estimated at around 7-8 percentage points by 2031 in the central scenario, assuming medium capital productivity and high absorption of the funds in the next two years. A low absorption scenario, in turn, emphasises the importance of the full use of RRF funds, including from the perspective of maximising their beneficial impact on public debt.

On top of these macroeconomic effects, there are also tentative signs of modest RRF-induced improvements in the quality of institutions in certain

9 At the time when the previous paper was finalised – Bańkowski et al. (2022), published at end-February 2022 – euro area countries had requested about €401 billion. However, the Netherlands had not yet submitted its RRP; adding this country, the total is around **€406.5 billion**. It was assumed that all these funds would have been spent by the end of 2026. This compares with total RRF *requests* for €532 billion in this paper. The difference is due to: (i) Croatia becoming part of the euro area in January 2023; (ii) new RRF loans requested in the meantime by some euro area countries; (iii) additional RRF grants under the Emissions Trading System (ETS) and transfers from the Brexit Adjustment Reserve, which were made available to the Member States with Regulation No. 2023/435; (iv) an additional allocation of RRF funds to euro area countries due to a change in GDP weights. The right comparison with the previous paper, however, is with **€486 billion** in this paper. The discrepancy between the RRF funds allocated to the euro area countries (€532bn) and the RRF funds estimated to be *spent* (€486bn) is due to the fact that in a few countries the loan entitlements are expected not to be used in full. Out of the difference of about **€80bn** between the 2022 and the 2024 papers: (i) €49 billion have in the meantime been allocated to loans to the private sector and equity injections, with multipliers that are assumed to be only slightly above zero; (ii) the remaining €31bn, which translates into 10% of the nominal NGEU investment spending, broadly equals the erosion of NGEU funds by the unanticipated inflationary shock.

countries, which are expected to be an important factor in the effectiveness of EU funds, productivity growth and potential output growth in the long run. While the impact of the RRF on potential output will take time to fully unfold, some effects can already be tentatively observed, empirically, in the early stages of the transmission chain, mainly in the indicators of institutional quality. Improvements in institutional quality can be expected to boost potential output in the long run, most notably by promoting productivity-enhancing investment and innovation in the private sector, as well as public trust and acceptance of the capacity of institutions to ensure the efficient and effective use of allocated funds. ECB staff estimates based on data in the period to 2022 suggest a positive, albeit modest, impact of the RRF on institutional quality in some beneficiary countries, particularly in Italy as the main beneficiary, subject to high statistical uncertainty. The institutional improvements caused by the RRF in the period to 2022 may be expected to provide a small boost to potential output growth in the long run – of up to 0.15 percentage points in Italy.

The RRF also seems to be driving some improvement in the quality of national public finances. Preliminary evidence on the composition of public expenditure in the main beneficiary countries suggests that the implementation of the programme has produced a shift towards items with relatively stronger effects on GDP growth, such as renewable energy, charging stations for electric vehicles, digitalisation of small and medium-sized enterprises (SMEs) and artificial intelligence.

The RRF also provides an important contribution to the EU's green and digital transitions. In the euro area, the shares of RRF expenditure dedicated to the green and digital transitions are 42% and 26%, respectively (although the proportions vary significantly across countries). This is well above the minimum thresholds envisaged by the RRF Regulation (37% and 20%, respectively). Looking at the EU as a whole, the RRF is projected to cover around one-quarter of the additional public funding needs estimated for the decade 2021-30 for green and digital investment (where "additional" is defined as the difference between total investment needs and historical averages). Including private sector investment, this accounts for 6% of the total estimated green and digital investment needs.

NGEU-related borrowing is another crucial aspect reviewed in this paper. The NGEU programme has led to a substantial increase in EU issuance of long-term bonds and bills, which has enhanced the Commission's role among supranational issuers. As of the end of May 2024, EU debt of more than €320 billion had been issued by the European Commission to finance NGEU.[10] Given the available budgetary safeguards, there is no material risk of the EU defaulting on its NGEU debt, which will be repaid either through new EU own resources or higher own resources based on the gross national income (GNI) of EU Member States, both of which are sufficient in size. At the same time, the relative burden of NGEU repayment across Member States will differ depending on how NGEU grants are repaid.

[10] It should be noted that the Commission has moved to a unified funding approach, with a central pool from which the various EU policy programmes are funded. By the end of August 2024, the total amount of EU outstanding bonds stood at €531.4 billion.

In conclusion, it is up to the euro area countries (and other EU Member States) to enhance the implementation of their NGEU-linked investments and reforms through targeted policy action. Governments may redirect administrative resources, make more intensive use of the EU's Technical Support Instrument and identify targeted regulatory changes that would facilitate the roll-out of their NGEU projects. Such corrective policy measures might alleviate the trade-off between the speed and quality of plan execution in the remaining part of the NGEU's envisaged lifespan. More generally, such policy efforts are vital to ensure that NGEU can unlock its transformative potential and thus act as a catalyst for the modernisation and economic convergence of the euro area economies.

1 Introduction

This paper provides an updated ECB staff assessment of the impact on the euro area economy of the NGEU RRF.[11] It is based on previous ECB analysis[12] and the mid-term evaluation of the RRF published by the European Commission in February 2024.[13]

The paper is structured as follows:

- *Chapter* 2 takes stock of the implementation of the RRF since it started in 2021 – with a cut-off date 26 August 2024, if not otherwise specified – and assesses its prospective implementation until it expires in 2026. Section 2.1 reviews NGEU borrowing and RRF payments and provides an in-depth examination of the size, time profile and composition of RRF-funded public expenditure. Section 2.2 centres on RRF-linked structural reforms, their implementation and the related challenges. More granular evidence pertaining to the implementation of the RRF in Italy is provided in **Box 1**.
- *Chapter 3* presents the methodology used to estimate the economic, fiscal and structural impact of the RRF in the euro area. This includes a discussion of the transmission channels (Section 3.1), the models used (Section 3.2) and the underlying assumptions and scenarios (Section 3.3).
- *Chapter 4* provides quantitative estimates of the impact of the RRF on GDP and inflation (Section 4.1), potential output (Section 4.2), public debt (Section 4.3), institutional quality and the effectiveness of EU funds (Section 4.4 and **Box 2**) and the quality of public finances (**Box 3**). Section 4.4 ends by reporting estimates of the overall impact of the RRF on the euro area, including a comparison with the estimates released in the early stages of the RRF.
- Finally, *Chapter 5* contains the conclusion.

11 The other NGEU instruments are React EU, Just Transition Fund, Rural Development, Invest EU, Horizon Europe and rescEU.

12 See Bańkowski et al. (2022), Freier et al. (2022) and Dorrucci and Freier (2023).

13 See European Commission (2024a).

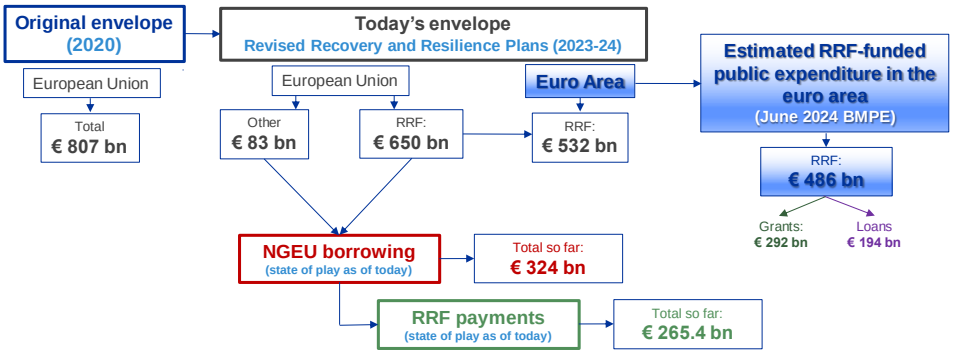
2 Taking stock of RRF implementation

2.1 RRF borrowing, payments and expenditure

This section uses two main data sources to take stock of the RRF implementation. *First*, it benefits from an original, comprehensive dataset of the WGPF of the ESCB. This dataset captures: (i) the time profile of RRF-funded expenditure (and, therefore, the extent to which expenditure is being backloaded compared with the original plans); (ii) the composition of the expenditure; and (iii) an assessment by WGPF members of whether the RRF-funded expenditure adds to investment or substitutes investments that would have taken place in any case. This database also serves as input for the quantitative estimates of the RRF's economic impact presented in Chapter 4. *Second*, we use data published by the European Commission on (i) allocated grants and loans according to the revised national RRPs, (ii) disbursements of funding to the Member States and (iii) NGEU supranational borrowing.[14]

The key figures to bear in mind regarding the fiscal channel of transmission of the RRF to the euro area economy are illustrated in Chart 1.

Chart 1
Key NGEU and RRF figures as of end-August 2024



Sources: European Commission and WGPF of the ESCB; Broad Macroeconomic Projections (BMPE) of the Eurosystem (June 2024).
Note: The cut-off date in this chart is 26 August 2024.

The original budget set aside to fund NGEU amounted to almost €807 billion for the EU as a whole. Of the seven NGEU programmes listed in footnote 11, the RRF is by far the largest, accounting for almost €724 billion or 90% of the total envelope. It was able to provide funding to EU Member States in the form of grants of up to €338 billion and loans of up to close to €386 billion. The euro area, on which this paper focuses, was expected to absorb 81% of the requested RRF funds, compared with 19% for non-euro area countries (see Bańkowski et al. (2022) for further details).

14 While these data sources are complementary, the WGPF estimates of actual spending differ slightly from the officially allocated funding.

The EU Member States have applied for €650 billion in RRF funds. While all EU Member States requested the RRF grants in full, several countries chose not to apply for RRF loans, or requested less than they were entitled to ask for by the deadline of August 2023. Moreover, the envelope itself was subsequently revised.[15] As a result, as of 26 August 2024, the EU Member States have applied for €650 billion in RRF funds – or 4.6% of 2019 EU GDP – to which the other six NGEU programmes (totalling €83 billion) should be added.

In order to disburse these funds, by the cut-off date of this paper (26 August 2024), the Commission had already borrowed more than €320 billion, of which €265.4 billion was paid to the Member States after their satisfactory fulfilment of the qualitative milestones and quantitative targets for the completion of the reforms and investments associated with each tranche of the RRF. This means that, at that date, around 60% (50%) of RRF grants and loans had not yet been paid to the EU (euro area) Member States.

Focusing on the euro area, the member countries are entitled to use RRF funds of up to €532 billion, i.e. 82% of the EU total of €650 billion (**Chart 1**; see **Table 1** for details). Of this amount, it is estimated that slightly less – €486 billion – will be *actually spent*.[16]

It is based on this latter figure – almost half a trillion in RRF-funded public expenditure – that this paper builds estimates of the macroeconomic impact of the RRF on the euro area via the fiscal channel.

2.1.1 RRF entitlements after the revision of the Recovery and Resilience Plans

It should be recalled that, in 2021-22, the allocation of non-repayable RRF support in the form of grants was calculated based on two methodologies. Both considered population size and inverse GDP per capita. For 70% of the grants to be made available until 31 December 2022, the allocation key included the average unemployment rate between 2015 and 2019. For 30% of the grants to be made available in 2023, the methodology took account of the change in real GDP in 2020 and the aggregated change for 2020 and 2021. As this calculation used GDP data from the Commission forecast of autumn 2020, it was set to be updated with actual outcomes by June 2022. For Member States that had a comparatively better than forecast outcome in 2020 and 2021, the maximum value of grants subsequently decreased, while it increased for others.

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15 The revisions included additional grants under the Emissions Trading System (ETS) and transfers from the Brexit Adjustment Reserve, for a total of €20 billion and €2 billion respectively.

16 Estimate by the Working Group on Public Finance (WGPF) of the European System of Central Banks (ESCB). The discrepancy between the RRF funds allocated to the euro area countries and the estimated RRF funds they will spend reflects the fact that, for a few countries, full use of the loan entitlements is not expected. As a result, RRF expenditure in the euro area is expected to be funded by €295 billion in grants (the discrepancy with the WGPF estimate is mainly due to the subsequent inclusion of an REPowerEU chapter in Germany's RRP) and €194 billion in loans, although countries may use up to €237 billion in loans, as shown in Table 1.

The maximum available loan was in turn calculated as 6.8% of the Member States' GNI in 2019. In the euro area, Italy and Greece requested the maximum loan in their original national plans, while Cyprus, Portugal and Slovenia requested lower proportions.

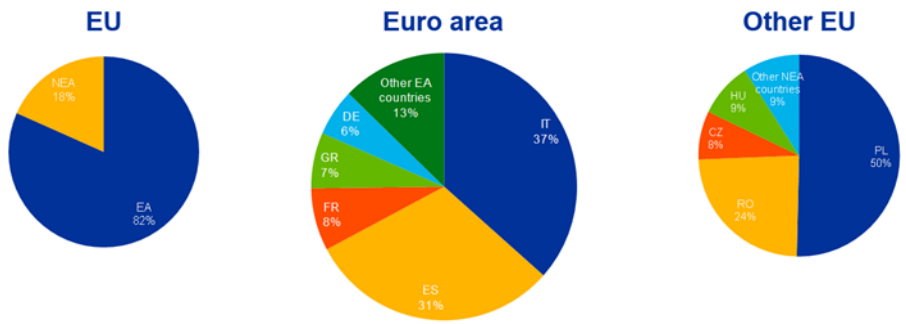
In December 2022, Member States started to submit modified RRPs to the Commission. Modifications could have different purposes. If Member States found that the successful implementation of some milestones and targets was no longer achievable due to objective circumstances within the expected timeline, they could remove such milestones and targets or replace them with alternative measures. Moreover, modifications could reflect a change in the maximum contribution through grants, the requesting of additional RRF loans and/or the introduction of REPowerEU chapters. In February 2023, the RRF Regulation was indeed revised to account for the new REPowerEU instrument, set up in response to Russia's war against Ukraine, in order to strengthen the resilience and security of the energy system in the EU, decrease dependency on fossil fuels and increase the proportion of sustainable energy sources.

RRF entitlements have been redistributed across euro area countries since the revision of the RRPs in 2023-24, with more than two-thirds of euro area RRF funds being absorbed by Italy and Spain. As mentioned above, the available RRF grants were requested in full. In the update of the distribution of grants in June 2022, the available support for the euro area increased by a total of €5 billion, which was reallocated from non-euro area to euro area countries. Under the original RRPs, EU Member States had applied for €165 billion in loans, including €139 billion for countries in the euro area. By August 2023, the revised RRPs included additional loans amounting to €126 billion in the EU, and €98 billion in the euro area. While Italy and Spain are the main beneficiaries of RRF funds in the euro area, approved contributions to Poland and Romania amount in total to three-quarters of non-euro area resources (**Chart 2**).

Chart 2

Allocation of requested RRF funds across euro area countries and other EU Member States (2024)

(percentages)



Source: European Commission.
Notes: Revised RRPs, including funding through (i) transfers from countries' Brexit Adjustment Reserves, (ii) revenue from the Emissions Trading System and (iii) repurposed loans.

Nine euro area countries requested loans by the deadline of August 2023; among the largest economies, Italy and Spain applied, whereas Germany, France and the Netherlands did not. To date, REPowerEU chapters in the euro area amount to €31.8 billion (**Table 1**).[17] As of September 2024, all euro area countries had revised their RRPs to include REPowerEU chapters, utilising €13.6 billion of Emissions Trading System (ETS) funds.[18] Transfers from the Brexit Adjustment Reserve to the RRF are adding an additional €1.8 billion of financing for the euro area.

While, according to the RRF Regulation, at least 37% (20%) of RRF-funded expenditures must contribute to climate (digital) objectives, most countries have significantly outperformed these thresholds. The largest RRF beneficiaries tend to present relatively smaller proportions of the climate and digital targets and relatively higher proportions of other general objectives designed to increase their economic and social resilience (**Table 1**).

Table 1

Allocation of RRF funds that euro area countries are entitled to use (2024)

(€ billion; percentages)

	RRF funds (€ billion)				Composition of RRF-funded expenditure plans (percentages)		
	Total	Grants	Loans	REPower EU chapters	Green transition	Digital transition	Economic/social resilience, other
Belgium	5.30	5.03	0.26	0.73	49.2	27.0	23.8
Cyprus	1.22	1.02	0.20	0.10	45.0	24.6	30.4
Spain	163.01	79.85	83.16	6.92	39.9	25.9	34.2
Estonia	0.95	0.95	-	0.09	59.4	24.1	16.5
Finland	1.95	1.95	-	0.13	52.3	28.9	18.8
France	40.27	40.27	-	2.82	49.5	21.6	28.8
Germany	30.32	30.32	-	2.44	47.0	47.5	5.5
Greece	35.95	18.22	17.73	0.79	38.1	22.1	39.8
Croatia	10.04	5.79	4.25	2.93	39.0	20.1	40.9
Ireland	1.15	1.15	-	0.24	42.0	34.2	23.8
Italy	194.38	71.78	122.60	11.18	41.3	25.6	33.1
Latvia	1.97	1.97	-	0.13	41.5	23.0	35.5
Lithuania	3.85	2.30	1.55	0.75	37.3	23.3	39.4
Luxembourg	0.24	0.24	-	0.16	68.8	29.6	1.5
Malta	0.33	0.33	-	0.07	68.8	26.2	5.0
Netherlands	5.44	5.44	-	0.73	54.9	25.6	19.5
Austria	3.96	3.96	-	0.21	55.7	36.0	8.3
Portugal	22.22	16.33	5.89	0.86	41.2	21.1	37.7
Slovenia	2.69	1.61	1.07	0.12	48.9	20.0	31.1
Slovakia	6.41	6.41	-	0.40	47.7	20.5	31.8
TOTAL EURO AREA	531.65	294.93	236.72	31.80			

Source: European Commission.
Notes: Revised RRPs, including funding through (i) transfers from countries' Brexit Adjustment Reserves, (ii) revenue from the ETS and (iii) repurposed loans. "Total" is the sum of grants and loans. The funding allocated to the new REPowerEU chapters includes both grants and loans. "Economic/social resilience, other" should be understood as a residual category.

The take-up of RRF loans increased during 2023. Notably, Spain submitted a modified RRP in June 2023 to request €83 billion of loans, which is close to the available maximum.[19] The loans to Greece and Croatia somewhat exceeded the

17 REPowerEU chapters are mostly financed via additional loans, revenues from the Emissions Trading System (ETS) and transfers from the Brexit Adjustment Reserve.

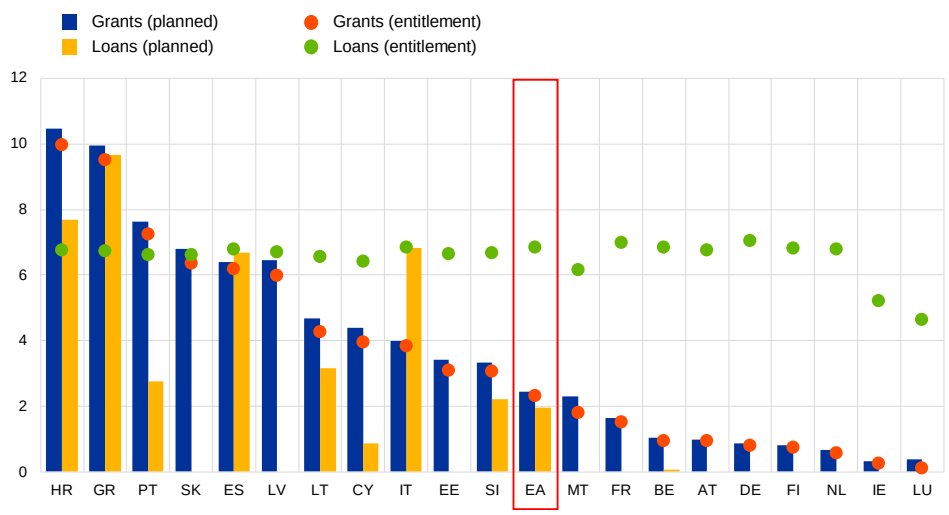
18 The calculation for the allocation key of the ETS revenues considers population size, inverse GDP per capita, the gross fixed capital formation price deflator and the proportion of fossil fuels in gross inland energy consumption.

19 A large proportion of these loans is intended to support small and medium-sized enterprises. Moreover, the funding is intended to be used for new investment measures to foster growth in Spain's microelectronics and semiconductors industry.

threshold of 6.8% of GNI, for reasons that the Council endorsed.[20] Nevertheless, several countries have preferred not to use or to make partial use of the loans, as shown in **Chart 3**.

