

László Török

Rise of Public Debt in EU Countries Due to the Coronavirus

Post-recovery Public Debt Rates along with Different Recession Scenarios

SUMMARY: Economics is also expected to try to say something to the future in addition to exploring the facts of the past. It is not its primary task to make forecasts, but it cannot ignore it, especially during non-crisis periods. My study aims to use an econometric model to provide a forecast of the expected rates of increase in public debt in the Member States of the European Union caused by the coronavirus epidemic. I carry out the study assuming four different versions of the course of the crisis, and in the fifth scenario, I analyze the macroeconomic situation when the crisis ends. In any epidemic model, the expected increases in government debt resulting from the calculations are widely spread across countries. However, critical values are expected to be reached for Greece, Italy, and Spain.

KEYWORDS: epidemic, econometric model, public debt, European Union

JEL CODES: H63

DOI: https://doi.org/10.35551/PFQ_2020_3_2

Today, the expected economic and social consequences of the coronavirus epidemic are in the center of the attention of both the professional community and society. The public has every right to expect specialists and researchers to answer their questions arising based on their concerns and fears. The objective of my study is to attempt to forecast the public debts of EU member states occurring due to the coronavirus epidemic in the medium term

E-mail address: dr.torok.laszlo@eng.unideb.hu

by using data and information originating from reliable sources (IMF, ECB, EP, etc.) and by applying an econometric model accepted and widely used in today's economics. It is, as a matter of fact, obvious for all of us that the performance of the economy falls back due to the coronavirus epidemic, and at the same time, the revenues of the entire government sector are decreasing, in parallel to the drastic increase of their expenditures. These two jointly result in the dynamic rise of the indebtedness of states.

Economic expectations have been changing almost continuously in the past few months, no one has an accurate view of the potential economic impacts of the coronavirus. Previously, an economic growth rate of 1.4% was estimated for the entirety of the European Union for 2020 (EC, 2020). It is abundantly clear that a rise of this rate will be completely unattainable due to the impacts of the coronavirus epidemic already known, and it is also quite trivial that the public debt rates will increase in the countries of the European Union. At the same time, this also means that there will be a break in the downward trend in government debt rates lasting since 2014 in the EU. In the period between 2014 and 2019, the European Union gross consolidated public debt to GDP ratio dropped from 92.8% to 84.1% in 19 member states of the Monetary Union, while it fell from 87% to 79.3% in the

case of 28 member states (Eurostat, 2020). See *Figure 1*.

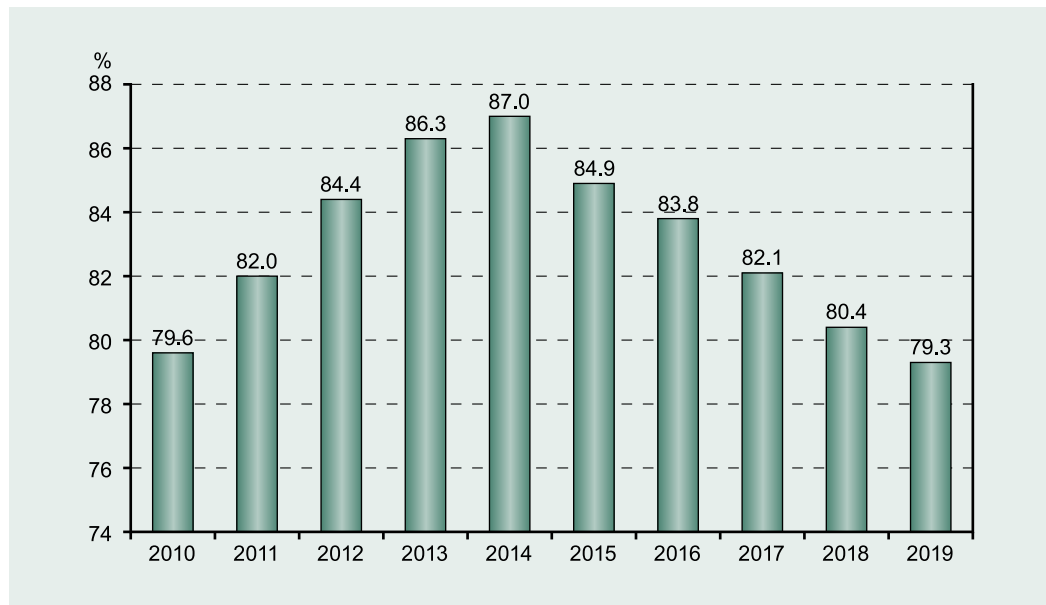
Several years of public debt shrinkage will go to waste due to the outbreak and global escalation of the epidemic, and not only in the countries of the European Union. This can be stated safely because economic growth is, in addition to several other factors, one of the significant elements influencing public debt. I will present these factors in detail later on in my study.

