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Research Report

The nonsense of next generation EU net balance calculations

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The nonsense of Next Generation EU net balance calculations

Zsolt Darvas

Executive summary

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THE ESTIMATION OF payments from the European Union's COVID-19 economic recovery fund, Next Generation EU (NGEU), to each EU country in 2021-2026 involves uncertainties, yet the overall magnitudes can be estimated with a reasonable degree of precision. In contrast, estimating member states' contributions to the repayment of EU debt (which will be issued to finance NGEU spending) is burdened with enormous difficulties, primarily related to the uncertainty of gross national income projections up to 2058. Some numerical scenarios can be put forward to illustrate the difficulties in estimating the amounts of such future contributions.

PROPOSALS TO INTRODUCE new direct revenues to the EU budget ('own resources') are welcome because of their positive externalities, such as reducing harmful emissions or levelling the playing field in the single market. But ultimately, new revenue sources for the EU budget imply that such revenues will not accrue to national budgets.

THE EU'S TRADITIONAL way of calculating net balances in relation to the EU budget disregards the economic impact of the EU budget. This is a drawback for the standard seven-year EU budget, but especially problematic for NGEU, which is a temporary instrument. A proper analysis should compare the scenario in which there is no NGEU with the NGEU scenario, in which increased incomes arising from NGEU should also be considered in addition to direct cash flows between the EU budget and member states.

ASSESSING THE ECONOMIC impact of NGEU is very difficult, while the European Commission's impact assessment seems greatly exaggerated. Even one-half of the estimated impact of the Commission's 'low additionality' scenario would make all EU member states net financial beneficiaries of NGEU.

INSTEAD OF CONCENTRATING on net balances, NGEU should help to focus more on effective, efficient and fair ways of spending EU money and the long-term benefits countries can derive from it.



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1 Introduction

Politicians and the general public alike are interested in knowing how much their country will receive from the European Union's landmark economic recovery instrument, Next Generation EU (NGEU), which is intended to help the EU recover from the economic impact of COVID-19. They also want to know how much each country has to contribute to it in the future. NGEU pay-outs should be made between 2021 and 2026, and will be financed by EU borrowing from the markets. The resulting EU debt is expected to be repaid between 2027 and 2058, according to the December 2020 European Council agreement¹.

The total maximum financial envelope of NGEU comprises grants and guarantees amounting to €390 billion in 2018 prices or €420 billion in current prices, and loans amounting to €360 billion in 2018 prices or €375 billion in current prices. These amounts will be disbursed via the seven facilities of NGEU: the Recovery and Resilience Facility (RRF, €312.5 billion in grants and €360 billion in loans); Recovery Assistance for Cohesion and the Territories of Europe (REACT-EU, €47.5 billion in grants); the Just Transition Funds (JTF, €10 billion in grants); Rural Development (€7.5 billion in grants); Horizon Europe (€5 billion in grants), civil protection (RescEU, €1.9 billion in grants); and InvestEU (€5.6 billion of guarantees). All of these amounts are measured at 2018 prices.

Estimating gross pay-outs from the instrument involves uncertainties, yet the overall magnitudes can be estimated with a reasonable degree of precision because most of the allocation to countries depends on historical data (Darvas, 2020b, 2020c).

Figure 1 on the next page shows estimated allocation to countries (as a share of GNI; Darvas, 2020c) plotted against the 2020 economic shock, which is measured as the difference between the November 2020 and the November 2019 forecasts for 2020 GDP. The figure suggests that redistribution (lower-income countries get more than higher-income countries) is much more important than the insurance component (harder-hit countries get more than less-hit countries). For example, Austria and Bulgaria have been similarly hit economically, yet Bulgaria will get 11 percent of its GDP in grants, but Austria only 1 percent. Lithuania and Spain are expected to get the same 6 percent of their GNI in grants, though the Lithuanian economy was the second least-hit country in the EU in terms of the economic shock, while the Spanish economy was hit the most².

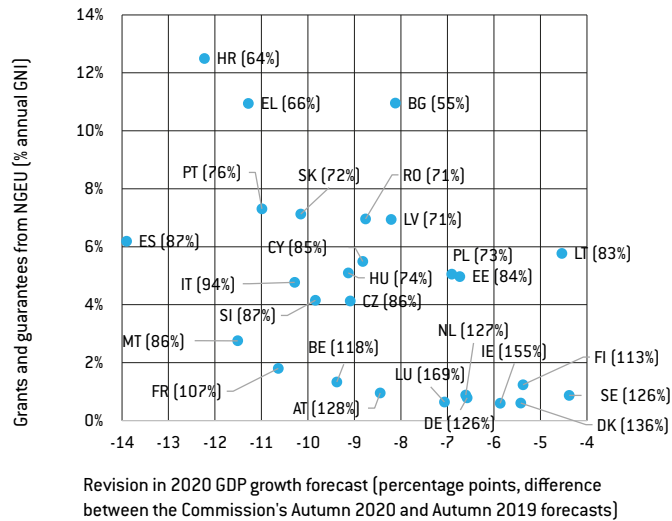
Estimating the national contributions to the repayment of EU debt in 2027-2058, which is necessary to estimate the net financial implications of NGEU, is however extremely difficult and depends on the assumptions made. Crucial issues relate to whether EU debt will be repaid as currently planned or rolled over, the role of eventual new 'own resources' in reducing national contributions, the distribution of EU GNI in 2027-2058, the interest rate at which the EU will borrow in 2021-2026 and the interest rate of member states, which is needed to calculate the present value of benefits and costs³. As regards the benefits of NGEU, an important question is if it will have a positive economic impact or not.

1 See <https://www.consilium.europa.eu/en/press/press-releases/2020/12/14/next-multiannual-financial-framework-and-recovery-package-council-moves-to-finalise-adoption/>.

2 The dominant redistribution component primarily results from the Recovery and Resilience Facility's (RRF) allocation method, for which one of the three indicators is GDP *per capita*. Moreover, instead of measuring GDP *per capita* at purchasing power standards (PPS), which is the usual measure of cross-country comparison of economic development, GDP *per capita* at current price euros is used for the RRF. The European Commission has not justified this unusual choice. The cross-country allocation algorithm of ReactEU and the Just Transition Fund also heavily favour countries with lower *per-capita* income levels, for which GDP *per capita* at PPS (not at current price euros) is considered.