Chart 3

RRF grants and loans allocated to euro area countries: entitlements vs amounts planned in the revised Recovery and Resilience Plans



Source: European Commission.
Notes: "Entitlements" refer to the updated maximum amount of RRF grants and loans that each Member State may use, as specified in the update of the maximum financial contribution of the European Commission in June 2022. "Planned" refers to the amounts specified by each Member State in its revised RRP. Loans may exceed entitlements if requests can be justified by exceptional circumstances. Grants are higher than the entitlements for a few countries due to the added REPowerEU chapters.

2.1.2 NGEU borrowing and repayments

The implementation of the RRF allowed for joint borrowing and risk sharing among Member States. This is particularly the case for the grant component. As the grants are intended to be repaid through the EU budget, they do not add to national debt, resulting in a limited perception of the associated costs. Our analysis indicates that, while repayment risks are minimal owing to the budgetary safeguards in place, the burden of repayment will ultimately fall almost entirely on Member States, and the incidence and the redistribution of this burden across countries remains uncertain.

Borrowing

While the Commission has been borrowing from international capital markets for decades to support EU policy programmes, the volume of Commission issuance increased massively only with the implementation of NGEU (ECB

[20] The Council acknowledged that Greece faced higher financing costs than other euro area Member States following the substantial increase in interest rates. For Croatia, the higher amount of loans offsets a downwards adjustment of €785 million in available grants. Measures targeting transport, water management and education that were initially financed by grants are now financed by loans.

2024). Between January 2020 and May 2024, the Commission's net issuance reached almost €500 billion, primarily for NGEU, surpassing other EU entities, such as the European Stability Mechanism (ESM) and the European Investment Bank (EIB) (**Chart 4**). This large-scale borrowing will continue until the end of 2026, with an estimated issuance of about €75 billion per semester. After 2026, the Commission will cease issuing new NGEU debt and focus instead on regular liquidity management operations and rolling over maturing debt, with the aim of smoothing financing needs until 2058, when repayment has to be completed. For the time being, any expected further issuance is limited to existing or potential future EU programmes other than NGEU (e.g. the Ukraine Facility and the Reform and Growth Facility for the Western Balkans).

In recent years, the Commission has developed a comprehensive risk management framework for its NGEU debt management operations, enhancing its position as a leading supranational issuer. Between 2020 and 2023, the total EU issuance ranking improved from seventeenth to seventh within the European Union. Since 2021, the Commission's annual bond issuance has consistently exceeded that of Belgium, the Netherlands and Austria, and by early 2024 it had reached levels comparable to Spain. However, its issuance volume remains considerably lower than that of the three largest euro area economies (**Chart 5A**).

The EU's bond yields remain higher than that of other AAA-rated sovereigns, aligning more closely with other EU supranational issuers. The EU is now active along the entire yield curve, extending maturities to up to 30 years (**Chart 5B**). Before 2022, the EU bond yield curve generally mirrored that of France, though with some volatility. In the wake of the monetary policy tightening cycle, supranational bonds were less affected by scarcity effects than sovereign bonds, causing EU bond yields to rise disproportionately compared with French bonds, with the spread between the two only narrowing close to zero in March 2024. This trend reflects patterns also seen for other EU supranational issuers. More recently, due to political instability in France, the EU yield curve has dipped below the French yield curve for longer maturities.

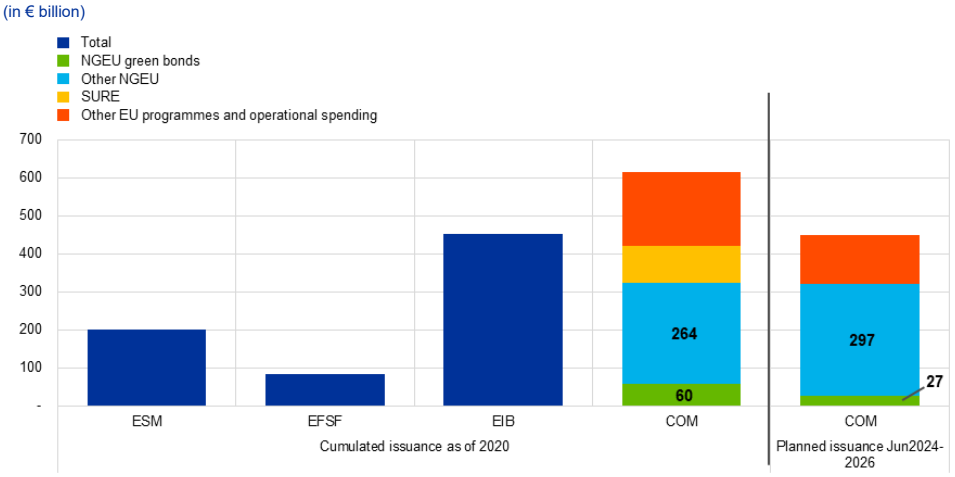
Despite progress, EU bonds are still not on par with major European government bonds (EGBs). Despite their favourable ratings, EU bonds are generally not yet considered safe assets (Bletzinger et al., 2022). Research and investor surveys highlight key concerns such as limited liquidity in the secondary market, largely due to the EU's lower outstanding debt volume, the exclusion from "sovereign indices", the temporary nature of the NGEU programme and the absence of an EU-managed repo facility (launched on 7th October 2024, but currently on hold).[21] Additionally, the fragmentation of bonds between the various programmes was also a source of risk, though this was addressed with the introduction of the unified funding strategy from January 2023, which decoupled the borrowing timelines, volumes and maturities from fund disbursements. The lack of agreement in the EU Council on the new EU budget own resources for NGEU debt repayment

[21] See, for example, the September 2023 EU-Bond Investor Survey results in https://commission.europa.eu/document/1bcb556f-8942-488d-b54f-d4c6bc129aa4_en.

and the lack of taxation power at EU level are also key factors that increase the risk perception of EU debt.

Chart 4

Debt issuance of European Commission and other EU supranational entities since 2020



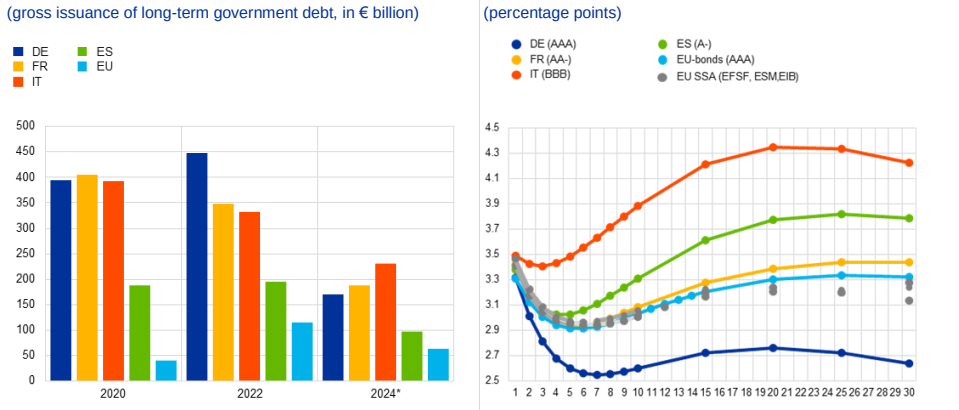
Sources: European Commission and ECB (CSDB database). Latest observation: May 2024.
Notes: COM = European Commission. Expected total issuance estimated by the COM of about €75 billion per semester may vary, depending on COM disbursement needs.

Chart 5

EU bond issuance and yield curves

a) Total new bond issuance by the Commission vs the four largest euro area economies (2020, 2022, 2024)

b) Yield curves: EU bonds vs bonds of four largest euro area economies and EU supranational entities



Sources: ECB (Chart A); Bloomberg and ECB staff calculations (Chart B).
Notes: Chart A: non-consolidated long-term debt issuance; 2024 data include debt issued until the end of May 2024. Chart B: cut-off date: 7 June 2024.

Repayment of NGEU borrowing

The repayment of the grant component of NGEU was agreed to be financed through the EU budget, with budgetary safeguards in place to mitigate risks

and prevent default on future repayments. The inter-institutional agreement (IIA) between the European Parliament, Council and Commission (December 2020) emphasised that "*in order to enhance the credibility and sustainability of the European Union Recovery Instrument repayment plan, the Institutions will work towards introducing sufficient new own resources with a view to covering an amount corresponding to the expected expenditure related to the repayment*".

Currently, the EU budget is financed almost entirely via own resources, with the largest proportion represented by national transfers. Only customs duties on imports from outside the EU are considered traditional EU own resources. These are complemented by the recently introduced levy on non-recycled plastic packaging waste and contributions from the Member States, which are calibrated based on VAT tax bases and GNI. The latter, designed to ensure that the EU budget is in balance, constitutes by far the largest component of own resources. Overall, national contributions cover about 80% of total own resources in 2024.

The Commission proposal on the EU Own Resources Decision (ORD) is intended to expand the existing revenue system by about 0.2% of EU GNI. The proposal, first presented in December 2021 and then amended in June 2023[22], is broadly balanced between traditional EU-wide revenues and revenues in the form of Member State transfers. Traditional revenues encompass 25% of proceeds from the ETS and 75% of revenues from the Carbon Border Adjustment Mechanism (CBAM). Additional transfers are to be based on a new common consolidated corporate tax base (CCCTB). The proposal has been approved by the European Parliament but awaits endorsement from the Council, which remains uncertain. Progress has been limited, with several Member States expressing scepticism towards the new proposal. Concerns have centred particularly around the new statistical own resource based on corporate profits, considered too similar to the GNI-based contribution and lacking the ability to generate new revenue streams.[23]

Refinancing is also ensured by temporary "budgetary headroom". Budgetary headroom is the difference between the own resources ceiling (i.e., the maximum amount of resources that the Commission can ask Member States to contribute in a given year) and the funds that the Commission actually needs in order to cover the expenses foreseen by the budget, which ensures that the EU can meet its commitments to investors. The permanent own resources ceiling of the EU budget, set at 1.4% of EU GNI, provides financial safeguards for the European Financial Stabilisation Mechanism (EFSM), Balance of Payments (b.o.p.) assistance facility, and the European instrument for temporary Support to mitigate Unemployment Risks in an Emergency (SURE), along with additional guarantees specific to SURE and Macro-Financial Assistance (MFA) to Ukraine. This has been further expanded by

[22] According to the IIA roadmap, a second basket of own resources was to be proposed by June 2024. In December 2021, the Commission announced that it would present a proposal for a second basket of new own resources by the end of 2023. In order to accelerate the negotiations, this proposal was brought forward to June 2023 as an adjusted package for the next generation of own resources. No additional proposals are expected.

[23] Presidency report on new own resources, November 2023. See: https://data.consilium.europa.eu/doc/document/ST-15858-2023-INIT/en/pdf

temporary budgetary headroom of 0.6% of EU GNI, intended solely to cover NGEU borrowings.

Though subject to significant uncertainty, we estimate a scenario in which the Commission's debt management operations are conducted in such a way that the annual financial burden peaks at €26 billion in 2028 and falls steadily after that (**Chart 6**). This possible profile would ensure that the debt would be fully repaid in 2058, in line with the RRF Regulation.[24] The annual EU issuance is based on EU bond issuance to May 2024 and assumptions on NGEU grants transfers after that.[25] In terms of repayment strategy, the Commission has indicated its intention to continue liquidity operations beyond 2028 to ensure a smooth repayment profile. This approach suggests that the annual repayment of principal debt will average nearly €13 billion each year between 2028 and 2058 (0.06% of 2028 EU GNI). The maturity structure of newly issued debt is assumed to mirror the current maturity structure of EU debt only in the first year of the projections. The average maturity is assumed to shorten gradually after that, ensuring that no outstanding debt will remain after 2058.[26] The assumptions on interest rates are based on market expectations, while longer-term projections are consistent with the assumptions of the Output Gap Working Group and European Commission's Ageing Report. Should interest rates evolve in line with market expectations, the EU budget would need to account for a maximum of €26 billion in 2028 (approximately 0.13% of 2028 EU GNI).

No repayment risk for NGEU borrowing is foreseen. The estimated repayment amounts remain well below the temporary budgetary headroom established as a guarantee for borrowers. Alternatively, repayments could also be fully covered under the current ORD Commission proposal. The necessary funds will be secured either through new EU own resources or via higher GNI-based contributions, both of which are sufficient in size (**Chart 6**). The outcome will depend on whether the Council can agree on the proposal. Any failure to fully cover the repayment burden will increase the risk of depleting funding allocated to other EU programmes.[27]

Regardless of the outcome – i.e. whether financing occurs though higher GNI contributions or increased transfers to the EU budget – the financial burden will ultimately fall on the individual Member States, which should account for this extra spending in their medium-term plans. This may result in either a potential increase in the tax burden or constraints on their ability to invest, even in critical and strategic areas. Nevertheless, there are country-specific risks, as the distributional effects of each option will result in net "winners and losers". Notably,

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24 Any further roll-over of debt is highly unlikely at present. The report on the Future of European competitiveness presented by Mario Draghi to the European Parliament on 9 September 2024 suggests that "*Member States could consider increasing the resources available to the Commission by deferring the repayment of NGEU*". However, a possible deferral of NGEU debt repayment would require a political consensus on this matter which currently seems limited.

25 WGPF estimate.

26 In line with the approach followed by Claeys, McCaffrey, and Welslau in their estimate of the EU long-term borrowing cost bill, provided in a briefing prepared for the Committee on Budgets (BUDG) of the European Parliament (2023).

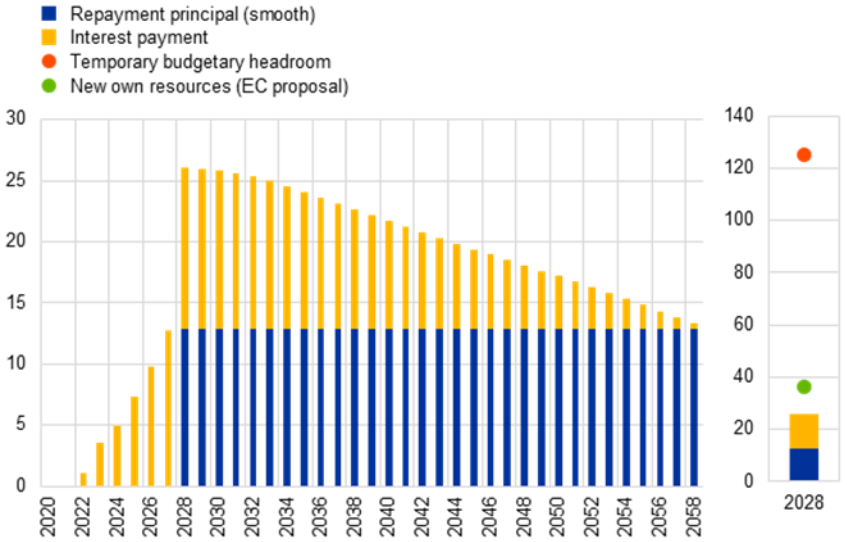
27 The costs of European Union Recovery Instrument (EURI) borrowing and the repayment of debt have been included as a budget line under Heading 2b for the 2021-27 period, alongside programmes such as Erasmus+, EU4Health, Creative Europe and Citizens, Equality, Rights and Values.

the current ORD proposal implies a redistribution that could place certain countries at a disadvantage. These include countries with relatively higher carbon emissions and/or a higher proportion of corporate tax revenues earmarked to calibrate the transfer under the ORD proposal. While these problems with distribution could, in principle, be addressed by introducing new correction mechanisms, as seen with the new plastic own resource, this would come at the cost of a further reduction in transparency.

Chart 6

Scenario on annual repayment on the grant component of NGEU and interest costs

(EU debt associated with NGEU grants, roll-over; in € billion)



Sources: European Commission and ECB staff calculations.
Notes: The chart depicts one possible scenario, out of several alternative scenarios. Cut-off date for financial assumptions: 2 April 2024. The estimates are based on the assumptions of constant debt repayment and residual maturing debt roll-over, with a decreasing maturity profile until 2058. The temporary budgetary headroom is equal to 0.6% of EU estimated GNI in 2028, based on ECB staff calculations. The estimate of the ORD proposal is based on Commission's estimates.

2.1.3 RRF payments

By August 2024, euro area countries had submitted 53 RRF payment requests to the Commission, of which 45 had been finalised; RRF payments of over €238 billion had been executed, including €156 billion in grants, and several other payments were in the pipeline (see **Table 2**, which also shows figures for the EU as a whole).

Table 2

Stocktaking of RRF payments and RRP revisions in the euro area and the rest of the EU (as of end-August 2024)

	August 2024				
	Payment requests submitted	Tranches disbursed	Submitted revisions of Recovery and Resilience Plans	Funds disbursed	
				Grants	*Loans*
Euro area	53	45	34	€ 156.6 bn	€ 82.1 bn
Non-euro area	11	9	8	€ 14.2 bn	€12.5 bn
TOTAL EU	**64**	**54**	**42**	**€ 170.8 bn**	**€ 94.6 bn**

Source: European Commission, last updated: 26 August 2024.
Notes: By August 2024, the Commission had already issued around €325 billion (about half of the total) to finance the RRF payments to the EU Member States. "Tranches disbursed" does not include prefinancing. The figures consider partial disbursements due to initial payment suspension.

2.1.4 Estimates of RRF-funded expenditure in the euro area

Composition and additivity of RRF-funded expenditure

Several interesting indications can be drawn from an inspection of the composition of RRF expenditure across euro area countries, which, given NGEU's solidarity principle, differs widely in terms of both proportions of national GDP and total euro amounts (Chart 7). Some differences can be also observed in terms of the distribution of spending categories within countries, although government capital spending – i.e. the sum of government investment and government capital transfers, as further discussed below – accounts for the bulk of expenditure in nearly all countries (**Chart 8**).

Chart 7

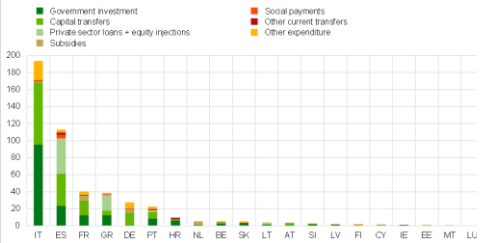
RRF-funded expenditure: significant differences across euro area countries

a) Expenditure profile of the national RRPs as a percentage of GDP

(2021-26; percentage of 2019 GDP)

b) Expenditure profile of the national RRPs in € billion

(2021-26)

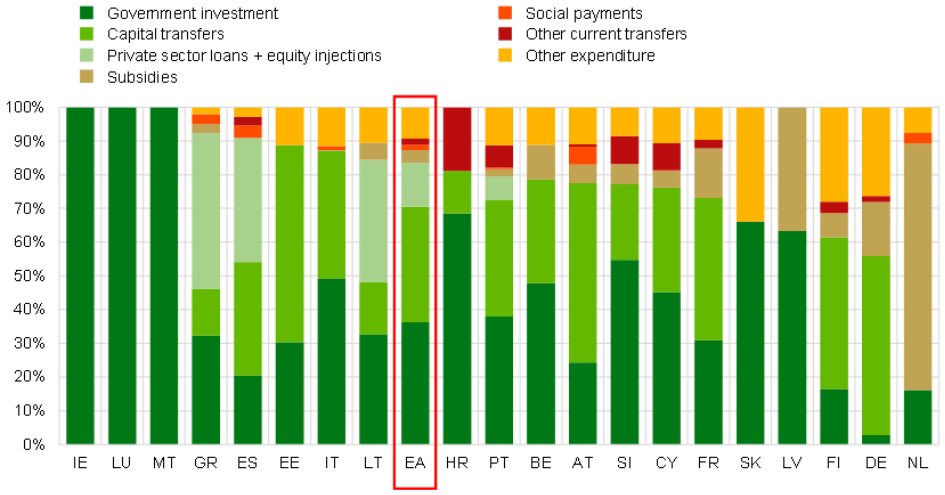


Sources: ESCB WGPF and ECB staff calculations.
Notes: Based on the national central banks' estimates of national expenditure plans. For Spain, only about half of RRF loans are estimated to have been absorbed. The difference between the total loans included in the revised Spanish RRP (€83 billion) and the Banco de España estimate (€41.5 billion) is due to assumptions regarding the final demand for such loans, and is subject to high levels of uncertainty. Slightly lower RRF absorption is also estimated also for Slovakia (€0.85 billion shortfall) and Croatia (€0.7 billion shortfall). All in all, the total cumulated expenditure is estimated at €486 billion, i.e. €43 billion less than requested in the revised RRPs at the time. The official envelope had increased by over €2 billion to €532 billion by August. Government investment + government capital transfers = government capital spending.