PUBLIC DEBT AND THE DIFFERENT PERCEPTIONS OF ITS EXTENT

The gross consolidated public debt equals the total deficit of the government sector accumulated in the past. We accept and apply this statement while bearing in mind that

Figure 1

THE TOTAL GROSS PUBLIC DEBT OF EU MEMBER STATES IN GDP PERCENTAGE (2010-2019)



Source: Eurostat (2020), edited by the author

there have been and will be items that have not/are not included in the deficit. If the total expenditures of the government sector exceed the revenues thereof in a given year, the state may issue debt instruments (typically zero-coupon treasury bonds and state bonds) to finance the deficit generated this way, or may resort to taking out a loan. The volume of debt instruments issued to finance the deficit accrued over the years forms the government debt. The state is bound to pay interest for its existing debt. Even though the balance of a state calculated without interest payments (primary balance) may be in equilibrium in an indebted country, a deficit may already occur due to the interest payments. The mutually reinforcing process of the rise in debt and debt service (interest payment) implemented through positive feedback requires the achievement of a surplus on the level of the primary balance so that the debt does not increase. This statement pertains to the nominal values, of course, however it depicts the nature of the indebtedness process well (Török, 2012).

Financing the general government deficit can be ensured in two ways according to the classic formula: via bond financing and capital financing. In the countries of the European Union, financing through the creation of money is not a viable solution, as the central bank cannot provide a loan to the state according to the act on the central bank. If financing via the creation of money is not an option for any reason, then the nominal increase in public debt occurring in a given period will equal the general government deficit by default. Another element influencing government debt is the increase or decrease of the public debt ratio denominated in foreign currency due to the change of exchange rates.

As opposed to the aforementioned, the debt can also be regarded as the value of the

state's future liabilities discounted to the present. This approach is primarily important as it shows the room for maneuver economic policy will have in the future. Many times, the state has commitments that are not included in the official deficit figures, however, they pose liabilities that will certainly arise in the future. However, our study does not examine these so-called implicit future liabilities. For details see (Mosolygó, 2010).

In economics, there is no specific rule for the optimal extent of the debt rate of a given national economy. The 60% debt-to-GDP outlined in the Maastricht Treaty is a product of a conventional agreement, serving as a sort of the point of reference. The only requirement about the extent of the public debt is that it should approach the level given as GDP percentage at a 'satisfactory rate' (Benczes, Kutasi, 2010). Several studies strived to determine the limit of government debt rate above which the debt has a negative impact on the economic growth of the given national economy. Examining this, (Reinhart, Rogoff, 2010) concluded that public debt above 90% of the GDP consistently decreases the growth of the given national economy. In opposition, *Herrndon et al.* (2014) found that there is no significant difference between the average and median GDP growth of countries with public debt below or above the 90% threshold. They concluded that public debt and growth of GDP varied significantly by country and period.

An important conclusion of debt dynamics models is that the debt (or at least a part of it) can also be grown out. If the correction is made in a growth-friendly environment, with structural measures also sustainable in the longer-term, this also improves the budget balance directly on the one hand and will result in public debt representing an increasingly lower share compared to the GDP through the denominator impact (Hoffmann, 2011).

It was an important revelation of researching the global public debt rise due to the subprime crisis that monetary policy is not sufficient on its own, and there is also a need for the active use of fiscal policy in the course of crisis management (Blanchard et al., 2010). *Arestis* (2014) drew a similar conclusion in his paper, pointing out that the national economic policies are further strengthened by the adequate coordination of monetary and fiscal policy to create financial stability. As shown by the later parts of the study, fiscal and monetary cooperation will have a central role in financing the growing public debt due to the coronavirus epidemic.