3 Due to the enormous difficulties in the estimation of the national contribution to the repayment of EU debt, it is surprising that the September 2020 European Central Bank *Economic Bulletin* presented such calculations without any detail about the assumptions made for 2027-2058 (Giovannini *et al*, 2020). The only information provided is: "Repayments are assumed to correspond to countries' shares in EU gross national income", which is not informative about the assumptions.

Figure 1: The pandemic economic shock and support from NGEU



Source: Bruegel based on cross-country allocation corresponding to the European Parliament/European Council December 2020 compromise agreement on the RRF, and the July 2020 European Council conclusions for the other NGEU facilities, GNI from European Commission Autumn 2020 forecast, GDP growth forecast for 2020 from the European Commission Autumn 2020 and Autumn 2019 forecasts. Note: numbers in brackets show the forecast GNI per capita at purchasing power standards expressed as percent of the EU average in 2021 according to the Autumn European Commission forecasts.

This Policy Contribution discusses these issues and concludes that the possible range of estimated net benefits is very wide and depends greatly on the particular assumptions made, yet even one-half of the estimated GDP impact of the Commission's 'low additionality' scenario would make all EU member states net financial beneficiaries of NGEU.

2 Economic impact

Cash payments from the EU budget to beneficiaries in a particular member state are not the only positive effects of NGEU. The very reason it was designed is to generate a positive economic impact throughout the EU. Traditional net balance calculations for annual EU budgets consider only cash flows between member states and the EU budget (and in fact not even all cash flows, only about 80 percent of them; see Darvas, 2019) and view the EU budget as a pure redistribution system between member states without any economic impact. Neglecting the economic impact would be even more problematic for NGEU, which is a one-off instrument.

For example, in one of the scenarios I consider, Austria would pay 1.8 percent of its annual GDP more into NGEU than the direct cash transfer from NGEU it would receive in 2021-2026, while its GDP would be cumulatively 3.8 percent higher as a result of NGEU (considering one-half of the European Commission's low additionality scenario; see below). Should Austria consider that its net contribution to NGEU was 1.8 percent of its annual GDP if it benefits from 3.8 percent extra annual GDP in total in the years to come?

Quite likely, NGEU has already had a positive economic impact, even before it was enacted and implemented. Its confidence-increasing impact likely reduced both government and private-sector borrowing costs in euro-area countries with large spreads relative to Germany, such as Italy and Spain, which benefits growth. Knowing that NGEU funds will be paid in the future might encourage EU countries with less fiscal space to provide more fiscal support to economic recovery now, financed by national borrowing, since they know they can borrow less in the future when NGEU funds arrive. This makes the recession shallower.

Positive economic impacts will expand when actual spending from NGEU starts.

Increased public-sector and EU spending implies more demand, which can stimulate investment, economic activity and increased productive capacity, which can also lead to long-term gains. A shallower recession because of EU spending could reduce the long-term negative impacts of the crisis, such as the number of unemployed people whose skills are gradually eroded by inactivity. Cross-country spillovers also exert positive impacts, as exporting companies benefit from larger markets in other EU countries. The very fact that an agreement was reached on NGEU might have reduced the risk of break-up of the euro area, as well as reducing the risk of the likelihood of a deep crisis in countries with high debt levels⁴, thus benefitting all other EU members too.

A proper analysis should compare the scenario in which there is no NGEU with the NGEU scenario. This comparison would not only consider the direct cash flows between the EU budget and member states, but also increased incomes because of NGEU. Unfortunately, such an impact assessment is difficult and the estimates of the European Commission (2020b, Section 3.2) seem to me greatly exaggerated.

The Commission's impact assessment (European Commission, 2020b) considers alternative scenarios, including high additionality (all grants and half of the loans are used for productive public investment) and low additionality (only half of grants and loans are additional). Other alternatives include whether all NGEU funds are absorbed in 2021-2024 or in 2021-2026⁵. In case of six-year long absorption and high additionality, the Commission estimated the total cumulative impact of NGEU in 2021-2030 to be about 13 percent of annual EU GDP⁶. Graph I.3.7a of European Commission (2020b) presenting this scenario suggests that the impact will fade away slowly in 2027-2030 and will still be slightly over 1 percent in 2030, suggesting that positive GDP effects are estimated to be maintained long beyond 2030. Based on these dynamics, I have extrapolated the Commission's estimates beyond 2030 and found a total cumulative impact over 2021-2050 of about 24 percent of annual GDP. For the 'low additionality' scenario, the Commission (Graph I.3.7b of European Commission, 2020b) suggests 9 percent extra GDP in total from 2021-2030, while an extrapolation might conclude 13 percent in total from 2021 to 2043.

It seems unlikely that public spending of approximately 2.7 percent of annual GDP from NGEU grants (total cumulatively in 2021-2026) and an additional 2.4 percent from NGEU loans, would generate (cumulatively) more than 20 percent extra annual GDP in the high additionality scenario and about 13 percent in the low additionality scenario⁷. These two impacts imply fiscal multipliers of more than four and about 2.5, respectively, which is much larger than what is typically found in the literature, even in a recession (Auerbach and Gordanichenko, 2013). Moreover, three-quarters of NGEU is expected to be spent from 2023 to 2026 when a recession is no longer expected (Darvas, 2020a).

Consequently, in my illustrative scenarios (section 7), I assume a much more modest impact compared to the Commission's impact assessment: one-half of the impact of the Commission's low-additionality scenario, which corresponds to a fiscal multiplier of about 1.2. This assumption is more in line with the findings of the literature. For comparison with cash-flow based standard EU budget net balance calculations, I also consider a scenario with zero economic impact.

4 See Consiglio and Zenios (2020) for an analysis of the vulnerability of Italy to a public debt crisis.

5 The exact numerical values of the estimates are not presented in tables, but one can read them from Graphs I.3.7a and I.3.7b of European Commission (2020b).