Chart 8

RRF-funded expenditure in the euro area by statistical category

(2021-26; percentage of total RRF funds requested in the RRPs revised in 2023)



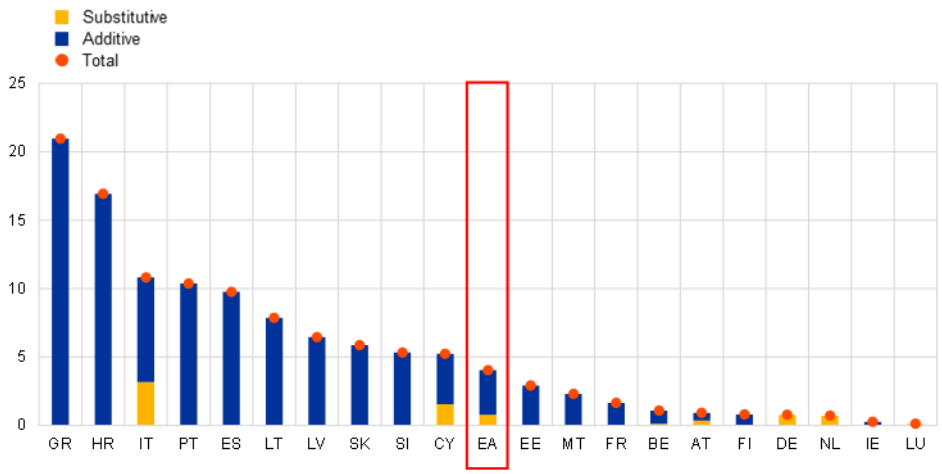
Sources: ESCB WGPF and ECB staff calculations.
Note: Government investment + government capital transfers = government capital spending.

On average, the WGPF estimates that 81% of RRF-based expenditure in the euro area is additive in nature, i.e. providing a genuine fiscal stimulus rather than substituting already planned expenditure (Chart 9). This is taken into account in the macroeconomic estimates discussed in Chapter 4.

Chart 9

Additive vs substitutive measures funded via the RRF

(as a percentage of GDP)



Sources: ESCB WGPF estimates and ECB staff calculations.
Notes: "Additive" (blue bars in the histograms): RRF grants and loans used to finance new fiscal measures (estimated at about 81% of the total in the euro area). "Substitutive" (yellow bars in the histograms): RRF grants and loans used to fund pre-existing measures in some euro area countries (IT, DE, LU, CY, AT and NL).

The time profile of RRF funds: underspending in 2021-23, backloading to 2024-26

When inspecting the time profile of RRF expenditure, a crucial aspect emerges – its backloading to the second phase of the programme – of which due account should be taken when assessing the macroeconomic impact of the RRF in the euro area. In each of the years between 2021 and 2023, there was significant under-execution of RRF-funded expenditure in most euro area countries compared with their original plans (**Chart 10**). This mainly reflects two factors that were particularly evident in the first three years of NGEU: (i) limits on the administrative capacity to spend; and (ii) a sequence of shocks that resulted in supply-side bottlenecks and downscaling of procurement contracts due to higher-than-expected inflation (see Section 2.2.3 for further discussion of these two factors).

As a result, it is estimated that in 2021-23 the RRF increased the level of euro area GDP by only 0.1-0.2%. This is much less than what might have been expected if the original plans had been swiftly and fully implemented: in the order of 0.5%, according to the calculations discussed in Chapter 4.

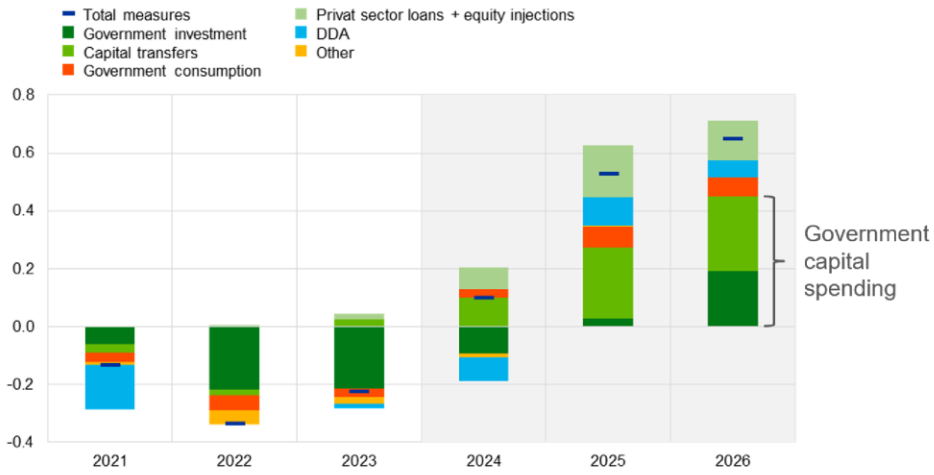
There are reasons to expect significantly higher GDP gains in the years to come, with the first being a highly backloaded expenditure profile. The catch-up in expenditures should have already started in 2024, but should be especially

pronounced in 2025-26 (**Chart 10**).[28] The main reason cited is the length of time required to define the procurement procedures and each single call for tenders (awarded competitively to firms) or grants (allocated to firms or households upon fulfilment of requisites or projects) to be allocated to private and public entities, but this preparatory phase is now largely over. RRF spending has therefore started gaining traction. More granular micro-evidence on the ground also points to the same conclusion, as discussed in **Box 1** for the case of Italy. Of course, this does not mean that problems have suddenly disappeared. Administrative constraints, delays in execution, ineffective implementation and new shocks may always materialise. It is, therefore, important to highlight the uncertainty surrounding the expectation that RRF-funded expenditure will catch up in the final years of the programme.

Chart 10

RRF-funded expenditure in the euro area: difference between estimated actual spending following the plan revisions and initial ESCB estimates

(year-by-year and cumulated; in € billion)



Sources: ESCB WGPF (June 2024) and ECB staff calculations.
Notes: The higher endpoint in 2026 is mostly the result of two developments that occurred in 2023, namely: (i) an increase of the euro area RRF envelope by €15.4 billion; and (ii) the take-up of additional RRF loans totalling €98 billion by some euro area Member States before the deadline of August 2026. Government investment + government capital transfers = government capital spending. The shaded area represents planned execution.

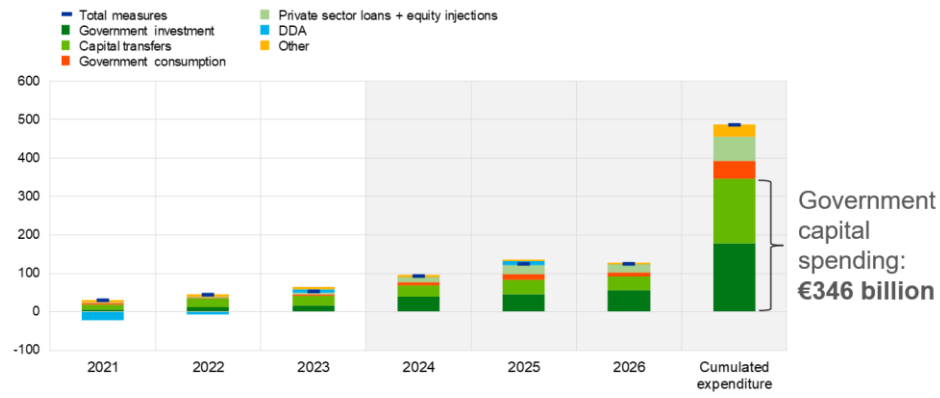
[28] The light blue bars in Chart 10 show the *debt-deficit adjustment* (DDA). Generally speaking, a positive DDA means that an increase in public debt exceeds the deficit or that the reduction in debt is lower than the surplus. A negative DDA means that the increase in debt is less than the deficit or that the reduction in debt is greater than the surplus. In the case in point, the DDA reflects the time difference between recorded expenditure in the EU Member States and the payments that the European Commission makes to each country (calculated as "RRF-funded expenditure minus RRF payments"). For instance, the negative value of DDA in 2021 shows that, in that year, the Commission made more RRF payments to Member States than Member States executed RRF-funded expenditures. Over the entire programme horizon, this timing difference is expected to balance to zero, as countries are assumed to spend all the RRF funds received. Cumulatively, the DDA is expected to decrease in both 2025 and 2026. Finally, it should be noted that, since Spain is also reporting positive spending for 2027, but the RRF payments will stop in 2026, a positive DDA is recorded for 2027 (expenditure amount – payment amount > 0) for this country. Accordingly, the light blue portion of the bars is expected to be zero after 2027.

Zooming in: (1) Government capital spending

A second reason why there is potential for significant future output gains from the RRF is that, of about half a trillion in expenditure, 70% (almost €350 billion) consists of government capital spending with higher multipliers, but with an output impact that takes more time to materialise than, for instance, government consumption (Chart 11). Capital spending includes both *direct government investment* (the dark green bars in **Chart 11**) and *government capital transfers* to private and public entities (green bars). Such capital transfers can be allocated via tenders, grants or tax credits, or even via direct payments. Some examples include: (i) most investments in energy efficiency in buildings, schools, hospitals or business enterprises; (ii) investments in clean energy and to support green and efficient public transport services; (iii) financial instruments for financing start-ups, as well as investment by SMEs; and (iv) investment in key digital technologies, including quantum technologies, cybersecurity, 5G and future telecommunication and cloud solutions. The RRF-funded capital transfers tend to feed directly into investment and, as a result, they are here assumed to have the same multipliers as government investment.

Chart 11
RRF-funded expenditure in the euro area by statistical category

(year-by-year and cumulated; in € billion)



Sources: ESCB WGPF and ECB staff calculations.
Note: Government capital spending = government investment + government capital transfers.

The light green bars in Chart 11 show RRF-funded loans to the private sector and equity injections. This is a relatively small expenditure category that has materialised in a few Member States (Greece, Spain, Lithuania and, to a lesser extent, Portugal). In these countries, some RRF funds are being used to enhance the credit capacity of development banks and similar entities that lend at favourable conditions. The macroeconomic impact of this alternative way to spend the RRF funds will depend on several factors that are difficult to predict, including private sector demand for this credit, and whether such demand will crowd out or crowd in other sources of funding. This creates significant uncertainty over the economic impact of this expenditure item. As discussed in Section 3.1, we believe that its output effect will probably be minimal, not least because only a small portion of the economy's financing will be affected. Our estimates therefore mostly focus on direct

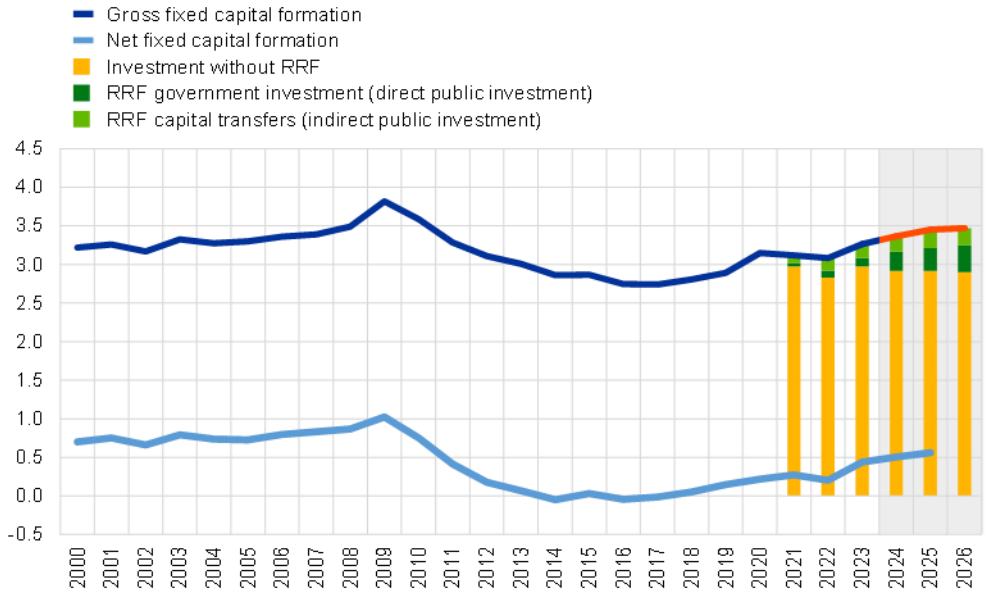
NGEU expenditure, which has a much more tangible stimulative effect on the economy.

All in all, we estimate that RRF-funded government capital spending has significantly increased real gross fixed capital formation in the euro area, bringing it to levels comparable to those preceding the 2007-08 global financial crisis (GFC)[29]**,** i.e. around 3.5% of euro area GDP, or around 1 percentage point above the trough of 2016-17. In *net* terms (i.e. accounting for the depreciation of capital), fixed capital formation hovered around zero between 2014 and 2017, but has now moved back to positive territory (**Chart 12**). A forthcoming study from Banco de España also suggests that RRF-related public tenders have positively affected firm-level private investment.[30]

Chart 12

Gross and net fixed capital formation in the euro area

(as a percentage of GDP)



Sources: European Commission, ESCB WGPF and ECB staff calculations.
Note: RRF-funded government investment + capital transfers = RRF-funded government spending.

While the RRF added only 0.7 percentage points to gross fixed capital formation in the euro area in 2021-23, it is projected to add 1.6 percentage points cumulatively over 2024-26. At the same time, **Chart 12** shows that the level of euro area investment net of RRF-funded investment remains quite low, at around 3% of euro area GDP. This raises questions about future investment developments after the NGEU programme expires in 2026.

29 It should be emphasised that, after the GFC, it took only two years for the United States to catch up with the investment levels of 2010, compared with nine years for the European Union. Moreover, between 2011 and 2023, (i) private investment grew almost three times faster in the United States than in the European Union (64.5% vs 23% in real terms) and (ii) public investment in the US grew almost twice as fast (18.3% vs 11.5% in real terms).

30 See González, Khametshin and Veiga (2025, forthcoming).

Zooming in: (2) Green and digital expenditure

The RRF intends to provide an important contribution to the green and digital transitions. Under the NGEU legislation, countries are required to commit at least 37% of RRF expenditure to green projects and 20% to digital projects. However, the actual amounts of RRF funds that euro area countries have committed to these two objectives until end-2026 significantly exceed these thresholds. According to the Commission, the commitments reach on average 42% and 27% of total RRF funds, for green and digital spending respectively. The ESCB estimates the proportion of climate spending to be slightly higher for the euro area, at 44%.

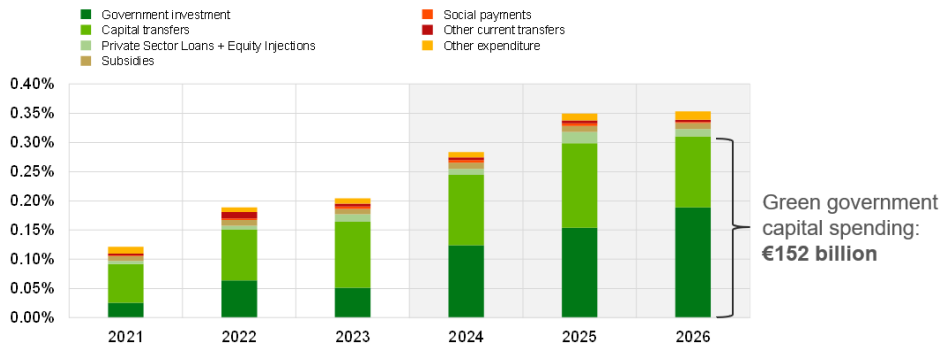
Contributions of national plans to the climate and digital objectives are heterogenous across euro area countries. Based on ESCB estimates, committed climate-related funds are highest in the Netherlands, reaching 73% of total allocated RRF funds, and lowest in Slovakia, at 30%. For digital expenditure, spending plans range from 53% of total RRF funds in Germany to 19% in Latvia[31] and 16% in Slovakia.

Most of the green RRF spending will be channelled via government capital spending. Over the RRF horizon, green government capital spending amounts to €152 billion, corresponding on average to 84% of total green RRF spending in the euro area (**Chart 13**). This percentage is significantly higher than the 70% proportion of investment in total RRF funds (see previous section), reflecting the fact that many of the funded projects, such as wind and solar parks or hydrogen, are highly capital intensive while entailing risks to profitability for the private sector. However, the composition of spending categories is expected to change over the RRF horizon. Until the end of 2023, most funds were channelled via capital transfers to the private sector, mainly to firms, but government investment is expected to gain in relative importance in the second half of the programme and even to exceed capital transfers by the end of the RRF horizon.

Chart 13

RRF climate spending by statistical category

(as a percentage of 2019 GDP)



Sources: ESCB WGPF, European Commission and ECB staff calculations.

[31] The NGEU envelope for Latvia includes REPowerEU, which is classified as neither climate nor digital. Including REPowerEU therefore pushed down this percentage to 19%.

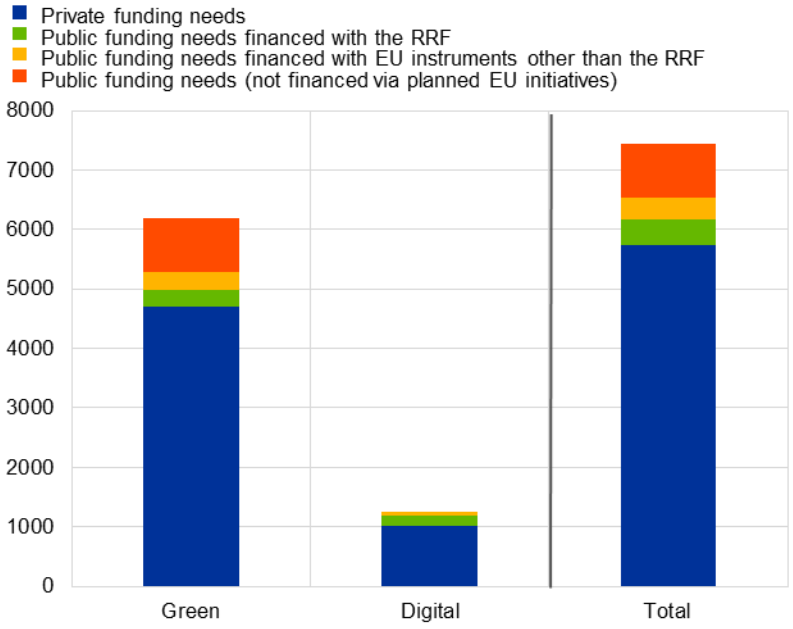
Notes: The chart shows the euro area average annual climate-related RRF spending in the period 2021-26, with a breakdown by statistical category. The data are based on the WGPF fiscal questionnaires. "Investment" in the heading of the chart is defined as government investment + government capital transfers = government capital spending.

Although most funding of green and digital investment needs in the period to 2030 has to come from the private sector, the RRF is projected to cover 25% of the portion funded by public sources. Based on historical averages, the weighted percentage of digital and green investment that will be funded by public sources is projected at around 23%.[32] The private sector, in turn, will have to fund more than three-quarters of additional green and digital investment needs.[33] Taking into account all available additional EU funding sources for green and digital investment, cumulatively, in the period to 2030, 25% of public sector funding on average will be provided through the RRF (**Chart 14**).[34] Including private sector investment, this accounts for 6% of the total estimated green and digital investment needs. The part not yet covered by available funding sources would have to be covered by other sources, including national funds.

Chart 14

RRF contribution to additional EU green/digital investment needs in the decade 2021-30

(2021-30; in € billion)



Sources: European Commission, EIB and ECB staff calculations.
Notes: The funding of cumulative additional investment needs is broken down into what is expected to be covered by the private sector vs the public sector. Public sector funding is, in turn, broken down into what has been already legislated for in the EU (RRF, other) and what has to be funded with additional national and EU resources. For the EU budget, the envelope for green and digital investment is assumed to remain constant until 2030. Green investment needs include the investment for the Fit-for-55 package, REPowerEU (excluding fossil fuel investments), the Net-Zero Industry Act (NZIA) and environmental protection.

32 For the methodology, see Bouabdallah et al. (2024) and Nerlich et al. (forthcoming). The estimates of green and digital investment needs are taken from the European Commission.