THE THEORETICAL METHODOLOGY OF THE FORECAST

Analyses and forecasts pertaining to the status, expected change, and public debt of a given national economy have been a frequent subject of macroeconomic studies. Their examination was particularly amplified following the subprime crisis in 2008, as several national economies reached the financing limit of their government debts. The financing limit meant that several countries were unable to manage their public debt from the financial markets (Török, 2012). Out of these countries, Greece maintained its solvency related to its public debt by resorting to the so-called orderly default.¹

Public debt will increase significantly on a global scale due to the coronavirus epidemic. This is triggered by the collective impact of several factors. General government spending will increase, while tax revenues will fall behind due to the economic downturn. The new loans and guarantees offered to businesses as well as financing and compensating the income support of households will also increase the indebtedness of national economies.²

In the period of the coronavirus epidemic, the forecast of the public debt of national economies is in the center of increased attention, as the expected debt rates calculated with substantiated prognoses are decisive, and serve as a sort of compass for developing strategies of financial policy.

Due to the Coronavirus epidemic, when forecasting the expected rise in government debt in EU member states, I start from a model suitable for presenting the most important links of debt dynamics. Then I expand the model through the gradual and substantiated modification of the initial condition to make it as suitable as possible for quantifying the future public debt positions of EU member states. The model is based on the division of the change of the debt rate and shows the impacts and dynamics of the factors influencing the public debt with the help of the links between the three explanatory variables. So that the expected future output values of the public debt rates of EU member states can be forecasted, a macroeconomic framework was needed on which we can rely when forecasting, and allowing us to conduct scenario analyses. When selecting and applying the macroeconomic forecast model, two factors should prevail: the model should be adjusted well to the input data and thus it should have an appropriate forecasting capability; and the theoretical relationships should also be echoed in its structure. The model to be applied will satisfy the criteria set out in the previous paragraph. Given all the above considerations, the econometric fundamentals of the simulation are provided by the following equation:

$$b_t = [(1 + r_{t-1})/(1+g_{t-1})] b_{t-1} - pb_t \quad (1)$$

In this equation, b and pb mark the public debt to GDP and the primary balance of the budget respectively, r stands for real interest,

and g represents economic growth (Balatoni, Tóth, 2011).³ It follows from the equation that the change of the debt rate fundamentally depends on the relationship between the real interest and real growth as well as the primary balance of public finances.

DEFINING THE INPUT VARIABLES OF THE MODEL

1 **THE RATE OF ECONOMIC GROWTH:** the change of GDP compared to last year's figures. This must be considered in the calculation as it is not the absolute extent of the debt, but its ratio to GDP that has a macroeconomic relevance. The decrease in debt rate resulting from growth is marked by this variable (GDP-growth impact). If the economy grows, and presuming an unchanged budgetary policy, the general government revenues will automatically increase, resulting in more financial resources available for reducing the public debt. The decrease in the GDP results in a reversed impact.

2 **THE PRIMARY BALANCE OF THE BUDGET (PUBLIC FINANCES) CALCULATED WITHOUT INTEREST PAYMENTS:** realizing a smaller primary deficit (more surplus) helps to reduce the existing debt. This variable is fundamentally influenced either negatively or positively by the balance-improving or deteriorating measures imposed by the government, as the interest revenue accounted for among debt service revenues and the interest payments related to debt service do not form part of the primary balance. If the primary balance is positive, then the revenues of the given year cover expenditures and the budget deficit are only resulting from the interest burden of previously accumulated debts. This variable shows the debt-increasing impact of the budget deficit to GDP (primary deficit impact) if the deficit increases. If there is a surplus in

the state budget, it may/will reduce the public debt depending on economic policy priorities as may be changed from time to time.