6 The graphs in Section 3.2 of European Commission show GDP deviations from the no-NGEU baseline because of the NGEU in 2021-2030. Thus, the bars on these figures show by how much GDP is expected to be higher in each year in 2021-2030 because of NGEU. Adding up these annual GDP impacts shows the total cumulative impact of NGEU as a percentage of annual GDP.

7 A further alternative scenario assumes that public investment has low productivity and additionality is low: even in this case, the total cumulative impact could be over 6 percent.

3 Repayment or roll-over of EU debt?

The July 2020 European Council concluded that EU debt that will finance NGEU programmes will have to be repaid by 31 December 2058 in a steady and predictable way. Early repayment is also foreseen by the European Council if interest payments are less than planned, or if new own resources are introduced, underlying the determination to repay the debt (see point A7 of European Council, 2020).

However, there could be two main reasons for reconsidering the repayment plan:

- First, EU debt would necessitate national taxpayer money. My calculations suggest that the annual burden to repay maturing debt would be in the range of 0.04-0.075 percent of GNI (see section 5), which does not seem large, though it would still require some national resources. In contrast, rolling over debt at close-to-zero nominal interest rate would not incur significant interest costs, and in fact would imply a lower burden as a share of GDP in the future if the interest rate remains below the growth rate of output.
- Second, the EU is set to become the largest supranational bond issuer, on the back of NGEU and the European instrument for temporary Support to mitigate Unemployment Risks in an Emergency (SURE) bond issuances⁸.

4 The role of new own resources

European Commission (2020a) argued that possible new direct EU budget revenues (called “own resources”) will “help” the repayment of EU borrowing for the New Generation EU instrument “in a fair and shared way”. At first sight, one might think that such own resources will reduce the burden on member states to repay the debt. Unfortunately, the case is not so clear.

Own resources might reduce GNI-based contributions made to the EU budget by national finance ministries, but do not necessarily reduce countries’ total contributions, if we take into account what the governments, companies and other entities that are subject to the own resources already contribute to the EU budget, and consequently what they do not contribute to national budgets.

The non-recycled plastic packaging waste levy will be paid by governments. Thus, governments pay a new plastic-based contribution and pay less GNI-based contribution. In this case, the overall burden on member states to repay the debt remains the same, but when the distribution of non-recycled plastic waste differs from the distribution of GNI (which is the case, see Darvas, 2019), the cross-country distribution of total national contributions to the repayment of EU debt alters compared to the baseline GNI-based distribution. Certainly, a plastic waste levy has the major benefit of incentivising more recycling, which is good for the environment, and hence the introduction of this levy is welcome. But this positive externality does not change the fact that member states pay this levy.

An EU tax on companies would mean that the revenues from such a tax would not accrue to national budgets, implying lower national budget revenues (Wolff, 2020). For example, if the EU introduces a common EU-wide digital tax to be paid directly to the EU budget, it could mean that member states do not introduce national digital taxes and hence revenues from digital taxes will be missing from national budgets. If no EU-wide digital tax is introduced, then (most likely) member states will introduce national digital taxes and receive revenues

⁸ For information about SURE, see https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/financial-assistance-eu/funding-mechanisms-and-facilities/sure_en.

from this tax. The overall total burden on member states with and without an EU-wide digital tax is the same, but similarly to the plastic-waste levy, the cross-country distribution of contributions to the EU budget will differ if the distribution of digital tax revenues differs from the distribution of GNI, which is the case. An EU-wide digital tax would have a benefit for the single market, given that an EU tax would be uniform across member states, while if member states themselves introduce national digital taxes, then there could be differences in the design of such taxes. Thus, introduction of an EU-wide digital tax is welcome from the perspective of the single market, yet this positive aspect does not change the fact that member states would forego tax revenues.

Therefore, unless new own resources come from a source that member states themselves would not be able impose, such as the carbon border adjustment mechanism, then the new own resource just changes the distribution of total national contributions to the EU budget, but otherwise represents a financial burden on national economies and budgets.

In illustrative calculations, I do not consider possible new own resources in the repayment of EU debt.

5 EU borrowing costs and the timing of debt repayment

There is uncertainty about the interest rate at which the EU will borrow. On 20 November 2020, the 1-year German government bond yield was -0.7 percent, the 10-year yield was -0.59 percent per year, the 20-year yield was -0.30 percent per year and the 30-year yield was -0.17 percent per year⁹. If such low interest rates persist throughout 2021-2026 when the EU borrows from the markets, and the EU pays only a few basis points over the German interest rate, the EU might also benefit from negative borrowing rates, implying that less than a euro will have to be paid back for each euro borrowed. On the contrary, if the current negative interest rates turn positive, or if the EU must pay a large spread relative to Germany, then more than one euro will have to be paid back for each euro borrowed.

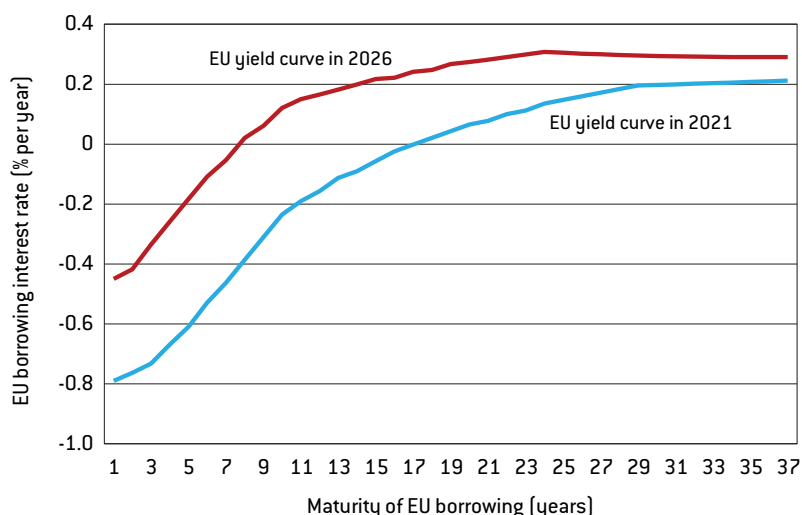
To illustrate the possible EU borrowing rates, I assume that the interest rate spread of the EU over the German government borrowing rate will be 1 basis point at 1-year maturity, 30 basis points at 10-year maturity and 35 basis points at the 30-year maturity, values slightly higher than the spread the European Investment Bank pays now. I linearly interpolate the spreads between 1-10 years and between 10-30 years.