33 The term "additional" is defined here as the difference between total green and digital investment needs and historical averages.

34 It is assumed that the green and digital part of the EU budget will remain constant after 2027.

Box 1

What can be inferred from country-specific granular information? The case of Italy

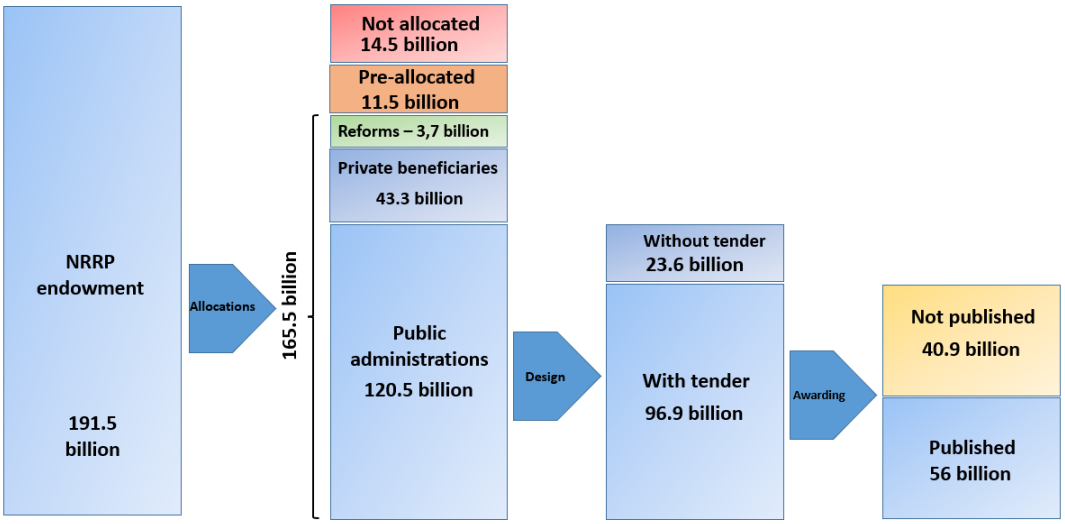
Prepared by Gabriele Rovigatti, Banca d'Italia

The Italian RRP originally amounted to €191.5 billion. By the cut-off date of this paper, Italy had already received more than €113 billion in five instalments (on top of prefinancing of €25 billion). The country had also completed 269 milestones and targets as of June 2024, including major reform measures. At the end of December 2023, more than 85% of the available funds had been allocated to implementation entities, with approximately €120 billion assigned to public administrations. Regarding the implementation of investment projects requiring a procurement procedure, more than half of the financing (about €56 billion) has been put out to tender (Chart A). This amount began increasing in 2022 and accelerated in 2023, when more than €28 billion was tendered, primarily related to medium-value contracts (between €1 million and €5 million) and high-value contracts (over €5 million) for large-scale infrastructure projects.

Chart A

Italian RRP implementation as of end-2023

(in € billion)



Source: Banca d'Italia, based on data from "Italia Domani" and National Anti-Corruption Authority (ANAC).
Note: The revision of the Italian RRP approved at the end of 2023 increased the original endowment to €194.4 billion, adding a mission dedicated to the energy transition (REPowerEU) and modifying the targets and milestones to be achieved by the end of 2026.

The use of data on individual procurement procedures and awarded public contracts, combined with data on labour costs for every construction worksite financed through the National Recovery and Resiliance Plan (NRRP) allows for the timely monitoring of the public works funded by the Plan.[35] In particular, we can track the status of work progress for each procedure by comparing the expected and actual time and costs incurred in order to flag delayed, on-time, complete or not-yet-started worksites.

[35] The data on labour costs per worksite is provided monthly by the *"Commissione nazionale paritetica per le Casse Edili"* (, an Italian non-government entity that manages the wages and benefits of construction workers via "construction funds"), and areis collected for social security reasons from all construction companies in the country.

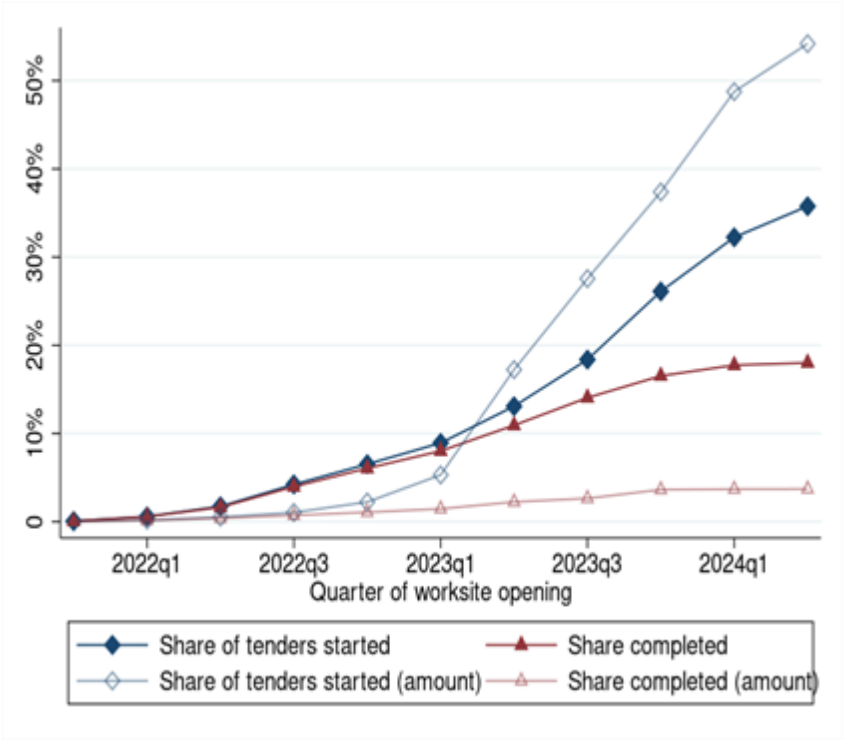
The NRRP monitoring with microdata shows that Italy has made significant progress in the execution of public works (Chart B). Between the first quarter of 2023 and the second quarter of 2024, the percentage of NRRP tenders that activated a worksite increased from less than 10% to more than 35%. This share corresponds to more than half of the overall amount already tendered, indicating that the largest tenders have entered the execution phase. Most of the tenders for which works have not yet started (almost two-thirds) have nonetheless been awarded.

In terms of work progress, 18% of projects have been completed. However, of the open and ongoing construction sites, roughly two-thirds are at risk of delays to their schedules. There are differences in the execution of public works across the country, with the south of Italy struggling to keep pace with other areas (Chart C). This is due to greater congestion and the initiation of relatively more complex public works.

Chart B

Italy: RRP-funded tenders in the execution phase (November 2021 – March 2024)

(share of the number of RRP-funded published tenders)

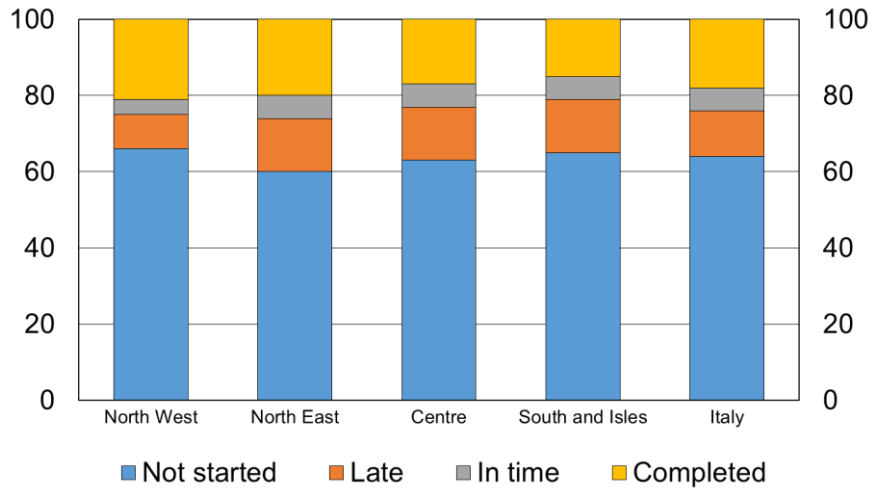


Source: Banca d'Italia, based on data from ANAC, "Italia Domani" and the *Commissione nazionale paritetica per le Casse Edili*.

Chart C

Italy: progress made by public works related to the implementation of the RRP (November 2021 – March 2024)

(share of the number of RRP-funded published tenders)



Source: Banca d'Italia, based on data from ANAC, "Italia Domani" and the *Commissione nazionale paritetica per le Casse Edili*.

2.2 RRF-linked structural reforms

2.2.1 Updates to the national reform plans

Structural reforms are an essential part of the RRPs and complement the RRF-linked investments.[36] The planned reforms aim to modernise the euro area economies and enhance their resilience over the medium term. To this end, the RRF Regulation requires that the reforms be tailored to Member States' structural weaknesses, as captured by the CSRs issued under the European Semester. Moreover, the reforms have to be commensurate with the size of the individual RRF envelopes and should exploit synergies with RRF-financed public expenditure, most notably by removing administrative or regulatory bottlenecks to the investments envisaged by the RRPs. The reforms also support institutional and economic convergence across euro area countries, since the initial framework conditions in the countries with the most comprehensive RRF-linked reform plans were generally weaker than in many peer countries.

Recent RRP modifications have left the overall balance of reforms and investments broadly unchanged compared with the initial plans. All euro area countries have requested modifications to their initial RRPs over recent years, most notably to include REPowerEU chapters, reflect their updated RRF envelope or replace measures that are no longer attainable. The REPowerEU chapters outline policy measures intended to reduce energy demand, safeguard energy security and

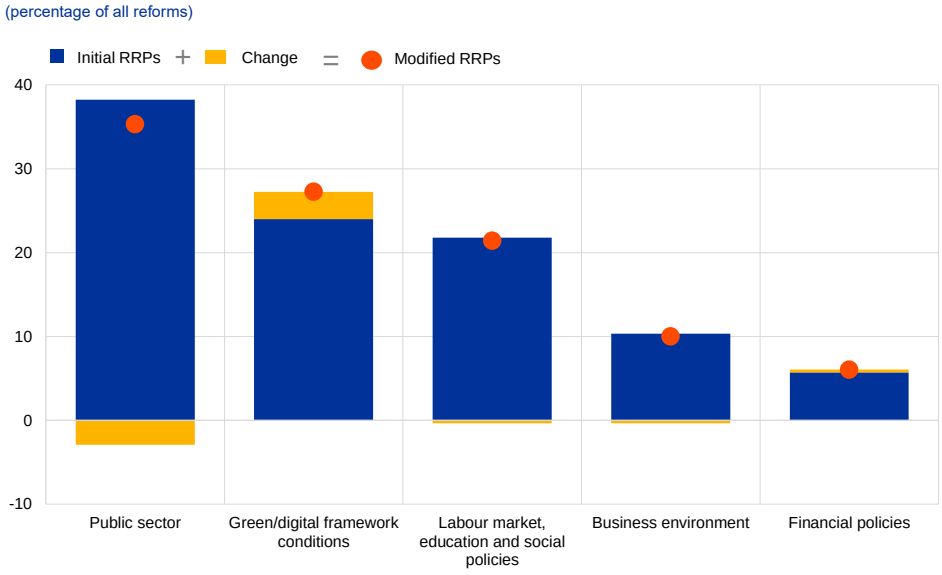
[36] See Bańkowski et al. (2022) for a detailed ECB staff assessment of the initial RRP-linked reform plans.

accelerate the transition to sustainable sources of energy. As a result of these modifications, the RRPs of the euro area countries now include more than 1,700 qualitative milestones and quantitative targets in relation to structural reforms, complementing about 3,000 investment-related deliverables. Hence, the balance of reforms and investments has remained broadly unchanged compared with the initial RRPs, with reforms accounting for almost 40% of all milestones and targets.

The reform mix has become "greener" with the recent RRP modifications, while "classical" reforms are still underrepresented. In response to the energy crisis triggered by Russia's war of aggression against Ukraine, many euro area countries integrated REPowerEU chapters into their RRPs. As a result, "green" reforms now account for a higher proportion of the total number of reforms than in the initial RRPs. In fact, green and digital framework conditions together account for around one-quarter of all planned reforms (**Chart 15**). For example, some euro area countries are planning to change their regulatory frameworks in order to accelerate the roll-out of renewable energy. Despite these modifications, the structural reforms envisaged by the RRPs are still strongly geared towards the public sector (35%). This category includes, for instance, reforms of the judiciary and tax administration. The proportion of all reforms of labour market, education and social policies is 21%. Within this category, measures related to digital skills and active labour market policies are particularly prevalent. Only around 6% of all reforms refer to financial policies, such as insolvency regimes. "Classical" reform areas, most notably improvements in the broader business environment, still do not feature prominently in most RRPs. This important blind spot will thus need to be addressed outside the RRPs, most notably in the context of the reformed European Semester.

Chart 15

Breakdown of RRP reforms by policy area

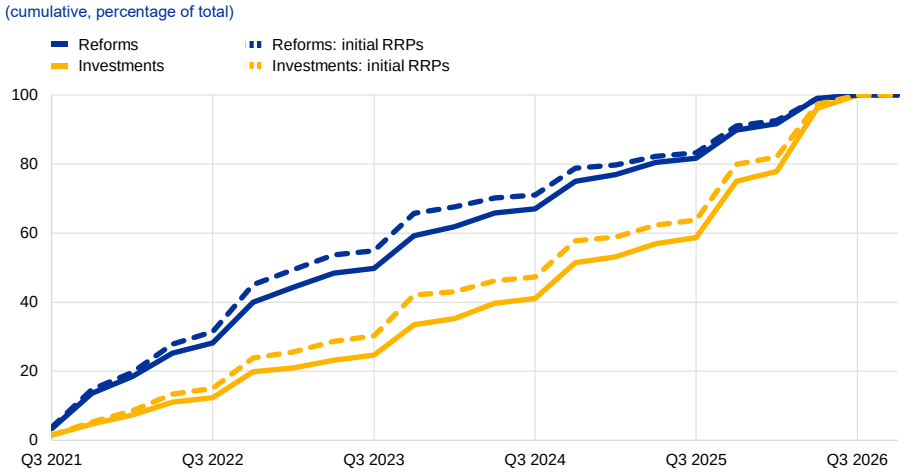


Sources: European Commission and ECB staff.
Notes: Covers all euro area countries. Based on ECB staff measure-by-measure classification.

In the revised RRPs, the reforms are less frontloaded than in the initial plans. The milestones and targets for reforms have, overall, been pushed into the later years of the RRF's envisaged lifespan (**Chart 16**). However, the same can be observed for investments, as discussed in Section 2.1. Therefore, the RRF-linked reforms remain, overall, more frontloaded than the investments, as was the case in the initial plans. This sequencing aims to enhance the RRF's effectiveness by reducing administrative and regulatory bottlenecks for public investments and complementary private investments. The frontloading of reforms relative to investments also underscores the conditional nature of RRF funding.

Chart 16

Envisaged timeline of milestones and targets: initial vs current RRPs



Sources: European Commission and ECB staff.
Note: Covers all euro area countries.

2.2.2 Reform implementation

The implementation of RRF-linked structural reforms has made significant progress over recent years. By early September 2024, the euro area countries had fulfilled 730 milestones and targets in relation to structural reforms (out of a total of 1,700), according to the European Commission. Hence, more than 40% of the reform-related deliverables envisaged by the RRPs had already been achieved. For some of these reforms, there is already tentative evidence of favourable (micro)economic effects.[37]

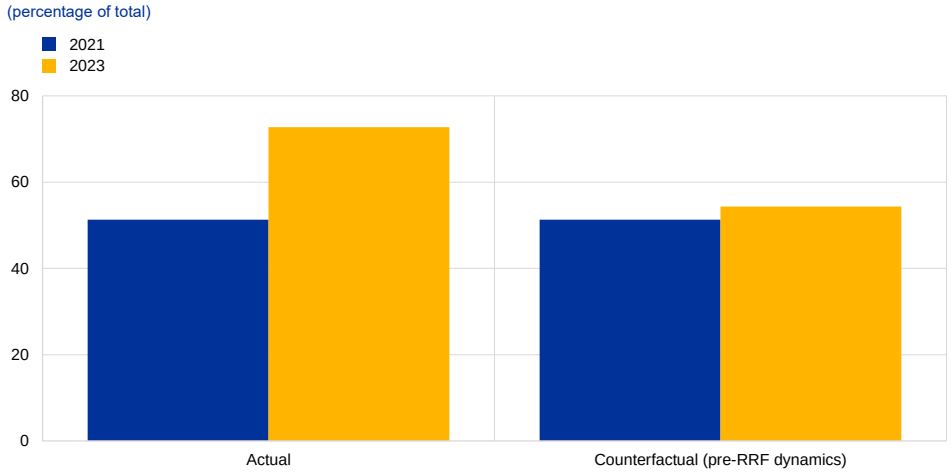
RRF-linked structural reforms have played an important role in improving the implementation of the CSRs. The CSRs are issued each year under the European Semester and provide guidance on structural policies. In the years leading up to the RRF, the implementation of the CSRs by euro area countries was disappointing. However, the RRF Regulation requires that Member States reflect a significant part of the CSRs in their RRPs. Against this backdrop, the implementation of the non-

[37] For instance, the judicial reforms in Italy appear to have contributed to a substantial decline in the backlog of cases and the disposition time. See Giavazzi and Goretti (2024).

fiscal CSRs has improved lately, compared with the pre-RRF years, according to the European Commission. More specifically, the implementation of the 2019 CSRs observable in actual data is higher than a counterfactual featuring the disappointing dynamics of CSR implementation in the pre-RRF period (**Chart 17**).[38] This finding suggests that the RRF and its design has been instrumental in incentivising structural reforms that are aligned with the CSRs.[39]

Chart 17

Proportion of non-fiscal CSRs with at least "some progress"



Source: European Commission.
Notes: CSRs with at least "some progress", according to the European Commission. RRP measures are included in this category only to the extent that they are being implemented. The chart shows the actual implementation of the 2019 CSRs and a counterfactual assuming implementation in line with 2018/20 data on the 2016 CSR vintage.

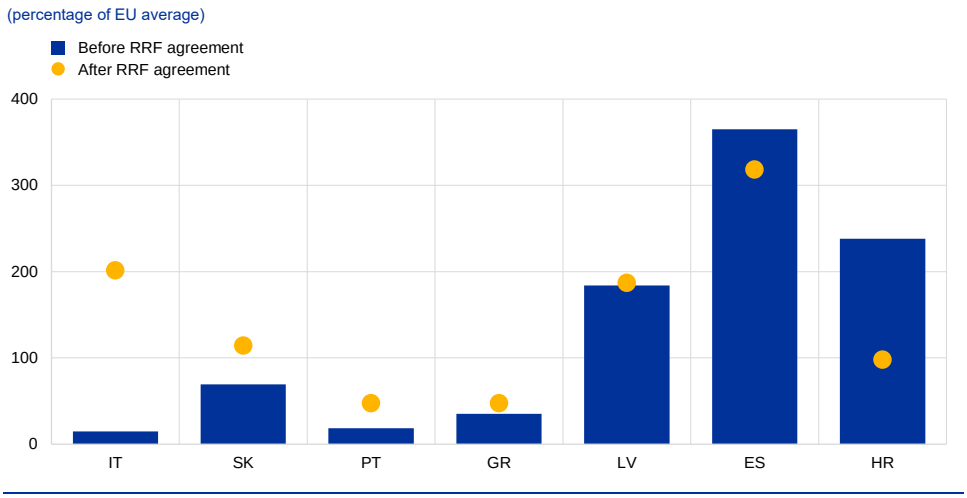
Public interest in reforms also appears to have increased since the RRF's inception, particularly in key RRF beneficiary countries. This tentative conclusion is based on Google Trends data capturing internet searches related to the topic of "reforms". According to this measure, public interest in reforms has increased over the past few years – or remained at high levels – in most of the main RRF beneficiary countries, most notably Italy (**Chart 18**). Of course, this finding has to be interpreted with caution, as it might not necessarily reflect a causal effect of the RRF. Moreover, the increased interest in the topic of "reforms" cannot simply be interpreted as public support for the RRF-linked structural reforms, as it could theoretically also reflect resistance to these reforms or factors unrelated to the RRF. Despite all these caveats, the Google Trends data are at least consistent with the view that the broader public is aware of the reform momentum triggered by the RRF in the main beneficiary countries.

38 The chart focuses on the 2019 CSR vintage, as it was formulated before the RRF's inception, had to be addressed in the RRPs and, unlike some of the more recent vintages, included detailed recommendations on structural policies. The 2016 CSR vintage is used as a benchmark, as it allows for the tracking of implementation over a similar period before the RRF's inception.

39 In its mid-term evaluation of the RRF, the European Commission concluded in February 2024 that: "One of the most notable successes of the RRF is its proven ability to incentivise the implementation of structural reforms." See European Commission (2024a).

Chart 18

Public interest in reforms in key RRF recipient countries (Google Trends)



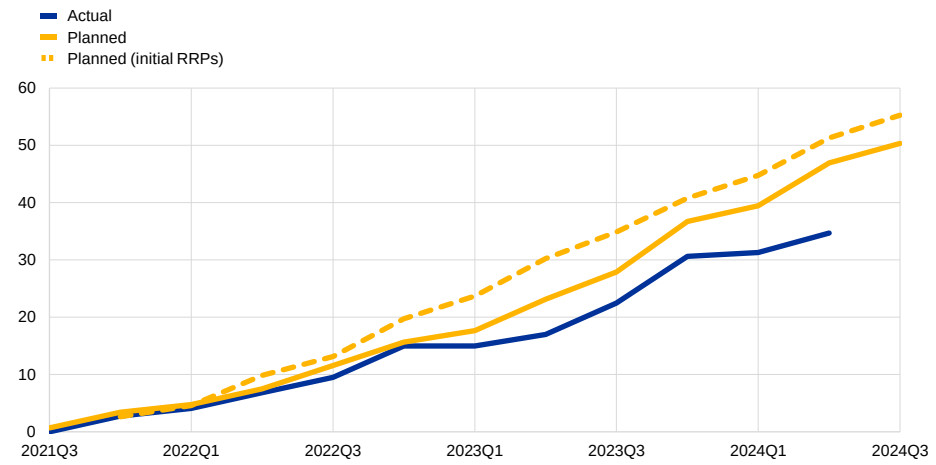
Source: Google Trends.
Notes: Popularity of "reform" topic relative to EU average. Popularity measured as topical Google searches as a proportion of total queries. Average outcome in 44 months before/after RRF agreement in July 2020.

Although reform implementation under the RRPs has made progress over recent years, there have been significant delays. Since the RRF is a performance-based instrument, countries only receive disbursements if they can show that they have fulfilled pre-agreed milestones and targets related to RRF-linked investments and reforms. To this end, Member States are required to submit payment requests, with sufficient documentation, to the European Commission. By early September 2024, around one-third of all payment requests envisaged by the RRPs of euro area countries (or, more specifically, the corresponding operational arrangements) had been submitted. This falls short of the indicative timetable included in the RRPs, according to which around one-half of all planned payment requests should have been submitted (**Chart 19**). Hence, submission delays have emerged and even become more pronounced over time.[40] This conclusion holds, irrespective of whether the initial RRPs or the (more backloaded) revised RRPs are taken as a benchmark. A submission delay suggests that one or more of the milestones and targets linked to the payment request have not been fulfilled on time, prompting the Member State to postpone the submission. Hence, submission delays are not merely procedural in nature, but also point to substantive obstacles to the implementation of the policy measures included in the RRPs. Consequently, the delays imply risks to the achievement of the RRF's policy objectives.

40 A similar picture emerges from the more comprehensive self-reporting by Member States, according to the European Commission. For milestones and targets with implementation initially envisaged in 2023, the EU Member States overall reported 40 delays in relation to reforms and 59 in relation to investments, with a median delay of 182.5 and 274 days, respectively, according to European Commission (2023).

Chart 19

Cumulative number of RRF payment requests



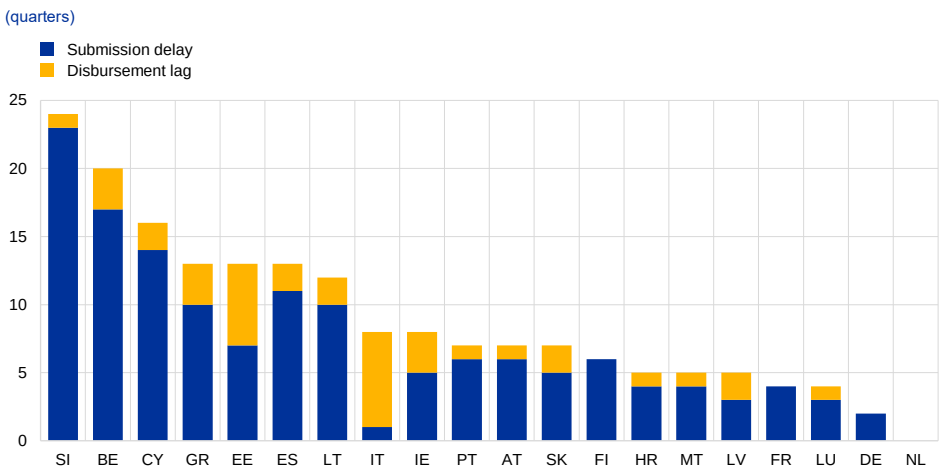
Sources: European Commission and ECB staff.
Note: Covers all euro area countries.

Implementation delays can be observed in virtually all euro area countries, albeit to varying degrees. The sum of the delays in the submission of individual RRF payment requests is as high as 23 quarters in some countries (**Chart 20**).[41] While the Netherlands is the only country without any submission delays so far, it finalised its RRP later than the other euro area countries. Apart from submission delays, some countries have also seen disbursement delays. Such delays may arise, for instance, if a country initially provides the European Commission with insufficient documentation. Disbursement delays can be approximated by the number of quarters between the submission of a payment request and the corresponding disbursement (minus one-quarter to account for the standard review process). Disbursement delays, while particularly evident in Italy, are generally shorter than submission delays.

41 The chart uses the initial RRPs as the benchmark to ensure a level playing field. If the modified RRPs were used, the chart would conceal the fact that some countries have already aligned the plans with their delayed submissions, while other countries are still in the process of adjusting their submission plans.

Chart 20

RRF payment requests: cumulative delays



Sources: European Commission and ECB staff.
Notes: Vis-à-vis initial RRPs. Disbursement delay reduced by one-quarter to account for review period.

The European Commission has so far classified only a few milestones and targets as "not satisfactorily fulfilled", mostly in relation to reforms. Although many payment requests have been submitted with a delay, almost all the milestones and targets already assessed by the European Commission have been classified as "satisfactorily fulfilled". Only very few milestones and targets have been classified as "not satisfactorily fulfilled", in which case RRF funds have been partially suspended (**Table 3**). Even in these few cases, the European Commission has generally been able to confirm fulfilment before the end of the six-month period after which the RRF Regulation envisages a permanent reduction of the funds available to the country. There has been only one case (Lithuania) in which a milestone could not be fulfilled within this six-month period, which led to a reduction of €8.7 million in the RRF funds available to this country. Notwithstanding this, the incidence of partial suspensions has increased slightly in recent quarters. It is also worth noting that almost all milestones and targets that have been classified, at least temporarily, as "not satisfactorily fulfilled" relate to reforms rather than investments. Overall, the non-implementation of RRP measures is, so far, much less of a concern than delayed implementation. However, this may change when the RRF approaches the end of its envisaged lifespan in 2026, since the Regulation does not envisage a "grace period".

Table 3

Non-implementation of RRF-linked reforms in euro area countries

Country	Date of preliminary assessment by European Commission	Number of milestones/targets not satisfactorily fulfilled (of which: reform-related)	Suspended RRF funds (€ million)	Number of milestones/ targets subsequently fulfilled	Subsequently disbursed RRF funds (€ million)
Lithuania	April 2023	2 (2)	26.2	1	17.5 (14.9 net of prefinancing)
Portugal	December 2023	3 (3)	810.5	3	810.5 (720.5 net of prefinancing)
Spain	June 2024	1 (0)	158.1	(*)	(*)
Belgium	July 2024	1 (1)	31.0	(*)	(*)
Italy	July 2024	1 (1) (not assessed)	110.0 (undisbursed but not suspended)	(*)	(*)

Source: European Commission.
Notes: If a milestone or target is not satisfactorily fulfilled, some RRF funds will be suspended. If the milestone or target is satisfactorily fulfilled within six months of the European Commission's suspension decision, the suspension will be lifted and the funds disbursed. Otherwise, the RRF funds available to the Member State will be permanently reduced proportionately. (*) refers to cases in which the updated European Commission assessment is not yet available. In the case of Italy, the European Commission noted in its preliminary assessment in July 2024 that it was not in a position to reach a conclusion on the satisfactory fulfilment of one target. According to the European Commission, it had emerged that the wording of the Council Implementing Decision approving the Italian RRP did not provide sufficient clarity on the methodology to apply for the assessment of the satisfactory fulfilment of this target. Given the need for additional clarification of the target, Italy intended to submit a reasoned request to amend it, ensuring that the ambition and policy objective of the measure were maintained. Against this backdrop, the European Commission did not initiate the suspension procedure. However, the disbursement was reduced accordingly.

The partial suspension of funds can be seen as a second-best solution, as it allows Member States to spend other RRF funds immediately. If the implementation of a specific milestone or target is behind schedule, the Member State in question has at least two options. First, it can postpone the submission of the corresponding payment request until the milestone or target is fulfilled. The drawback is that the entire instalment will become available later. Second, the Member State can still submit the payment request, which will lead to the partial suspension of RRF funds. In this case, the remaining funds will become available earlier and, if they are spent, their macroeconomic impacts can transpire. At the same time, "the clock starts ticking" for the implementation of the pending milestone or target, since the RRF Regulation envisages a period of up to six months for the fulfilment of the milestone or target before the suspended funds are foregone. The Member State's decision on whether to opt for later submission will generally be determined by a multitude of factors, including the importance of the pending milestone or target and the likelihood that it can still be fulfilled. In February 2023, the European Commission published a methodology for determining the amounts to be suspended in relation to missed milestones or targets, which has provided Member States with greater certainty when making such decisions.

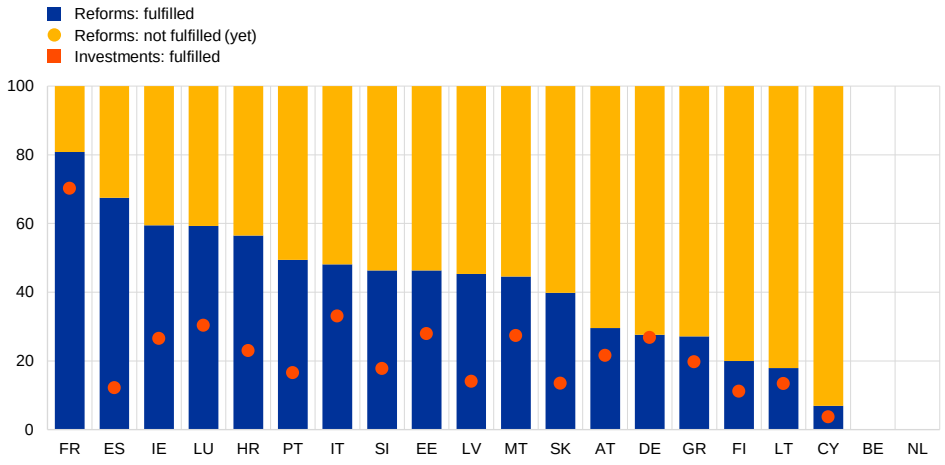
Many euro area countries have yet to fulfil most of their RRF-linked reform commitments. Although the RRF has already entered the second half of its envisaged lifespan, the percentage of reform-related milestones and targets already classified as fulfilled by the European Commission is well below 50% in many euro

area countries (**Chart 21**).[42] As a reminder, all milestones and targets have to be completed by 31 August 2026 at the latest, according to the RRF Regulation. Only a few countries are already deemed by the European Commission to have implemented more than 50% of their reform-related milestones and targets. In some of these more advanced countries, including France and Spain, the commitments include reforms that had already been implemented before the (initial) RRP was submitted, which has raised at least some questions in terms of their 'additionality'.

Chart 21

RRP implementation progress

(as a percentage of all relevant milestones and targets)



Sources: European Commission and ECB staff.
Notes: Only includes milestones and targets for which the European Commission's final assessment is available. No such assessment was available for BE and NL at the cut-off date of this paper.

2.2.3 Implementation challenges

The delayed implementation of the RRPs mainly reflects limited administrative capacity and supply-side bottlenecks. Both obstacles had been anticipated in earlier ECB staff analysis.[43] As expected, euro area countries with a combination of relatively weak administrative capacity and a large RRF allocation have, overall, recorded the longest RRP implementation delays (**Chart 22**).[44] Supply-side bottlenecks, most notably supply chain disruptions, have also been a major obstacle, particularly on the investment side. The aggravation of these bottlenecks, triggered by Russia's war of aggression against Ukraine, broadly coincided with the start of the RRF implementation phase. They emerged, for instance, in the form of shortages in specific inputs due to persistent supply chain disruptions, or labour market

42 The proportion of unfulfilled reforms shown in the chart constitutes an upper bound. Some of the missing reforms might already have been fulfilled, but cannot be formally assessed by the European Commission since the corresponding payment requests have not yet been submitted. The same applies to investments.

43 See Bańkowski et al. (2022).

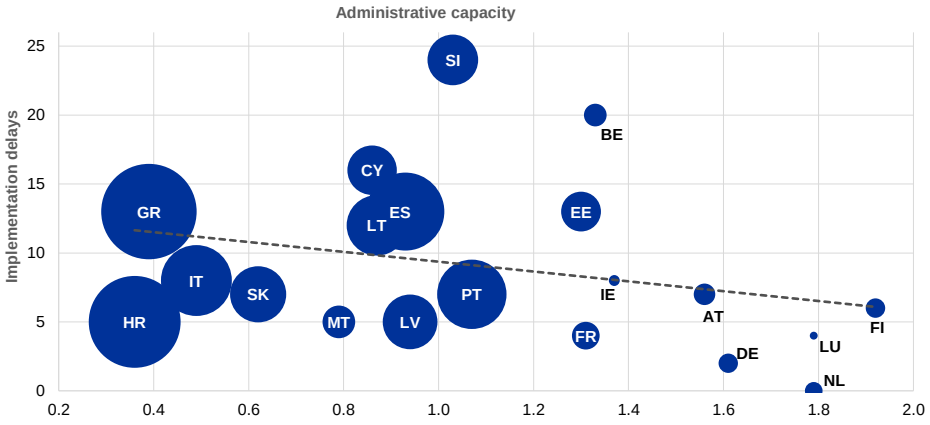
44 In the chart, administrative capacity is measured by the European Quality of Government Index. This indicator is based on an extensive citizen survey, in which respondents are asked about their perceptions of, and experiences with, public sector corruption, and the extent to which citizens believe that various public sector services are impartially allocated and of good quality. See Charron et al. (2024).

mismatches due to the departure of workers from the labour force and inter-sectoral reallocation. More recently, these bottlenecks have started to recede. The modifications of the RRPs also temporarily absorbed administrative capacity, most notably in 2023. Since these RRP modifications have now been finalised, the European Commission expects their implementation to accelerate going forward.[45]

Chart 22

Implementation delays and administrative capacity

(x-axis: index, y-axis: quarters, bubble size: RRF allocation as a percentage of 2019 GDP)



Sources: Charron et al. (2024) and ECB staff.
Notes: Implementation delays = submission and payment delays. Administrative capacity = European Quality of Government Index.

In view of these challenges, there is a risk that the RRF's effectiveness will be diminished by incomplete or ineffective implementation. Incomplete implementation could arise if Member States fail to implement all agreed milestones and targets by August 2026. This would reduce the macroeconomic impact of the RRF by the amount attributable to the missed deliverables. The 2024 CSRs issued under the European Semester therefore call on many Member States to accelerate the implementation of their RRPs.[46] However, an accelerated implementation of the national plans is not sufficient for the RRF to unfold its full potential. Member States will have to ensure that speed does not come at the expense of implementation quality. If Member States were to "rush through" some reforms and pursue an opportunistic "box-ticking" approach (in which deliverables are formally achieved but the measures are insufficient for the intended economic impact to fully materialise), the RRF's effectiveness would still be diminished. In the event of a trade-off between speed and quality, prioritising quality over speed would thus help to ensure the macroeconomic effectiveness of the reforms.

A recent survey of Member States by the European Court of Auditors also points to implementation risks in relation to the RRPs. The survey, conducted between April and June 2023 and published in September 2024, targeted the RRF coordinating bodies of all EU Member States. Around 55% of the respondents saw it as either unlikely or very unlikely that all reform-related milestones and targets would

45 See European Commission (2024c).

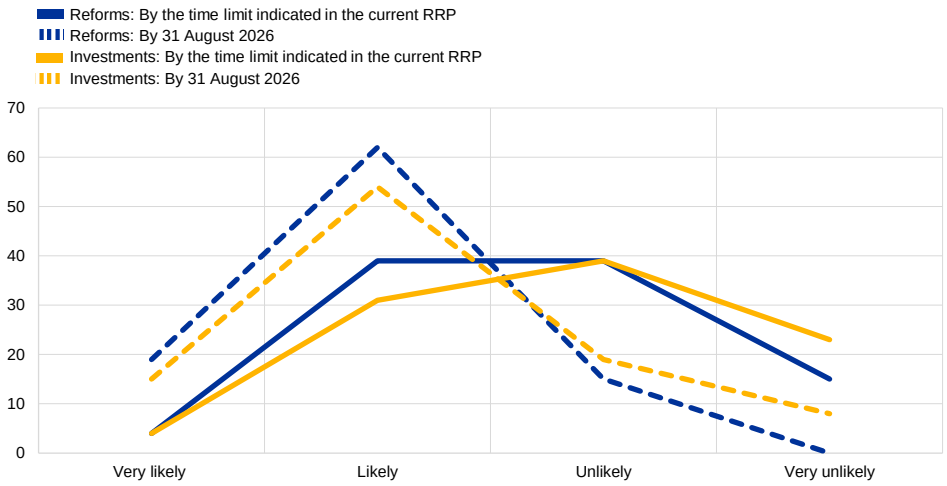
46 In the mid-term evaluation of the RRF, the European Commission also called for an acceleration in RRP implementation. See European Commission (2024a).

be achieved by the time limit indicated in the current RRP of the respective country (**Chart 23**). For investments, the proportion of pessimistic responses was even higher, at around 65%. At the same time, the respondents overall thought it more probable that all milestones and targets would be fulfilled by 31 August 2026, the latest possible date envisaged by the RRF Regulation.

Chart 23

Perceived likelihood of achieving RRF-linked milestones and targets as planned

(frequency of responses, as a percentage)



Source: European Court of Auditors (2024).
Note: Based on a survey by the European Court of Auditors of the RRF coordinating bodies of all EU Member States in the period from April to June 2023.

It is up to Member States to enhance the implementation of the RRPs through targeted policy action. Member States may redirect administrative resources towards the implementation of the RRPs. Euro area countries could also make more intensive use of the EU's Technical Support Instrument to tap external expertise and temporarily expand their administrative capacity. In addition, Member States may take advantage of the streamlining options offered by the European Commission's updated RRP guidance, including simplified reporting requirements and synergies between different audit procedures.[47] Moreover, Member States may seek to identify targeted regulatory changes outside the RRF framework that would facilitate the roll-out of the RRPs without any over-absorption of administrative resources.[48] Overall, such corrective policy measures would help improve reform implementation under the RRPs and might even alleviate the emerging trade-off between the speed and quality of RRP implementation.

47 See European Commission (2024b).

48 The European Commission has encouraged Member States to include such policy measures in their revised RRPs. These additional measures cover, for instance, training, IT systems and changes to public procurement and permissions procedures, as well as increased digitalisation of public administrations.

3 Transmission channels, models and scenarios

A comprehensive assessment of the NGEU programme requires a thorough consideration of all transmission channels using state-of-the-art analytical tools, ideally supplemented with scenario analysis to strengthen the robustness of the findings. This study acknowledges the transmission channels identified in previous analyses, such as Bańkowski et al. (2022), which include the risk premium, fiscal and structural reform channels. Additionally, within the fiscal channel, it considers a new mechanism described in Section 2.1: private sector financing through loans and equity injections. To analyse these channels, the study employs two macroeconomic models – EAGLE and ECB-MC – alongside a public debt sustainability analysis tool and insights from expert groups. Scenario analysis is also conducted to explore variations in fund absorption rates and the productivity of public capital, accounting for uncertainties in NGEU's overall economic impact on the euro area. This section provides a detailed overview of all these aspects.