To approximate the interest rate at which Germany will borrow in 2021-2026, I use the expectation hypothesis of the term structure (EHTS) of interest rates. I find, for example, that while the November 2020 10-year German zero-coupon yield is -0.59 percent, one year from now it is expected to increase to -0.46 percent, and by November 2026 it is expected to increase to -0.18 percent. I do such calculations for all maturities between 1 and 37 years and I assume that these November yields represent the yearly average.

After obtaining the expected German interest rates in each year in 2021-2026, I add the assumed EU spread to obtain the EU's possible borrowing rate (Figure 2). These calculations suggest that in 2021 the EU's borrowing rate will be negative between 1-year and 16-year maturities, yet even at the 30-year maturity the annualised interest rate will be just 0.2 percent per year. Rates are expected to increase by 2026, but remain negative up to seven years of maturity, while the 30-year borrowing rate is expected to be around 0.3 percent per year.

9 These are zero-coupon yields, available from the Bundesbank: <https://www.bundesbank.de/en/statistics/time-series-databases>.

Figure 2: Expected EU yield curve in 2021 and 2026



Source: Bruegel.

From 2021 to 2026, the EU will borrow to finance NGEU spending and is expected to repay this debt in 2027-2058. NGEU consists of both grants (including a small amount of guarantees) and loans. NGEU loans to member states will be fully repaid by member states and I do not expect defaults on these debts to the EU. Thus, in my calculations I only consider EU borrowing to finance NGEU grants and guarantees, which will be paid back jointly by member states.

I assume that in each year from 2021 to 2026, the EU will borrow the amount equivalent to the NGEU grant and guarantee payments that year, and that the maturity of EU borrowing will be evenly distributed across the years 2027-2028. That is, 1/32nd of each year's borrowing in 2021-2026 is assumed to be paid back in each year from 2027 to 2058¹⁰.

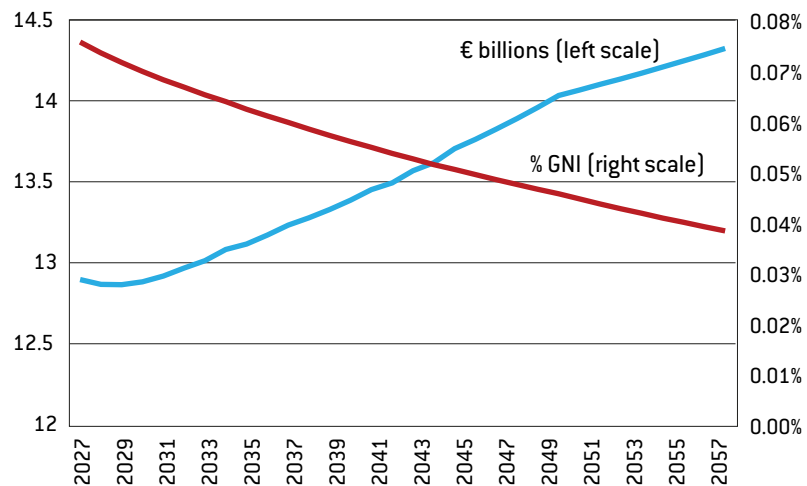
Using these assumptions, the total current-price euro value of the repayment of EU debt in 2027-2028 is projected to be €434 billion, €14 billion larger than the total euro value of EU borrowing in 2021-2026 to finance NGEU grants and guarantees, which is €420 billion¹¹. Thus, on average over 2027-2058, €430 million per year is the expected interest cost of EU borrowing to finance NGEU grants and guarantees.

As a share of GNI, repayment (capital amortisation and interest combined) is expected to decline from 0.075 percent of GNI in 2027 to 0.04 percent of GNI in 2058 (Figure 3 on the next page), well below the annual 0.6 percent of GNI own resources put aside by member states to guarantee the EU debt.

¹⁰ A further simplifying assumption is that the EU issues zero coupon bonds, and hence there is no interest payment before the maturity of the bonds. This implies that when the EU's borrowing rate is negative, it will pay back less than the amount it borrowed, and when the interest rate is positive, it will pay all interest when the bond matures.

¹¹ The European Council set the amount of €390 billion at 2018 prices for NGEU grants and guarantees, which, according to my calculations, will amount to €420 billion at current price euros in 2021-2026.

Figure 3: Repayment of EU debt – capital and interest combined (€ billions at current prices and % of GNI)



Source: Bruegel.

6 The difficulties in forecasting the output level in 2027-2058

Without new own resources for the EU budget, repayment of NGEU grant-spending related EU debt starting in 2027 will be proportional to the distribution of EU countries in terms of the euro value of EU GNI in 2027-2058. Net balance estimates thus need to take into account GNI forecasts for each EU country up to 2058, for which no reliable assumption can be made.

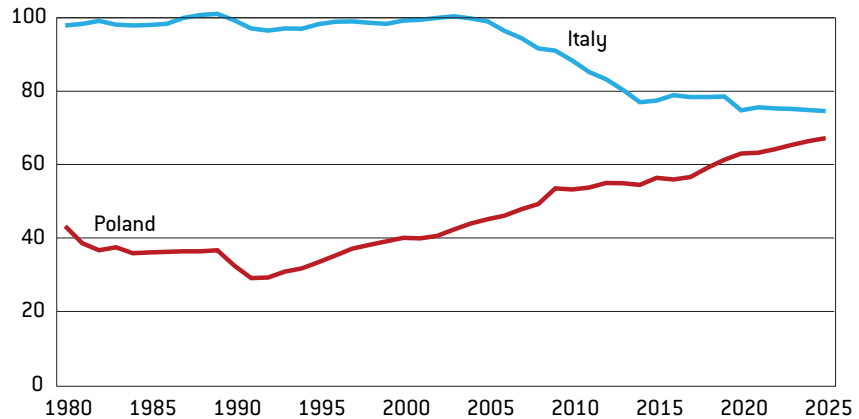
To illustrate the difficulties in making such long-horizon forecasts, GNI (or GDP) can be decomposed into three components:

1. Per-capita real income measured at purchasing power parity (PPP);
2. Price level;
3. Population.

Multiplying *per-capita* real income with the price level leads to *per-capita* nominal income, and further multiplying it by population leads to total (nominal) income. While any projection for several decades ahead is bound to be uncertain, it is easier to make assumptions about these three components separately than for total income. *Per-capita* PPP income is the standard measure of productivity and has been extensively analysed in convergence studies. The price level is related to *per-capita* income: more productive countries tend to have higher price levels. For population, long-term projections have been published by the United Nations.