3.1 Transmission channels

In addition to the previously identified channels through which the NGEU influences macroeconomic outcomes, a new mechanism involving loans and equity injections for the private sector must also be considered. Given the evolution of NGEU, it is necessary to reassess the pathways through which the programme impacts the euro area and its Member States. The three established channels remain relevant: (i) the risk premium channel, (ii) the fiscal channel and (iii) the structural reform channel. However, due to the substantial delay in the programme's implementation, as discussed in Section 2, a re-evaluation of the second and third channels is particularly crucial. Furthermore, a new tool has emerged, as several countries are extending the NGEU's instruments with the provision of private sector loans and equity injections. This mechanism will be classified under the fiscal channel.

In relation to the risk premium channel, the non-negligible effects observed following the announcement of the programme remain valid and continue to benefit affected countries, as previously established. Since NGEU's inception, it has been clear that it would entail a significant degree of solidarity, with relatively weaker economies receiving proportionately more support. Consequently, the announcement of the recovery programme agreement had a positive impact on market confidence, notably by reducing sovereign yields in vulnerable euro area countries (see footnote 5). Although disentangling this effect from other factors, such as concurrent monetary policy measures, is intrinsically difficult, the immediate post-announcement period of the Franco-German recovery fund proposal (18 May 2020) was marked by a notable compression of spreads among beneficiary countries. This spread compression underpinned the evaluation of NGEU's risk premium channel in

Bańkowski et al. (2022), which points to non-negligible positive macroeconomic effects. Specifically, the study concludes that a sustained reduction in risk premia, as reflected in the post-announcement spread compression, might gradually increase euro area output by up to 0.2%. The effects are expected to be more pronounced in countries that have seen the most significant reductions in credit risk premiums, such as Italy and Spain. While this paper acknowledges these effects, it refrains from updating the evaluation, as no significant developments have occurred that would necessitate this.

Regarding the fiscal channel, NGEU-financed projects involve a significant increase in public expenditure across the euro area. According to the Recovery and Resilience Plans, most NGEU-funded spending will be directed towards capital expenditure, specifically its two main categories – government investment and capital transfers – which have been described in Section 2.1. For the purposes of this analysis, both categories are treated as government investment. This approach is justified by the understanding that, despite their different statistical classifications, NGEU-induced capital transfers are generally intended to enhance public investment. Their classification as transfers is largely a statistical artifact, arising from the fact that these projects are often carried out by entities outside the general government sector, although still under government control. In our simulations, government investment has two key effects on the economy. In the short term, it stimulates demand during the investment execution phase. In the economy's productive capacity by increasing the capital stock. Other types of public expenditure, such as intermediate consumption, are represented by distinct corresponding fiscal instruments within the model. Given the significant delays in NGEU implementation, this channel will require careful attention and re-evaluation.

Also, the use of NGEU funds to support private sector financing for strategic projects has to be considered to obtain a complete picture of the fiscal channel. This component is new, and was not included in previous assessments. Under current government plans, financing will be funded by NGEU loans and provided to the private sector in the form of both loans and equity injections, as described in Section 2.1. Unlike the other subcomponent of the fiscal channel, the macroeconomic impact here stems from the lower cost of financing, rather than direct government investment. Assessing this channel requires not only considering the resources allocated to it, but also making plausible assumptions about the private sector's uptake of loans and the discount in financing costs compared with prevailing market conditions. Our analysis indicates that this channel may result in an increase of up to 0.1% in GDP level for the countries that implement it, with an even smaller impact at the euro area level. Given the limited scale of these effects, this study will not explore this channel in detail, but it is recognised that its overall contribution is likely to remain minimal.

The structural reform channel represents another crucial pathway through which the NGEU programme is expected to benefit the euro area economy. Structural reforms are a central component of NGEU's implementation and, while their macroeconomic effects tend to materialise gradually over time, they are essential for enhancing long-term economic potential. Conceptually, these reforms

boost potential output by improving the efficiency of resource utilisation within the economy. As with the fiscal channel, the structural reform channel should be carefully reconsidered in the light of the implementation delays that have become evident since the previous assessment. Another important factor is that the impact of structural reforms is inherently uncertain, making it particularly difficult to quantify. Therefore, the estimates provided in this study are accompanied by a high degree of uncertainty and should be interpreted with caution.

3.2 Models and tools used

The analysis of the economic impact of the NGEU makes use of two large-scale macroeconomic models, the ESCB's public debt sustainability analysis (DSA) tool, and input from the Eurosystem's expert group. Applying multiple tools in this study allows for the optimisation of methodologies to address the key questions. Additionally, the inclusion of two different types of macroeconomic models enhances the robustness of the results and enables the specific channels driving particular economic outcomes to be highlighted.

The two models used to assess the macroeconomic effects of the fiscal channel are EAGLE and ECB-MC. EAGLE is a global, large-scale DSGE model with forward-looking expectations, while ECB-MC is a semi-structural model designed for the euro area, aiming to balance the empirical fit in the short run with the theoretical foundations in the long run. A comprehensive overview of these models is provided in Gomes et al. (2012) and Bańkowski et al. (2023), respectively.[49] Unlike EAGLE, ECB-MC operates with value at risk (VAR) expectations, which are inherently backward-looking. Both models are multi-country in nature, representing the euro area as an aggregate of its largest Member States.

Both EAGLE and ECB-MC are well-suited for fiscal policy analysis, as they incorporate a meaningful role for fiscal authorities and include a wide range of fiscal instruments. Notably, both models feature productive government investment, which is critical for the analysis in this paper. This allows the models to capture not only the short-term demand effects of public investment projects, but also the long-term supply-side benefits.

The fiscal multipliers associated with government investment in both models are relatively large (around unity), aligning with existing literature that views government investment as a potent fiscal instrument. Government investment has a direct impact on GDP that is different from tax cuts or subsidies, which can be saved. Moreover, public investment enhances productive capital, which leads to long-term benefits for output (see Coenen et al., 2012). Both models embed monetary policy that responds to economic developments, including those induced by the NGEU programme. With unresponsive interest rate rules, the fiscal multipliers would be even larger.

[49] Bańkowski et al. (2023) provide a detailed account of the fiscal version of the semi-structural ECB-BASE model for the euro area, which serves as the foundation for the ECB-MC multi-country model.

At the same time, the two models exhibit important differences that will significantly impact the simulated economic outcomes. Most notably, their expectation mechanisms are different: EAGLE is forward-looking, while ECB-MC operates with backward-looking expectations. This distinction has critical implications for anticipation effects, which play a prominent role in EAGLE but are largely absent in ECB-MC. Specifically, in EAGLE, economic agents can anticipate future productivity gains from NGEU investments, with implications for current activity and prices. Another difference lies in how capital stock is represented in the models. While ECB-MC represents capital as a single aggregate, combining both private and public capital, EAGLE distinguishes between the two. This allows EAGLE to simulate government investment shocks under varying productivity assumptions – an aspect that will be further explored in the paper.

In addition to the two models, the DSA tool is used to estimate the impact of the NGEU programme on the government debt-to-GDP ratio. This tool, which is documented in Bouabdallah et al. (2017), complements the two macroeconomic models. In particular, it decomposes the dynamics of the debt-to-GDP ratio when combined with model simulations. It also allows for a more precise assessment of debt effects, particularly in calculating interest payments, compared with traditional models. This increased accuracy is due to the tool's incorporation of detailed information on debt structure.

To gauge the impact of the RRF and other NGEU instruments on potential output, this paper relies on the assessment of a Eurosystem expert group. In 2022, this group, with members from seven euro area central banks, conducted an initial assessment of the impact of NGEU on euro area potential output. Importantly, this assessment covers the impacts of both reforms and investments and – unlike the rest of this paper – considers both the RRF and the other NGEU instrument listed in footnote 11. In 2024, 11 euro area countries participated in an updating exercise. These 11 countries represent 88% of the euro area economy and 95% of NGEU funds allocated to euro area countries.[50] The 11s participating countries used various tools at their disposal to assess the impact of reforms, in particular of reforms. The methodologies ranged from applying elasticities found in earlier studies on the growth impact of reforms to DSGE models. Only NGEU additive measures were considered.

3.3 Assumptions and scenarios

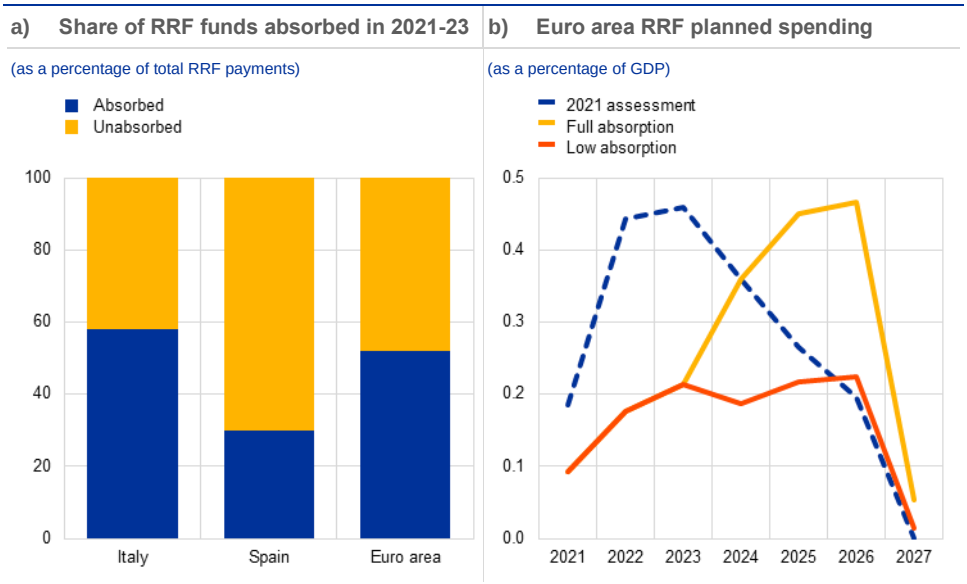
Given the uncertainty surrounding the NGEU's macroeconomic effects, our analysis incorporates scenario analysis to assess the robustness of estimates under different assumptions. On top of two distinct macroeconomic models, we consider scenarios across two key dimensions: (i) a different degree of fund absorption over the remaining lifetime of NGEU, and (ii) varying assumptions about the productivity of public capital.

[50] The countries participating in the exercise were as follows, in order of economic size: Germany, France, Italy, Spain, the Netherlands, Austria, Portugal, Greece, Croatia, Slovenia and Malta.

Different assumptions on the degree of NGEU programme absorption account for the risk of under-execution compared with the ambitious baseline implementation. The considerable delays in the initial phase of the programme indicate that achieving full absorption is not straightforward. Although some barriers, such as inflation and supply bottlenecks, have eased, and governments are now in a better position to push the programme forward, the assumption of full absorption of the remaining, substantial funds remains challenging. In this context, alongside the full absorption baseline, we consider an alternative scenario in which the past rate of execution continues. Specifically, we assume that the roughly 50% absorption rate observed in the programme's early years will persist in the coming years (**Chart 24A**). As a result, this alternative scenario does not involve a significant catch-up in implementation, but assumes the same spending levels as in 2021-23 (see Watzke and Watt, 2020 and Pfeiffer et al., 2023 for stylised full take-up scenarios).

Chart 24

Modelling assumptions on the absorption of the RRF programme



Source: ECB staff calculations on the basis of information collected through the ESCB WGPF.

Varying the productivity of public capital accounts for the uncertainty surrounding the productivity-enhancing effects of investment projects. Even when projects are executed, the extent to which they boost the productive capacity of the euro area economy depends on several factors. In the ECB-MC model, which assumes a single aggregate capital stock, public capital and private capital are treated as equally productive. However, in the EAGLE model, which distinguishes between public and private capital, the productivity of public capital can be modelled more explicitly. The baseline assumption uses a productivity parameter of 0.1 in the Cobb-Douglas production function, a value commonly cited in the literature.[51] Additionally, we consider two alternative scenarios: one with lower productivity (0.05) and one with higher productivity (0.15) of public capital.

[51] For details of the production function and how the productivity of public capital is incorporated, see Clancy, Jacquinot and Lozej (2016).

4 The impact of the RRF on the euro area economy

Based on the transmission channels and using the models and scenarios described in Section 3, the analysis conducted in the present section concludes that the NGEU programme may deliver substantial macroeconomic benefits for the euro area. We focus here on the impact of the RRF on economic activity, inflation, potential output, public debt, as well as on institutional quality and the quality of public finance.

Our core finding is that by 2026, the final year of the programme's implementation, euro area GDP is projected at between 0.4% and 0.9% higher than in a non-programme baseline. These positive effects strengthen in the long run, with estimated gains rising to between 0.8% and 1.2% (Table 4). The overall impact was initially mostly driven by the fiscal stimulus provided by NGEU, via the fiscal channel, and then by the growth-enhancing effects of the structural reforms embedded in the programme, via the structural reform channel[52]. The increasing benefits over time are largely due to the growing returns from structural reforms, even as the stimulative effects of NGEU spending diminish. However, the effects associated with the structural channel seem more uncertain than those associated with the fiscal channel.

Table 4
Estimated total impact of the RRF on euro area GDP and inflation

	Impact on GDP (percentage deviation from the non-NGEU baseline)		Impact on inflation (pp deviation from the non-NGEU baseline)
	Up to 2026	Up to 2031	
Fiscal measures	0.3 to 0.8	0.2 to 0.6	0.1
Structural reforms	0.1	0.6	-
Combined results	**0.4 to 0.9**	**0.8 to 1.2**	-

Sources: ECB staff and Eurosystem.
Notes: ECB estimates based on the EAGLE model and the ECB-MC model. The estimates on the structural channel are taken from the national central banks of the Eurosystem, and consider only the Total Factor Productivity component of potential output, to avoid double counting with long-run effects of fiscal measures. The estimates reported in ranges depend on the assumptions made with regard to (i) capital productivity (medium, high and low) and (ii) the high vs low absorption of RRF funds.

52 This finding does not factor in the confidence effects that occurred following the programme's announcement, as those benefits have likely already been fully realised by now. Nor does it include any macroeconomic gains from the component of the programme aimed at facilitating private sector financing, as its economic impact is expected to be minimal.

4.1 Impact on GDP and inflation

To quantify the fiscal impact of RRF-funded expenditures, the analysis utilises the dataset developed by the WGPF. This dataset (detailed in **Section 2.1**) captures the key characteristics of the programme, which are essential for evaluating its macroeconomic effects. It provides information (or hypotheses, when details are not available) on the composition of the programme, allowing the associated public expenditure increases to be matched with the appropriate shocks in the model. The dataset also includes a timeline dimension, enabling an assessment of the implementation schedule. Crucially, it also differentiates between additive and substitutive projects, which is vital for identifying projects that would have presumably occurred regardless of the programme, and thus should not generate additional macroeconomic effects.

Our macroeconomic simulations suggest that the NGEU-induced fiscal stimulus has the potential to generate significant gains for euro area output over the coming years. Depending on the underlying assumptions, these gains are projected to range between 0.3% and 0.8% by 2026, the final year of the programme. Moreover, these positive effects are expected to persist beyond 2026, with output gains estimated at 0.2% to 0.6% by 2031 (**Table 5**). This lasting impact is largely due to the durable nature of NGEU investment projects, most of which target government investment and contribute to the long-term productive capacity of the economy, even after the projects themselves have been completed. The effects are particularly pronounced in the main beneficiary countries, such as Italy and Spain, where the gains are two to three times higher than the euro area average.

Our analysis also highlights the critical importance of assumptions on both the absorption of RRF funds and the productivity of RRF expenditure, with absorption being particularly decisive. In the low-absorption scenario, where implementation continues at the slow pace previously observed, the output gains are halved compared with the main scenario with medium productivity (see **Table 5**). In this case, low absorption leads to governments missing much of the potential benefits of NGEU. Productivity assumptions also significantly influence the final outcomes, with the low and high productivity scenarios differing noticeably from the central case. Therefore, for governments aiming to maximise the impact of the programme, priority should be given to efficient projects that offer the highest economic returns.

Table 5

Estimated impact of the fiscal channel of the RRF on the GDP level of the euro area, Italy and Spain

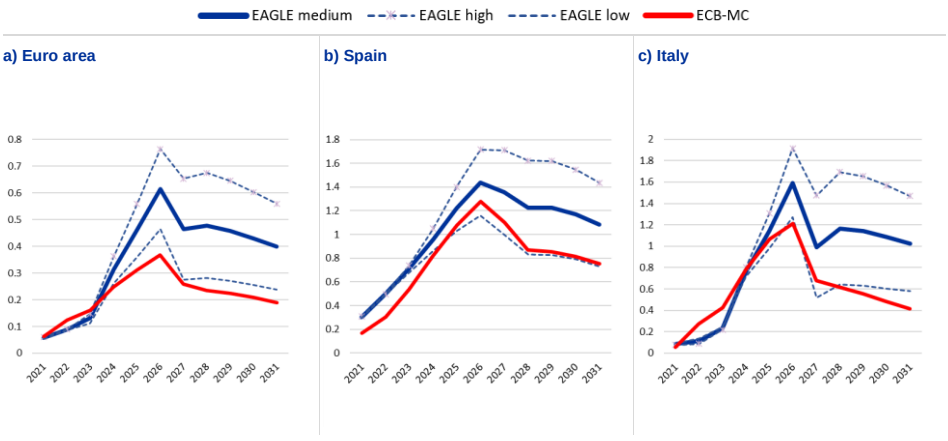
Assumption 1: **Absorption of RRF funds**	Assumption 2: **Productivity of RRF expenditure**	To 2026			To 2031		
		EA	IT	ES	EA	IT	ES
High in 2024-26	High	0.8	1.9	1.7	0.6	1.5	1.4
	Medium	0.5	1.4	1.4	0.3	0.7	0.9
	Low	0.5	1.3	1.2	0.2	0.6	0.7
Low in 2024-26	Medium	0.3	0.9	0.5	0.2	0.4	0.5

Source: ECB staff calculations and ESCB WGPF.
Notes: We use an original dataset developed by the WGPF, which captures the time profile of expenditure, its composition and the degree of additivity vs substitutivity. Given the uncertainty surrounding our quantitative estimates, we: (i) implement two distinct ECB models (a forward-looking DSGE model with rational expectations (EAGLE) and a semi-structural model with backward-looking expectations (ECB-MC)); (ii) use different multipliers depending on the expenditure items and in line with the existing literature; (iii) distinguish between high, medium and low productivity of public capital; and (iv) provide estimates under the assumptions of both high and low absorption of RRF funds in the residual lifetime of NGEU. Low absorption in 2024-26 is here defined as the same rate of spending of RRF disbursements as in 2021-23.

The output gains from the NGEU programme are still largely ahead, contingent on an implementation catch-up. As shown in the NGEU dataset, the programme has experienced significant backloading compared with previous assessments. Consequently, the output benefits realised so far have been relatively modest. The backloading implies, however, that substantial resources will be deployed in the coming years. If this occurs – and assuming high absorption of the funds in the residual life of the programme – the catch-up in implementation should result in output gains of nearly double those observed to date (**Chart 25**). While this conclusion holds across both models, the persistence of these effects varies. In particular, EAGLE, with its production function, in which public capital enhances total factor productivity, produces more pronounced long-term supply-side effects. Although ECB-MC captures these effects and they remain significant in absolute terms, they are less pronounced than for EAGLE.

Chart 25

Estimated impact of the RRF on GDP (euro area, Italy, Spain)

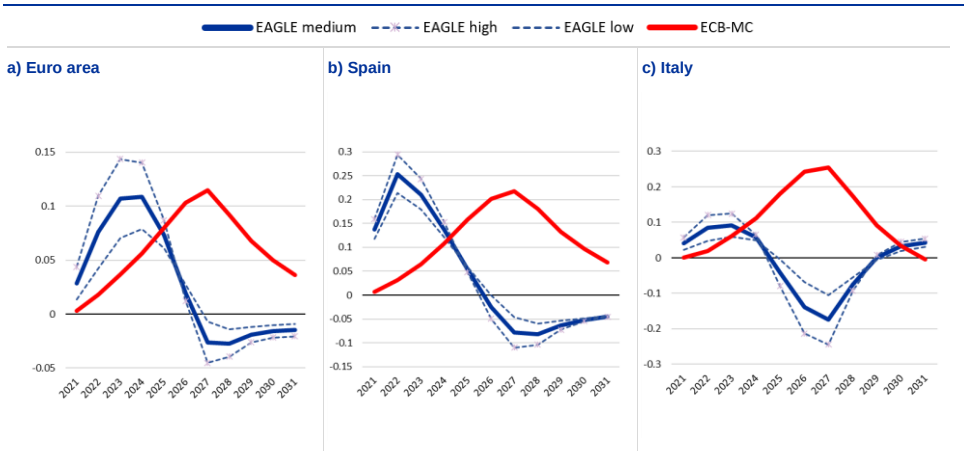


Source: ECB staff calculations.