While GNI matters for EU budget contributions, I initially focus on GDP, because longer-term projections are available for GDP than for GNI. I illustrate the difficulties in long-term GDP projections using the examples of Italy (a large EU country that has been falling behind for the last few decades) and Poland (a large EU county that has been catching up for the last few decades), relative to Germany, the largest economy in the EU.

Figure 4: GDP per capita at PPP relative to Germany (%), 1980-2025



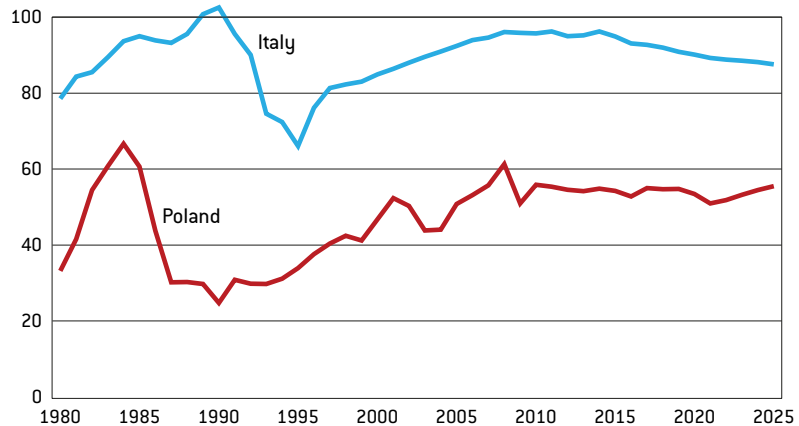
Source: Bruegel based on IMF World Economic Outlook, October 2020. Note: PPP = purchasing power parity.

Italy had a similar real *per-capita* GDP level to Germany in the 1980s and 1990s, but now it is 25 percent lower (Figure 4). Will Italy continue to fall behind in the next four decades? Or will Italy's relative *per-capita* income stabilise at 75 percent of the German level? Or perhaps will Italy converge (at least partly) back to Germany in the coming decades?

Unlike Italy, Poland has been catching-up with Germany since the early 1990s. Will this convergence continue and if so, to what level? Could Poland reach 90 percent of Germany or even 100 percent of Germany? Or will Polish *per-capita* income even exceed that of Germany by 2058, which would result from a mechanical extrapolation of the past trend?

Any answer to these questions based on economic modelling would just reflect the assumptions made.

Figure 5: Price levels relative to Germany (%), 1980-2025



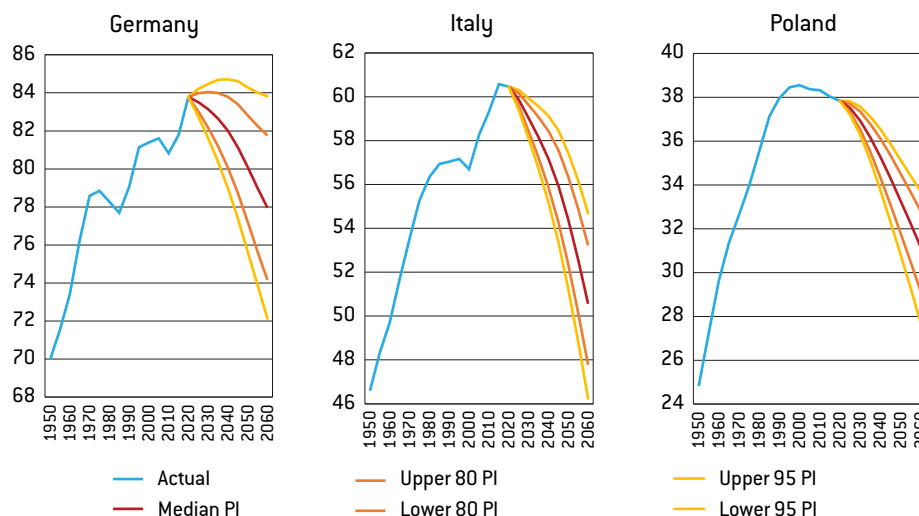
Source: Bruegel based on IMF World Economic Outlook, October 2020.

Price level projections up to 2058 involve similarly hard questions.

When two countries have separate currencies, the relative price level between the two countries is subject to both exchange rate swings and differences in national inflation rates. For example, after the 1992 European Exchange Rate Mechanism crisis, the Italian lira depreciated significantly against the Deutschmark and hence the Italian price level fell relative to Germany (Figure 5). In other words, fewer Deutschmarks had to be paid for the lira price of Italian goods and services. Lira appreciation after 1995 partly compensated for the earlier depreciation. Since entering the euro area in 1999, the relative price level between Italy and Germany is determined only by differences in inflation rates. Poland still has the zloty and thus the Polish price level relative to Germany is influenced by both exchange rate develop-

ments (like zloty depreciation after 2008) and different inflation rates. How will Italy's and Poland's price levels relative to Germany evolve up to 2058?

Figure 6: Probabilistic population projection by the United Nations, 1950-2060



Source: United Nations, Department of Economic and Social Affairs, Population Division (2019). Probabilistic Population Projections Rev. 1 based on the World Population Prospects 2019 Rev. 1, available at <http://population.un.org/wpp/>. Note: PI = prediction interval. Eg "upper 95 PI" refers to the upper end of the 95% prediction interval.

And third, population projections are also subject to major uncertainties. The United Nations (2019) presented long-horizon population projections under nine alternative scenarios, which suggest widely different outcomes. A probabilistic scenario is also published, showing the likely intervals at which future population will fall with 80 percent and 95 percent probabilities (Figure 6). These intervals are very wide, underlining the uncertainty of population projections. Which scenario should be used for projecting EU GNI by 2058?

7 Some illustrative scenarios

To illustrate a range of scenarios for each country's share of EU GDP, and then the implied contribution to EU debt repayment, I consider 12 alternative scenarios for GDP *per capita*.

GNI scenarios

Longer-term projections are available for GDP than for GNI. Thus, I make assumptions about GDP *per capita*. To obtain GNI values, I assume that the ratio of GNI to GDP in 2020 will remain the same from 2021 to 2058.

I measure GDP *per capita* at PPP relative to the weighted average of nine higher-income EU countries: Austria, Belgium, Denmark, France, Finland, Germany, Luxembourg, the Netherlands and Sweden. As a baseline, the 2014-2025 trend (as reflected in the October 2020 IMF forecast) is extrapolated up to 2058, with one exception and two sensitivity analyses. The exception is Ireland, for which I extrapolate the trend in 2020-2025 to leave aside the extraordinary growth which boosted Irish relative GDP *per capita* from 114 percent in 2013 to 173 percent in 2020. Still, Irish relative *per-capita* GDP is projected to growth further to 196 percent by 2058.

One sensitivity analysis considers those 13 countries that have *per-capita* GDP at PPP below 75 percent of the average nine higher-income countries in 2020. Most of these countries

were converging to the average of the nine higher-income EU countries, but it is uncertain to what extent this convergence will continue. For these countries, I set four alternative scenarios:

1. Baseline projection of the 2014-2025 trend;
2. A ceiling at 100 percent (ie by projecting the 2014-2025 trend, if and when relative *per-capita* GDP reaches 100 percent, it is expected to remain at 100 percent in the rest of the projection period);
3. A ceiling at 80 percent;
4. A ceiling at 90 percent.

The 100 percent ceiling would constrain seven countries: Estonia, Hungary, Latvia, Lithuania, Poland, Romania and Slovenia.

The second sensitivity analysis considers Italy, the third largest EU economy. Italy has been falling behind during the past two decades and its economic prospects are uncertain. Given Italy's large size, its future economic development will significantly impact the cross-country distribution of EU GNI. I consider three alternative scenarios for Italian relative GDP *per capita*:

1. Baseline projection of the 2014-2025 trend (implying a decline from 77.6 percent in 2025 to 73.1 percent in 2058),
2. Unchanged position relative GDP *per capita* at its 2025 level (which is 77.6 percent),
3. Convergence from 77.6 percent in 2025 to 88.8 percent by 2058, ie closing half of the 2025 gap.

Thus, there are $4 \times 3 = 12$ alternative scenarios for GDP *per capita* at PPP.

Several other alternative scenarios could be considered, including for the other large EU countries such as Germany, France and Spain. Nevertheless, the twelve scenarios I consider already illustrate well the great uncertainty of the cross-country distribution of EU GNI in 2027-2058.

Further assumptions:

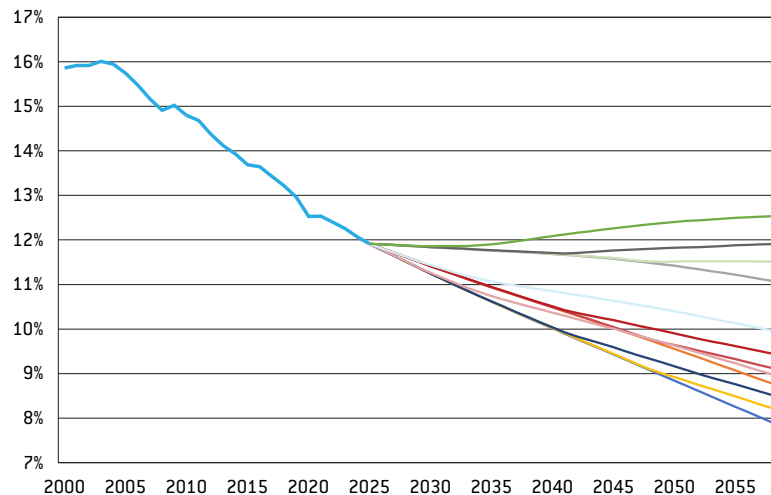
- The price level relative to the weighted average of nine higher income EU countries is assumed to change by the same magnitude as the change in relative GDP *per capita*. Eg German relative GDP *per capita* is expected to increase from 104.0 percent in 2025 to 104.2 percent in 2026, so the corresponding price level change is from 97.5 percent to 97.7 percent.
- Population: the median of the UN prediction interval is used for each country.
- Average nominal *per-capita* growth of nine higher income EU countries: 2 percent per year (this can be thought of as eg 1 percent *per capita* real growth and 1 percent inflation per year, or any other combination that adds up to 2 percent). Note this assumption only sets the absolute level of GDP and GNI, while for the repayment of NGEU, what matters is the relative position of each country in EU GNI.

With these assumptions, the nominal euro value of GDP can be projected up to 2058. By assuming that the 2020 ratio between GNI and GDP remains unchanged, I obtain scenarios for GNI.

As an example, Figure 7 shows Italy's share of EU GNI under the twelve scenarios. It is useful to consider the example of Italy, because I built alternative scenarios for Italy's future development. Also, since Italy is a large EU country, its share of EU GNI can have a significant effect on other countries' shares of EU GNI. If Italian *per-capita* real income relative to the average of nine higher-income EU countries converges from 77.6 percent in 2025 to 88.8 percent by 2058, and countries that currently have less than 75 percent relative real incomes do

not converge to over 80 percent, then Italy's share of EU GNI could slightly increase from 11.9 percent in 2025 to 12.5 percent in 2058. But if Italian *per-capita* relative income continues its downward slide, while current lower-income countries continue their convergence processes, then Italy's share of EU GNI would fall to 7.9 percent by 2058. The 7.9 percent to 12.5 percent range for Italy's share of EU GNI in 2058 is rather wide and implies a major uncertainty about how much Italy would contribute to the repayment of EU debt.