Turning to inflation, the analysis identifies only a modest impact from the NGEU programme on the euro area. Model simulations suggest that inflation could differ by around 0.1 percentage point at its peak from the non-NGEU baseline, although in Italy and Spain the effects could temporarily reach 0.3 percentage points (**Chart 26**). The dynamic pattern and magnitude of the inflationary effects depend mostly on a combination of two factors: (i) on the supply side, the potential for deflationary pressures resulting from RRF-funded investment boosting productive capacity[53]; and (ii) on the demand side, the risk of expenditure becoming highly concentrated within limited periods of time. Overall, the inflation dynamics are largely model-dependent. Forward-looking models, such as EAGLE, emphasise that any rapid, demand-driven inflation is quickly offset by disinflationary pressures as a result of anticipated increases in productive capacity. In contrast, models with backward-looking expectations, such as ECB-MC, primarily capture past and current demand pressures, which only gradually influence prices.

Chart 26

Estimated impact of the RRF on inflation (euro area, Italy, Spain)



Source: ECB staff calculations.

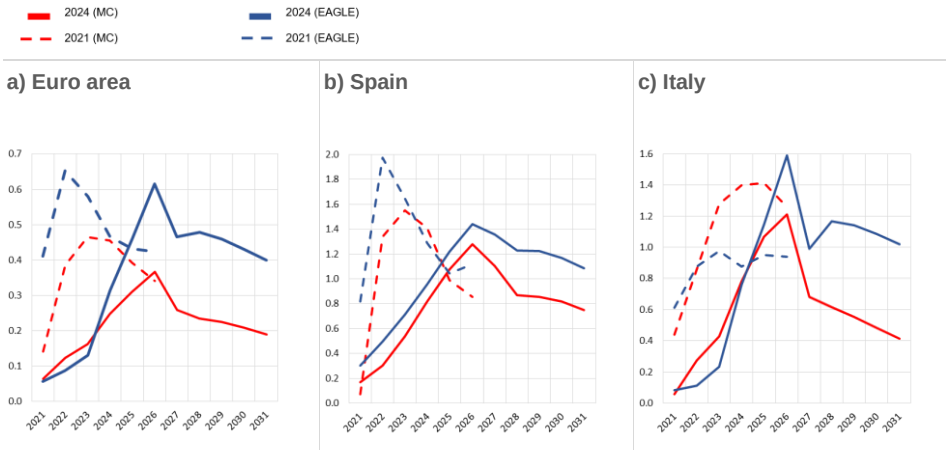
The current assessment of the NGEU programme's effects reflects a significant reprofiling of the timeline compared with the previous evaluation, as well as an expansion of the programme that was offset by the erosion in the real value of the stimulus. The assessment published in Bańkowski et al. (2022) assumed an ambitious and rapid implementation of the programme from the outset, with corresponding output gains realised early on. However, as delays in implementation have emerged, the execution of the programme has been pushed into the second half of the NGEU's lifespan. Naturally, this has shifted the timing of the programme's impact (**Chart 27**). Despite these delays, the magnitude of the overall effect remains broadly in line with initial estimates, as it is shaped by a combination of factors with varying influences. In particular, while the programme has been expanded, as illustrated in Section 2.1.1, this has been broadly offset by

[53] Our analysis abstracts from the supply-side bottlenecks that materialised during the first years of the NGEU programme.

an erosion in the real value of the stimulus caused by the unanticipated inflationary shock, which occurred after the inception of the programme.

Chart 27

Comparison of the current with the previous assessment (euro area, Italy, Spain)



Source: ECB staff calculations.

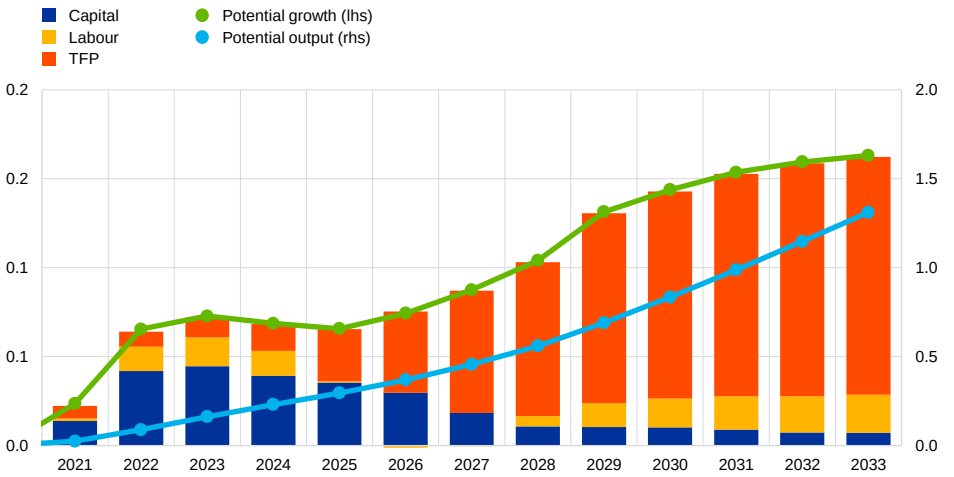
4.2 Impact on potential output and institutional quality

The updated estimates of an ESCB expert team suggest that NGEU could raise the potential output of the euro area by 1.0% by 2031, and 1.3% by 2033 if the RRPs are fully implemented. Potential growth could be boosted by 0.10-0.15 percentage points per annum in the period 2020-33 (**Chart 28**). Until around 2027, the capital contribution, representing the impact of investments, makes up a significant proportion of the expected effects. After that, most of the impact is expected to come about via structural reforms, mainly affecting the contribution of total factor productivity (TFP) to potential growth, and to some extent also the labour contribution. As noted above, these estimates cover the impacts of both reforms and investment. Moreover, the estimates include the RRF, as well as the other NGEU instruments.

Chart 28

The impact of NGEU on EA-11 potential output

(percentage and pp deviation from counterfactual)

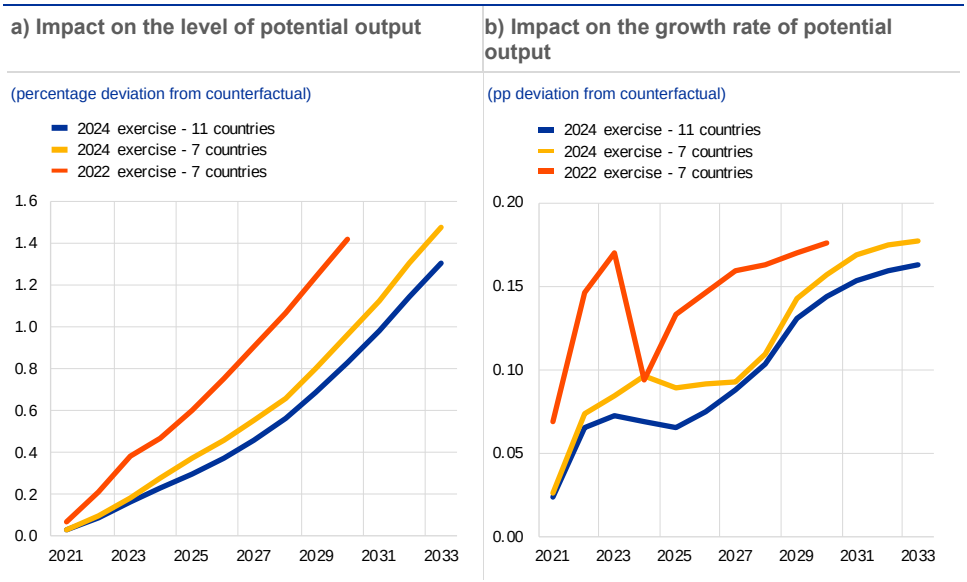


Source: Eurosystem expert group calculations.
Note: The euro area aggregate is represented by the weighted average of the following 11 countries: Germany, France, Italy, Spain, the Netherlands, Austria, Portugal, Greece, Croatia, Slovenia and Malta.

The updated estimates indicate that NGEU will have less of an impact on potential output over the period 2020-30 than was estimated in 2022. The ex ante exercise expected an n impact of 0.5% on the level of euro area potential output by 2024. In the updated exercise, the estimated impact in 2024 is only 0.2%, and the long-term impact of 1.3% is expected to materialise in 2033, rather than 2030. The delay can also be observed in the expected impact on potential growth: in 2022-23, the growth impact is estimated at around half of that originally projected, and a smaller growth impact is also expected over the long term, i.e. 2025-30 (**Chart 29**). The smaller expected impact on potential growth also reflects the fact that the previously anticipated effects of investments barely materialised in 2022-23, with 2024 being a transition year, and that inflation has been higher than originally expected, deflating the real value of planned investments. From 2025 onwards, a pick-up in the impact on potential growth is expected, as structural reforms start affecting potential growth. In the most recent update, however, this impact is also estimated to be slower. Overall, the smaller, delayed impact of investments and the smaller impact of structural reforms results in a smaller impact on the near-term potential growth profile than in the initial estimates. While the long-term impact of NGEU on potential output will only materialise over time, it is possible to conduct a tentative analysis of the extent to which the effects of the RRF are already apparent in the actual data (**Box 2**).

Chart 29

Impact of NGEU on euro area potential output: 2022 vs 2024 exercises



Source: Eurosystem expert group calculations.
Notes: In the 2024 exercise, the euro area aggregate is represented by the weighted average of the following 11 countries: Germany, France, Italy, Spain, the Netherlands, Austria, Portugal, Greece, Croatia, Slovenia and Malta. In 2022, the Netherlands, Austria, Croatia and Malta were not covered.

The revisions to the potential output estimates mainly reflect the backloading of previously expected effects due to observed implementation delays. In fact, long-term estimates of potential output growth converge to a similar level in both estimation vintages. The differences between the two vintages mainly lie in the time profile over the short-to-medium term. This reflects the assumption of the ESCB expert group that the RRPs will eventually be fully implemented, despite the delays observed in the first half of NGEU's envisaged lifespan.

The downside risks surrounding the potential output baseline estimates have increased since 2022. Due to the implementation delays observed so far, Member States might be tempted to "rush through" investments and reforms at the expense of implementation quality – or some projects might be cancelled altogether. Hence, the likelihood of ineffective or incomplete implementation of NGEU, and specifically the RRPs, has increased since 2022. These risks are concentrated in the second half of NGEU's envisaged lifespan. Therefore, the baseline estimates of NGEU's long-run impact on potential output are now subject to larger downside risks than in 2022.

Box 2

The impact of the RRF on institutional quality: a tentative empirical assessment

Prepared by Nico Zorell and Christoph Zwick

The full impact of RRF-linked reforms on potential output will take time to materialise. However, some effects are already observable at the early stages of the transmission chain, particularly in indicators of institutional quality. Enhancements in institutional quality, in turn, are expected to boost

potential output over the long term, primarily by fostering productivity-enhancing investment and innovation in the private sector.

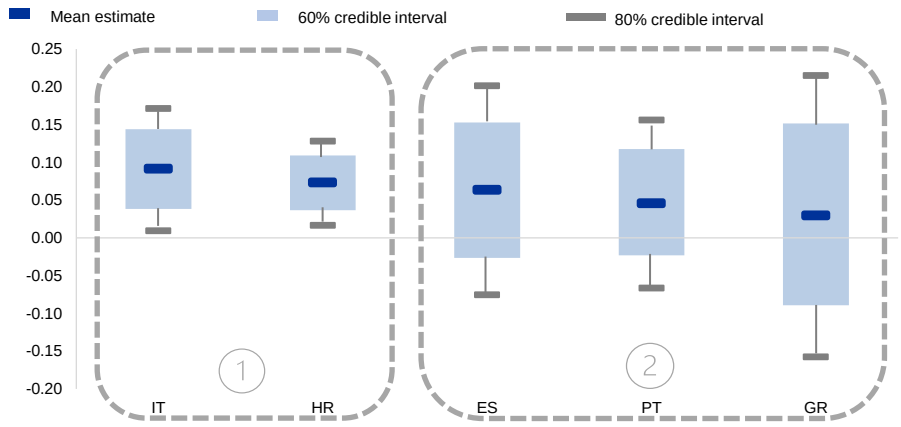
ECB analysis points to tentative signs of modest RRF-induced improvements in institutional quality in some key euro area recipient countries, amid high statistical uncertainty. Employing an appropriate methodology designed to estimate the causal effect of infrequent or one-off major policy interventions,[54] the estimates indicate a modest positive impact of the RRF on institutional quality, most notably in Italy (Chart A). In other countries in the sample, the estimated improvements in institutional quality are both smaller and surrounded by significantly greater uncertainty.

These estimates are derived using a Bayesian Structural Time Series (BSTS) model with two state components: (i) a static regression that uses institutional quality in a set of control countries as predictors and (ii) a semi-local linear trend. In line with the literature, institutional quality is measured by a composite index of four World Bank Worldwide Governance Indicators: government effectiveness, regulatory quality, rule of law and control of corruption. The RRF's impact on institutional quality is determined by comparing the actual change in this composite indicator in the selected countries between 2021 (the last pre-treatment year) and 2022 (the most recent post-treatment year), with their respective counterfactuals, estimated using the BSTS model.

Chart A

Estimated causal impact of the RRF on institutional quality in key euro area recipient countries

(index points, axis description)



Source: ECB estimates based on World Bank data.
Notes: Bayesian "confidence bands" (credible intervals). Institutional quality measured by the World Bank's Worldwide Governance Indicators (average of Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption; range: minus 2.5 to plus 2.5.).

Building on previous ECB research[55] on the impact of institutional quality on potential output, the estimated RRF-induced improvements in institutional quality imply some moderate increases in potential output per capita growth – of up to 0.15 percentage points on average over a 15-year horizon (Chart A). While these gains are non-negligible, they are only sufficient to close a small portion of the growth gap associated with weaker institutional quality relative to the euro area average (Chart B). This highlights substantial room for further policy action to enhance institutional quality, productivity and potential growth. It is important to note that some additional RRF-induced

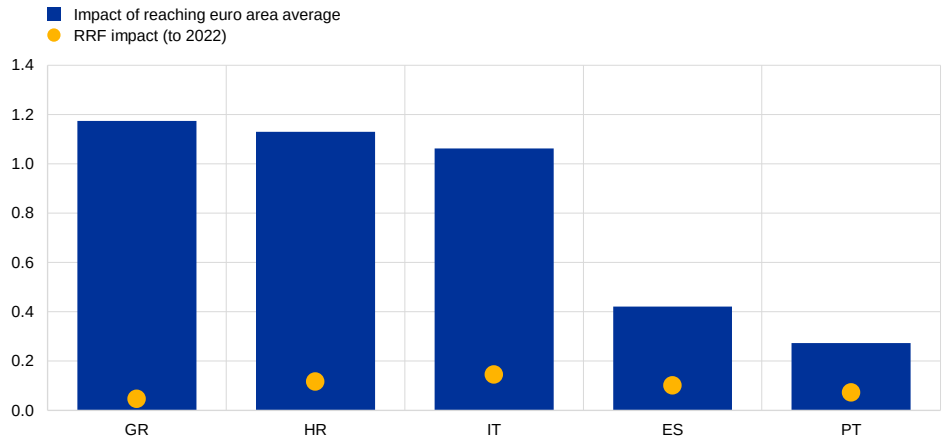
54 See Brodersen et al. (2015).
55 See Masuch et al. (2016).

improvements in institutional quality are likely still forthcoming. This is because the full impact of the implemented RRF measures on institutional quality might only appear with a lag. Moreover, due to data limitations, this analysis only considers measures implemented until 2022.

Chart B

Estimated long-run impact of RRF-induced improvements in institutional quality on potential output per capita growth

(percentage points, difference in average growth rate over 15 years)



Source: ECB.
Notes: Yellow dots = mean estimates of causal impact of RRF on institutional quality combined with updated coefficients from Masuch et al. (2016) on the impact of institutional quality on long-run per-capita growth. Blue bars = updated results from Masuch et al. (2016) on the growth impact of catching up to the euro area average in terms of institutional quality.

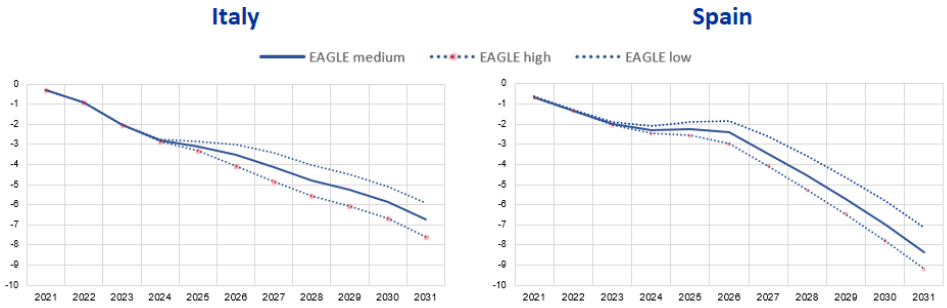
4.3 Impact on public debt and quality of public finance

The impact of the RRF on government debt ratios is estimated to be favourable and significant for the main beneficiary countries. The analysis is based on the June 2024 Eurosystem staff macroeconomic projections for the debt outlook and its main driving variables (i.e. covering the period 2024-26 and until 2033 for the potential growth estimates), assuming that all currently expected RRF effects are at play. Afterwards, a counterfactual scenario without the RRF is built by subtracting all debt-reducing and debt-increasing effects identified in the previous sections. For Italy and Spain, the overall debt-reducing impact of the RRF is estimated to be around 7-8 percentage points in the central scenario assuming a medium productivity level (**Chart 30**). The overall impact on debt does not change significantly when considering high or low productivity assumptions.

Chart 30

Estimated impact on the public debt of Italy and Spain

(deviation from baseline in percentage points)



Sources: Eurostat and ECB staff calculations using the ESCB's DSA tool.
Notes: Impact on the debt-to-GDP ratio in the following scenarios on productivity of capital spending: (i) medium (blue solid line), high (blue dotted line) and low (blue dotted line with pink dots) productivity.

The effects of the RRF on government debt ratios operate via the four main channels illustrated in Chart 31, which are as follows.

(1) A *direct channel* with two opposite effects: (i) a favourable effect over the period of analysis through the RRF grant component (recorded as revenue, with a significant impact on the budget balance of the main beneficiary countries) and (ii) a debt-increasing effect via RRF loans. The latter is the only debt-increasing factor, albeit with a lower marginal cost than if the individual countries, especially the high-debt ones, were to finance themselves on the market. As this second effect prevails over the first effect, in net terms the direct channel increases the public debt ratio in the two main beneficiary countries (**Chart 31**, yellow bars).[56]

(2) A *confidence channel* via lower sovereign risk premia and, therefore, lower financing costs. This effect has been more pronounced in the case of Italy, where the spread vis-à-vis German Bunds had widened more substantially at the beginning of the COVID-19 crisis. Therefore, the mere announcement of the NGEU agreement in May 2020 shifted the entire sovereign yield curve, including the long end, significantly downwards (red bars; see also footnote 5).

(3) The *demand-driven stimulative impact of the RRF on the economy*, which results in higher government revenues and a higher real GDP denominator in the public debt ratio (blue bars).

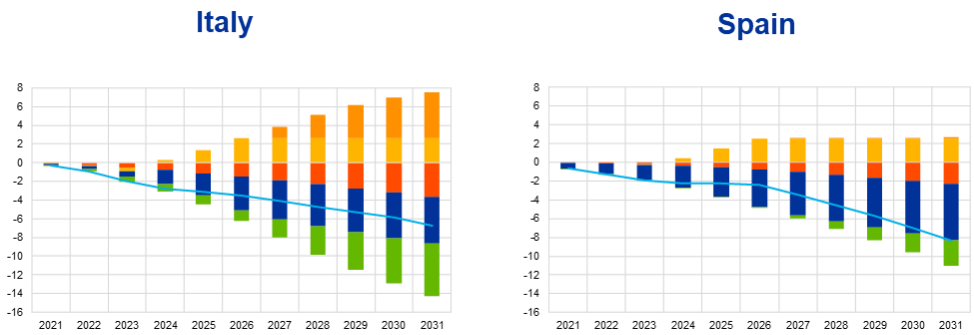
(4) The *effects on the supply side*, i.e. on potential GDP due to investment and reforms. The more favourable impact on potential growth estimated for Italy compared with Spain partly offsets the larger debt-increasing impact of higher RRF loan uptakes in 2023 (green bars).

56 A "fifth" channel (the orange bars in Chart 31) illustrates the effect of slower fiscal consolidation after the NGEU period (i.e. as of 2027), reflecting the new EU fiscal rules. This looser fiscal position, compared with what an abrupt end of NGEU would have suggested, mechanically results in a further rise in the debt ratio, particularly for Italy.

Chart 31

Estimated impact on the public debt of Italy and Spain

(deviation from baseline in percentage points)



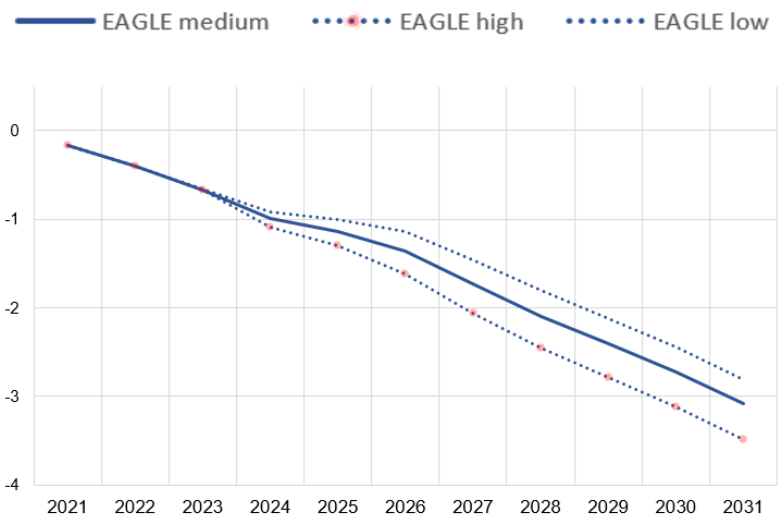
Sources: Eurostat and ECB staff calculations using the ESCB's DSA tool.
Notes: The impact on the debt-to-GDP ratio stems from four main effects, which are highlighted here in the medium productivity scenario: (i) yellow bars = direct budgetary impact of additive (debt-increasing) loans and (debt-decreasing) substitutive grants; (ii) red bars = interest savings from lower risk premia; (iii) blue bars = stimulus effect produced by NGEU on the economy, which leads to higher revenues and a higher denominator in the debt ratio; (iv) green bars = impact on the supply side (potential GDP) due to investment and structural reforms. Finally, the orange bars illustrate the effect of slower fiscal consolidation after the NGEU period (as of 2027), reflecting the new EU fiscal rules. This looser fiscal position, compared with what an abrupt end of NGEU would have suggested, mechanically results in a further rise in the debt ratio, particularly for Italy.

Although the favourable effects on the debt ratios of the main beneficiaries remain significant, this update points to a significant downwards revision compared with our initial estimates. For Italy and Spain, the overall impact has been revised downwards to 7-8 percentage points by 2031, from 12-14 percentage points in Bańkowski et al. (2022). The main factor behind the revision remains the backloading of previously expected effects due to observed implementation delays. These delays have resulted in a significantly less favourable stimulus effect on the budgetary outcome and on the denominator (GDP). More importantly for the long-term debt outlook, the delays in implementing the reforms have led to a significant downwards revision in potential GDP, which accumulates in the debt projections.

The impact of the RRF on the debt ratio of the euro area as a whole is also estimated to be favourable (Chart 32). We hereby define "euro area debt" in narrow terms, as an aggregate of national debt ratios including RRF loans, net of intra-area flows (e.g. bilateral loans to Greece), but not taking into account debt contracted at EU level to finance the grant component of NGEU. This approach is consistent with a statistical and legal perspective and, in particular, the fact that an EU institution such as the European Commission (which is in charge of NGEU borrowing) is resident in the EU, not in the euro area. In this context, it may be arbitrary to single out the euro area's share of public debt that has been contracted at EU level. Accordingly, Eurostat does not publish statistics on aggregate euro area debt. Having said that, we acknowledge the limits of this narrow measure of euro area debt. An alternative approach would be attributing national shares of EU consolidated debt to national debt levels, following the example of the Bundesbank, using the country's share of EU GNI as the allocation key (Bundesbank, 2024).

Chart 32
Estimated impact on euro area public debt

(deviation from baseline in percentage points)



Sources: Eurostat and ECB staff calculations.
Notes: Impact on the debt-to-GDP ratio in the following scenarios on productivity of capital spending: (i) medium (blue solid line), high (blue dotted line) and low (blue dotted line with pink dots) productivity. The estimates for the euro area are simply an aggregate of national debt ratios, net of intra-area flows (e.g. bilateral loans to Greece). The chart does not account for debt contracted at EU level as it is not possible to single out the euro area share.

Finally, the RRF may also be driving some improvement in the quality of public finance at the national level. As discussed in **Box 3**, preliminary evidence on the composition of public expenditure in the main beneficiary countries suggests that the implementation of the RRF has produced a shift towards items with more pronounced effects on GDP growth, such as renewable energy, charging stations for electric vehicles, digitalisation of SMEs and artificial intelligence.

Box 3
The impact of the RRF on the quality of public finances

Prepared by Marta Rodríguez-Vives

"Quality of public finance" (QPF) is a multidimensional concept that can be approached from several angles. The key dimensions for the analysis of the QPF are the size of government, the composition and effectiveness of expenditure and the structure of revenue systems. This box focuses on how the RRF can produce changes in the composition of government expenditure that may enhance its long-run growth potential.[57] However, the lack of granular data on RRF expenditure items limits the depth of our analysis.[58]

[57] The main impulse for this concept came from the European Commission during 2008-09 under the auspices of the Economic Policy Committee (EPC) Working Group on the quality of public finances (QPF). Later on, the OECD developed several analytical avenues to quantify the evolution of the QPF across OECD countries.

[58] The COM/Eurostat requests granular data on RRF to all the EU Member States, but the breakdowns of the Classification of the Functions of Government (COFOG) are optional and have not yet been provided.

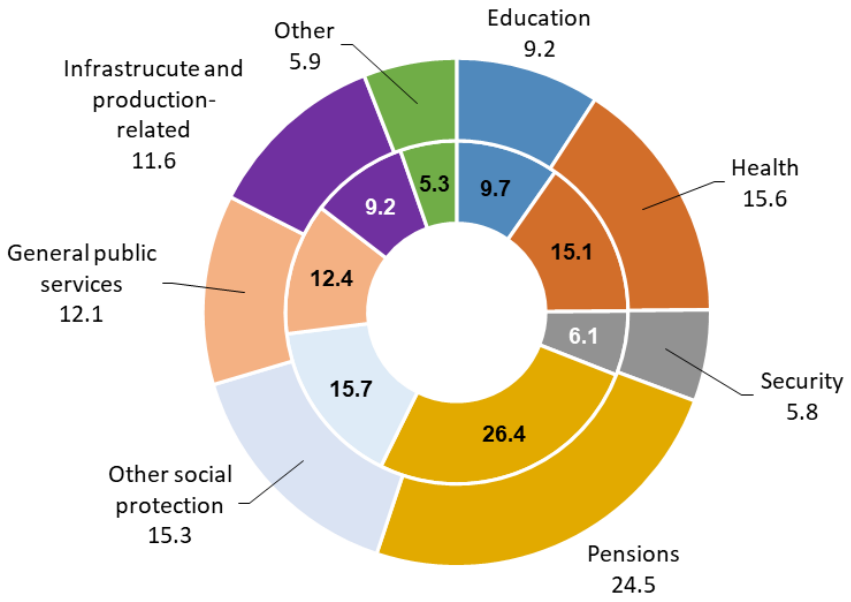
We have used a dataset based on the Classification of the Functions of Government (COFOG), which classifies government expenditure data from the System of National Accounts according to the purpose for which the funds are used. The data have been adjusted and regrouped to better fit the purposes of this analysis. This evidence shows some changes in the composition of public expenditure between 2019 (i.e. the pre-pandemic and pre-RRF year) and 2022. Chart A illustrates the changes in the functions of government expenditure in the period 2019-22 in the euro area. Although the provision of public goods and services differs across euro area countries, one common denominator is that social protection, followed by health, remains the most important function of the government. However, social protection as a proportion of total expenditure decreased from 42.1% in 2019 to 39.8% in 2022, mainly due to lower spending on pensions. The area that may have been more markedly affected by the RRF is infrastructure and production-related output, the proportion of which increased from 9.2% to 11.6% of total expenditure in the same period. This corresponds to the COFOG category of "economic affairs"[59], which includes expenditure on infrastructure – most notably transport – and energy, which was greatly affected by measures to mitigate the energy crisis.

Chart A

Changes in the composition of government expenditure in the euro area (COFOG data, 2022)

2019 (inner circle) and 2022 (outer circle)

(percentage of total expenditure by functional category)



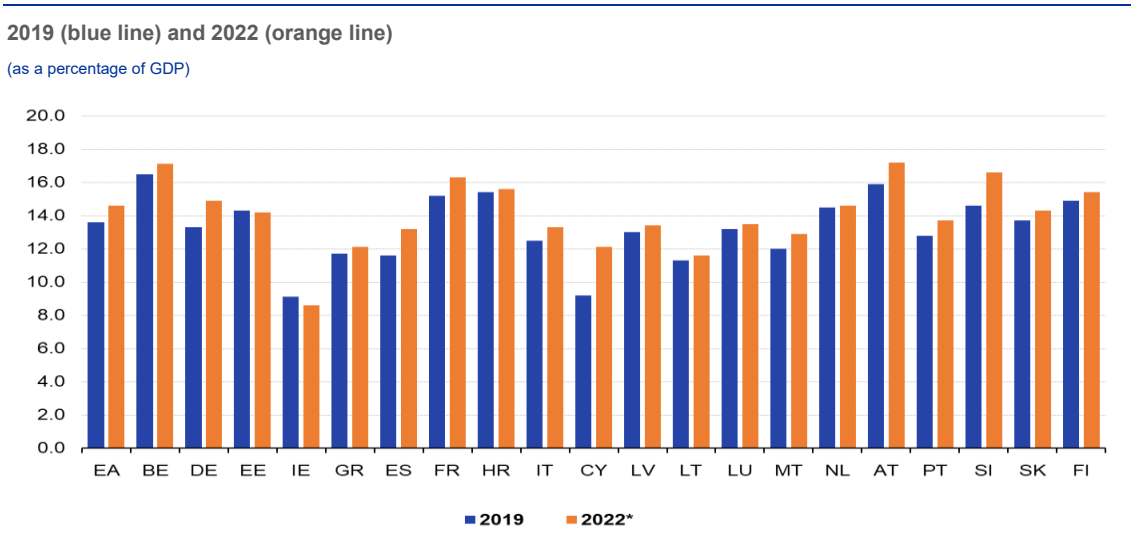
Source: ECB staff calculations based on Eurostat data. 2022 is the latest year available. Provisional data for some countries.
Notes: While these categories closely follow the COFOG, they have been adjusted and regrouped to better fit the purposes of this analysis. On the expenditure side, the analysis differentiates between eight categories: 1) general public services, which includes interest payments (COFOG 01); 2) security, which consists of defence (02) and public order and safety (03); 3) infrastructure and production-related spending, which corresponds to "economic affairs" (04); 4) health (07); 5) education (09); 6) pensions; and 7) other social protection (10); and 8) the "other", category, which comprises the COFOG items "environmental protection", "recreation, culture and religion" and '"housing and community amenities".

[59] In 2022, subsidies (4.4% of total expenditure; €349 billion) and capital transfers, including investment grants (€295 billion; 3.7% of total expenditure) were concentrated in the "economic affairs" function. Capital investments (gross capital formation) made up 6.7% of general government total expenditure in the EU in 2022. They were concentrated in the "economic affairs" category, which notably includes "transport".

Looking more closely at the composition of productive government expenditure, we can observe growth in this item in 2022 compared with 2019. Chart B shows an increased allocation to more productive spending at the euro area level in most countries. This includes government expenditure on transport and communication, health, education and R&D. In some cases, this may partly have been driven by RRF funds allocated to transport, including spending on roads and railways, which increased markedly in Portugal (from 1.8% of GDP in 2019 to 2.3% in 2022), Spain (from 1.5% to 1.9%) and Italy (1.8% to 2.1%).

Chart B

Changes in the composition of government expenditure in the more growth-friendly components (COFOG data, 2022)



Source: ECB staff calculations based on Eurostat data. 2022 is the latest year available. Provisional data for some countries.
Notes: "More growth-friendly" refers to more productive expenditure, which can be proxied by the **sum** of government expenditure on transport and communication (COFOG 04.05 and 04.06), health (07), education (09) and the second digit breakdown of R&D in each of the 10 COFOG categories.

Looking ahead, the overall quality of the expenditure of the main recipients of RRF funds may be improving in the longer run.[60] One indicator of the growth-friendliness of the composition of government expenditure is provided in Chart C. The expected change between 2023 and 2024 in the quality of expenditure relative to short-term economic growth and long-term growth is based on the notion of growth-friendliness of fiscal instruments, developed by Cournède et al. (2014). The composition score is a weighted average of the score of individual expenditure items (Table A) and these items as a proportion of the GDP of a given country. Although the expected changes are not significant in the euro area and the selected countries, Chart C suggests that the composition of public expenditure in the main RRF beneficiary countries may become more growth friendly in the long-term, especially in Greece and Italy. The effects in the short term seem relevant in Croatia.

[60] This analysis only takes into account the spending envisaged until 2024. The RRF programme runs until 2026, and the analysis does not take into account any changes in the spending breakdown when the programme expires.

Table A

Growth effects in the short and long term of fiscal instruments on the expenditure side

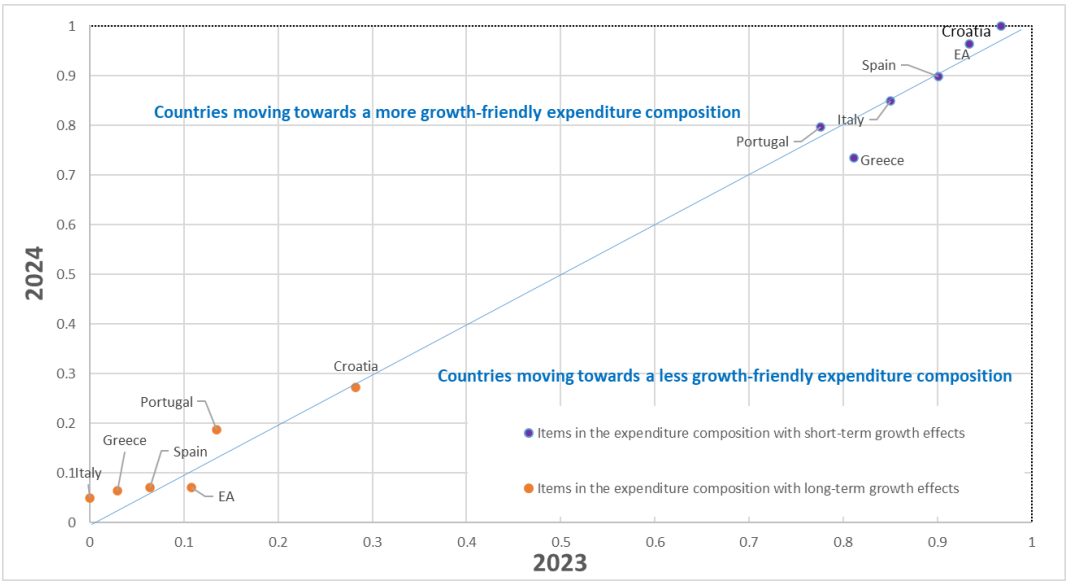
Expenditure item (macroeconomic indicator)	Short-term growth	Long-term growth
1. Education (consumption)	1.0	1.0
2. Health (public consumption)	1.0	0.5
3. Other government consumption (public consumption)	1.0	-0.5
4. Pensions (social transfers other than in kind)	0.0	-1.0
5. Sickness and disability (social transfers other than in kind)	0.5	-0.5
6. Unemployment benefits (social transfers other than in kind)	0.5	-0.5
7. Family (public consumption)	0.5	0.5
8. Subsidies	0.5	-1.0
9. Public investment	1.0	1.0

Source: Based on Cournède, B., Goujard, A and Pina, Á. (2014), "Reconciling fiscal consolidation with growth and equity", *OECD Journal: Economic Studies*, Vol. 2013/1

Chart C

Changes in the quality of the composition of government expenditure in the euro area and selected countries (national accounts data)

2024 (COM forecasts) and 2023 (Eurostat)



Sources: ECB staff calculations based on Eurostat and European Commission (AMECO database, May 2024).
Notes: The graph shows the ranking of countries based on the changes in the composition of expenditure in 2024 compared with 2023. Around 85% of total expenditure is examined with this methodology. This is calculated based on the impact on short-term and long-term growth of nine fiscal items based on Cournède et al. (2014). Several items (education, health, pensions etc.) are computed as a percentage of government consumption and social benefits other than social transfers in kind in 2023 and 2024, based on their percentage in the breakdown for 2022. The score of the breakdown for a given country is calculated as Sit = (Σ GDP share expenditure item it) * growth score expenditure item i. The resulting scores are ranked by minimum to maximum and normalised to 0 to 1 values.

5 Conclusions

This paper has shown that NGEU may significantly increase euro area output in the long run. Our model-based estimates suggest that the public expenditures and structural reforms linked to NGEU have the potential to increase the level of euro area GDP by around 0.4-0.9% by 2026 and 0.8-1.2% by 2031. The estimation ranges reflect the prevailing uncertainty around our key assumptions, most notably whether the planned investments and reforms will be implemented completely and effectively. The favourable impacts of NGEU are projected to contribute to a decline in the government debt ratios of the main beneficiary countries. On the nominal side, we find that NGEU is likely to have only a limited impact on euro area inflation due to offsetting demand and supply effects.

Our analysis also indicates that NGEU's growth-enhancing impact is likely to materialise later than initially expected and could be smaller than currently envisaged. This downwards revision largely reflects delays in the implementation of the national investment and reform plans. These delays, in turn, mainly reflect administrative constraints and the ramifications of the war-related inflation shock, while the programme's real value holds approximately stable through concurrent increases in the price level and in nominal RRF-related grants financing investment in the euro area countries. The NGEU implementation risks identified in Bańkowski et al. (2022) have thus materialised. At the same time, the projected long-run impact of NGEU on the growth rate of euro area output is similar to previous results. Hence, the revisions to the output estimates overall constitute a *reprofiling*, rather than a reassessment of NGEU's long-run effectiveness. Given the transmission lags involved, it is arguably too early to draw firm conclusions on the effectiveness of NGEU-linked investments and reforms. We leave this task to a future ex post assessment. Even so, the risk of ineffective or incomplete implementation of NGEU-linked investments and reforms has arguably increased since 2022. The implementation delays observed so far, combined with the fixed end date of NGEU, suggest that some projects may either be "rushed through" at the expense of implementation quality, or cancelled altogether. It is thus key that Member States remain committed to their plans, with ambition and targeted policy action, prioritising implementation quality over speed.

It is up to euro area countries to enhance the implementation of their NGEU-linked investments and reforms through targeted policy action.[61] Most notably, Member States could redirect administrative resources, make more intensive use of the EU's Technical Support Instrument and identify targeted regulatory changes that would facilitate the roll-out of their NGEU projects. Such corrective policy measures might alleviate the emerging trade-off between the speed and quality of plan execution in the second half of the NGEU's envisaged lifespan. More generally, such policy efforts are vital to ensure that NGEU can unlock its transformative potential

[61] This is consistent with the 2024 CSRs issued under the European Semester, which call on several Member States to improve the implementation of their NGEU-linked investment and reform plans.

and thus act as a catalyst for the modernisation and economic convergence of the euro area economies.

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