Figure 7: Italy's share of EU GNI under the twelve alternative scenarios, 2000-2058



Source: Bruegel.

Moreover, the range displayed in Figure 7 does not reflect the uncertainty in population developments, because the calculations use the median projection of the UN for all countries. Incorporating the uncertainty resulting from population projections would widen this range, as would incorporating the uncertainty about GDP developments in EU countries beyond the 13 lower-income EU countries and Italy that I already consider.

Overall, there is great uncertainty about GNI developments up to 2058.

Net financial benefit

I calculate the net financial benefit as the present value of gross financial benefit minus the present value of gross financial contributions. I calculate the 2020 present value of future benefits and contributions by using the country-specific government yield curves as the discount factor, eg the one-year yield to discount the 2021 benefits, the 20-year yield to discount the 2040 contributions, and so on. Thus, for countries with negative interest rates, such as Germany and the Netherlands, the present value is larger than the nominal euro values in the future, while for countries with somewhat higher interest rates, such as Italy and central European countries, there is quite some discounting of longer-maturity future obligations.

Financial contributions in 2027-2058 depend on each member state share of EU GNI in this period, for which I apply the 12 scenarios above. To simplify things, I consider only the two scenarios leading to the highest and the lowest shares of EU GNI for each country (these are labelled as 'lower' and 'upper' in Table 1) among the twelve scenarios I considered.

Note that the GNI scenarios differ substantially for Italy and for those central European member countries that experience rapid growth in 2014-2025 (according to IMF forecasts). But there is only one GNI scenario for the other member states and hence their share of EU GNI differs only because of the alternative scenarios for Italy and central European countries. Thus, for most EU countries, GNI uncertainty is not captured in my calculations.

NGEU benefits include cash transfers from the EU budget and many other direct and indi-

rect impacts, ultimately leading to higher output, which means higher incomes (see section 2 for further discussion). I look at two scenarios for gross benefits:

1. Only direct payments from NGEU to member states (assuming that the NGEU is a zero-sum game),
2. Direct payments from NGEU plus GDP impact.

On the GDP impact, I consider one-half of the low-additionality scenario of European Commission (2020b). Beyond the overall impact on the EU, the Commission discriminated between three country groups: above-average income (Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Luxembourg, the Netherlands and Sweden), below-average income with high debt (Cyprus, Greece, Italy, Portugal and Spain), and below-average income and low debt (Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia). For the high additionality model, the 2026 impact is estimated at 1.0 percent, 3.25 percent and 3.5 percent, respectively, for the three groups, while the impact for the EU as a whole is approximately 1.8 percent. I assume that the economic impact on the three country groups is proportionally the same for the one-half of the low-additionality scenario in each year in 2021-2043, when the Commission estimate implies a positive impact¹². This leads to the following total cumulative economic impact expressed as percent of annual GDP: 3.7 percent for the above-average income group, 12.1 percent for the below-average income group with high debt, and 13.1 percent for the below-average income group with low debt. These values are simply the sum of annual GDP deviations from the baseline (expressed as each year's GDP), yet for a proper assessment, I calculate the present value.

There are notable differences within the two below-average income groups in terms of the expected NGEU grants received as a share of GNI (eg Greece's 11 percent vs Italy's 5 percent, and Croatia's 12 percent vs Malta's 3 percent; see Figure 1). This likely implies different impacts within these groups. Nevertheless, I do not complicate my calculations further with country-specific economic impacts on NGEU, but use the group-average value for each group members.

Whether we consider NGEU a zero-sum game, or an instrument with positive economic impact makes a huge difference for assessment of the net benefit (Table 1). This finding highlights the importance of considering the economic impacts of NGEU. The overall ranges of net benefits are very wide, for example from -2.4 percent to +1.7 percent for Germany, from 3.1 percent to 14.9 percent for Italy, and from 1.4 percent to 15.5 percent for Poland.

When the economic impact is considered, all countries are net beneficiaries under the assumptions I made. The present value of net benefits is very large, over 10 percent of GNI for central and southern European members, and even over 20 percent of GNI for Bulgaria, Croatia and Greece.

12 As noted in section 2, European Commission (2020b) presented results for 2021-2030 in a chart. There is gradual decline in the estimated impact in 2027-2030, yet the 2030 impact is still sizeable. I extrapolated the rate of decline visible on the chart, which led me to conclude that the Commission estimate vanishes by 2044 in the low-additionality scenario.

Table 1: Some scenarios for the net financial implications of NGEU (present values % 2020 GNI)

Country	Zero economic impact		Economic impact is one-half of Commission's low-additionality scenario	
	Lower	Upper	Lower	Upper
Austria	-1.9%	-1.7%	1.9%	2.1%
Belgium	-1.3%	-1.1%	2.5%	2.7%
Bulgaria	8.5%	8.9%	21.2%	21.6%
Croatia	10.6%	11.1%	23.8%	24.3%
Cyprus	2.6%	2.8%	14.2%	14.5%
Czechia	0.1%	0.5%	13.2%	13.5%
Denmark	-3.0%	-2.8%	0.8%	1.1%
Estonia	1.2%	2.6%	14.8%	16.2%
Finland	-1.9%	-1.7%	1.9%	2.2%
France	-0.7%	-0.5%	3.1%	3.3%
Germany	-2.4%	-2.2%	1.5%	1.7%
Greece	10.1%	10.2%	21.4%	21.6%
Hungary	2.7%	3.2%	15.1%	15.6%
Ireland	-3.4%	-3.1%	0.4%	0.7%
Italy	3.1%	3.5%	14.4%	14.9%
Latvia	3.9%	4.8%	17.0%	17.9%
Lithuania	2.1%	4.4%	14.9%	17.2%
Luxembourg	-2.0%	-1.9%	1.8%	2.0%
Malta	-0.7%	-0.4%	11.7%	12.0%
Netherlands	-2.2%	-2.0%	1.7%	1.9%
Poland	1.4%	2.6%	14.3%	15.5%
Portugal	5.5%	5.7%	17.5%	17.6%
Romania	4.5%	5.4%	16.2%	17.1%
Slovakia	5.1%	5.3%	18.4%	18.6%
Slovenia	1.0%	2.0%	14.1%	15.1%
Spain	4.4%	4.7%	16.3%	16.7%
Sweden	-1.8%	-1.6%	1.9%	2.1%

Source: Bruegel. Note: alternative growth scenarios are considered only for Italy and several central European countries, but no uncertainty is considered for growth in some central and southern European countries and in all western and northern European countries, no uncertainty in the relationship between GDP *per capita* and the price level is considered, and no uncertainty in population projections is considered. Thus, the ranges presented in this table likely significantly underestimate the possible ranges. I use the country-specific government bond yields to calculate the present value of both future contributions to NGEU and future benefits from NGEU. Since information about the yield curve is not complete for several countries, I made assumptions to approximate the full yield curves. For central European non-euro members with floating exchange rates, I approximate the euro yield curve using the 12 November 2020 Hungarian euro bond issuance, which resulted in a spread of 1.18 percentage points over the German bund at the 10-year maturity and 1.88 percentage points over the German bund at 30-year maturity. For the other countries, I adjusted these spreads with the difference between their national currency borrowing rates and Hungary's national borrowing rate. For Estonia, a country with negligible public debt, government bond yield data is not available, so I assume a small spread to Germany, equivalent to the spread paid by the Netherlands.

8 Concluding remarks

Next Generation EU is an extraordinary common action taken by EU countries and institutions in response to an extraordinary public health and economic shock. It aims to combine macroeconomic stabilisation with the EU's green and digital plans. It will borrow money in the name of the EU to finance EU-wide expenditures. It will multiply EU bond issuances, potentially creating a reference asset for financial markets. Its boldness has already boosted confidence, with positive impacts on the economy. While many questions can be raised about the NGEU's purpose, size, fund allocation methods and governance, and whether it sows the seeds of further fiscal integration in Europe, it is clearly unprecedented and its creation demonstrates that when the EU faces an extraordinary shock, member states are able to put aside their day-to-day disputes and find common solutions.

The arguments and calculations in this Policy Contribution hopefully highlight another great feature of NGEU: the pointlessness of trying to estimate its cross-country net balance implications. Instead of concentrating on net balances, NGEU should help to focus more on effective, efficient and fair ways of spending EU money and the long-term benefits countries can get from it.

Nevertheless, my calculations result in an important positive conclusion about the net financial impact of NGEU. Despite the broad uncertainty surrounding the disbursement of NGEU funds, their impacts, the cost of repayment, and EU member states' future growth prospects, one firm conclusion can be drawn: even if NGEU has only a modest effect on growth, all EU countries are net beneficiaries.

References

- Auerbach, A.J. and Y. Gorodnichenko (2013) 'Fiscal multipliers in recession and expansion', in A. Alesina and F. Giavazzi (eds) *Fiscal Policy after the Financial Crisis*, University of Chicago Press, pp 63-93, available at <https://www.nber.org/books-and-chapters/fiscal-policy-after-financial-crisis>
- Consiglio, A. and S. Zenios (2020) 'Growth uncertainty, European Central Bank intervention and the Italian debt', *Bruegel Blog*, 28 October, available at <https://www.bruegel.org/2020/10/growth-uncertainty-european-central-bank-intervention-and-the-italian-debt/>
- Darvas, Z. (2019) 'A new look at net balances in the European Union's next multiannual budget', *Working Paper* 2019/10, Bruegel, available at <https://www.bruegel.org/2019/12/a-new-look-at-net-balances-in-the-european-unions-next-multiannual-budget/>
- Darvas, Z. (2020a) 'Three-quarters of Next Generation EU payments will have to wait until 2023', *Bruegel Blog* 10 June, available at <https://www.bruegel.org/2020/06/three-quarters-of-next-generation-eu-payments-will-have-to-wait-until-2023/>
- Darvas, Z. (2020b) 'The EU's recovery fund proposals: crisis relief with massive redistribution', *Bruegel Blog*, 17 June, available at <https://www.bruegel.org/2020/06/the-eus-recovery-fund-proposals-crisis-relief-with-massive-redistribution/>
- Darvas, Z. (2020c) 'Next Generation EU payments across countries and years', *Bruegel Blog*, 12 November, available at <https://www.bruegel.org/2020/11/next-generation-eu-payments-across-countries-and-years/>
- European Commission (2020a) 'Europe's moment: Repair and Prepare for the Next Generation', COM/2020/456 final, available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2020:456:FIN>

- European Commission (2020b) 'European Economic Forecast. Autumn 2020', *Institutional Papers* 136, Directorate-General for Economic and Financial Affairs, European Commission, available at https://ec.europa.eu/info/business-economy-euro/economic-performance-and-forecasts/economic-forecasts/autumn-2020-economic-forecast_en
- European Council (2020) 'Special meeting of the European Council (17, 18, 19, 20 and 21 July 2020) – Conclusions', EUCO 10/20, available at <https://www.consilium.europa.eu/media/45109/210720-euco-final-conclusions-en.pdf>
- Giovannini, A., S. Hauptmeier, N. Leiner-Killinger and V. Valenta (2020) 'The fiscal implications of the EU's recovery package', *ECB Economic Bulletin*, Issue 6/2020, available at https://www.ecb.europa.eu/pub/economic-bulletin/focus/2020/html/ecb.ebbox202006_08-7f90a18630.en.html
- United Nations, Department of Economic and Social Affairs, Population Division (2019) *Probabilistic Population Projections Rev. 1 based on the World Population Prospects 2019 Rev. 1*, available at <http://population.un.org/wpp/>
- Wolff, G. (2020) 'EU debt as insurance against catastrophic events in the euro area: The key questions and some answers', *Bruegel Blog*, 22 April, available at <https://www.bruegel.org/2020/04/eu-debt-as-insurance-against-catastrophic-events-in-the-euro-area-the-key-questions-and-some-answers/>