3 **REAL INTEREST RATE** (nominal interest rate/expected inflation rate, *see footnote no. 3*): due to the high amounts and relatively slow repricing of public debt, the potential decrease in real interests can only have a positive impact on the mitigation of the debt rate gradually. Financing public debt requires loans. In the costs of the loans (i.e. the interest), the risks of the given loan are quantified. If financing the public debt of a given national economy is of high risk due to the economic fundamentals, such circumstances will manifest in higher interest rates expected by creditors. However, the high real interest rate will result in higher costs of financing the public debt. If the real interest exceeds the extent of real growth, a surplus will be needed on the level of the primary balance for an unchanged debt rate, while with a real interest falling short of the real growth rate, the stability of the debt rate can be ensured even in the case of a deficit in the primary balance. In the case of the interest expenditures of the state, the actual burden is posed by the real interest in excess of the inflation compensation.⁴

THE FRAMEWORK OF THE INPUT VARIABLES OF THE MODEL

Today we can only estimate the course of the post-COVID-19 recovery within relatively broad boundaries, therefore I opted for analyzing the future development of the expected public debt rate of every EU member state individually with four recovery scenarios of different courses known and applied today. The first wave of the coronavirus epidemic could be significantly prolonged. Probably there will also be additional waves (MTA, 2020). In light of all this, the macroeconomic

model will contain rather pessimistic than optimistic input variables.

I have set up a total of five different scenarios depending on the time course of the coronavirus epidemic.

① In the case of the V course, it is probable that the initial dramatic economic downturn will be followed by a bounce-back of a similar dynamic, the recession will end at latest at the end of this year, and the national economies of the European Union will return to their operation planned pre-crisis from 2021 after suffering the one-time shock.

② In the case of a W course, the one-time significant economic downturn is followed by a sudden bounce back, which will be repeated in this year at least one more time. In total, the result of this scenario could be more drastic compared to the first one. Summarily, the V and W course forecast stronger temporary global economic impacts of the coronavirus pandemic in the member states of the European Union.

③ In the case of an U/1 course, the one-time shock-like economic downturn in 2020 will remain low all through the year.

④ In the case of the U/2 course, the downturn of the previous year will continue into and remain low all through 2021.

The U/1 and U/2 scenarios will demonstrate the permanent global economic impacts of the coronavirus pandemic in EU member states.

⑤ Finally, the 5th scenario assumes that by 2022, EU member states will have overcome the recession by suffering the consequences of either of scenarios 1-4. Therefore, from 2022, the national economies of the EU will continue their economic activity with the fiscal and monetary parameters planned for the year before the outbreak of the epidemic. Therefore, the potential public debt rates of EU member states will be calculated for these five scenarios with the presented econometric model for the years 2020, 2021, and 2022.

THE INPUT DATA OF THE MODEL

The explanatory variables presented in the previous chapter and the relationships between them forecast that the results of the public debt outputs are dependent on the input values of the variables. As ultimately the expected public debt rate values of the national economies of the EU will be quantified, the substantiated selection of their values will be relevant.

FORECASTING ECONOMIC DOWNTURN: today it can be safely stated that there will be a significant downturn in economic growth as a result of the coronavirus epidemic. The extent of the recession hitting certain national economies of the EU is also subject to debates between experts. At the time of writing the study, for determining the values of the economic downturn, I will use the data by country published on the website of the European Parliament following the outbreak of the coronavirus epidemic in Europe in part. These data originate from the reports of the central bank of the given EU member states but are not comprehensive (EP, 2020). The other two basic data sources were the forecasts of the World Bank (WB, 2020) and the International Monetary Fund (IMF, 2020) about the global economic downturn, published following the pandemic.

In the years 2020-2021 of the crisis, the values of the GDP downturn in the four scenarios will range between -1.1 and -11.3% in the national economies of the EU. I incorporated the GDP data forecasted for 2022 from the (EP, 2019) database. The values of these data are positive in the case of almost every EU country, their values range between 0.8 and 5.0%.

THE ESTIMATE OF THE PRIMARY BALANCE OF THE BUDGET: similarly to the estimation of the economic downturn, forecasting the primary balance of public finances of the

given EU member states also carry numerous uncertainties. The data source of the *ex-ante* values of budgetary balances was formed by the EP, WB, and IMF databases used for estimating economic growth. It is a relevant circumstance that concerning the economic situation caused by the coronavirus epidemic, the EU suspends the strict rules pertaining to the budget deficit in order to allow member state governments to finance the economy more flexibly. In practice, this decision means that the EU allows member states to spend on the protection against the epidemic and on mitigating the impacts of the coronavirus epidemic on the economy. While doing so, the EU foregoes the rules about the budget deficit. One of the basic theorems of the latter is a deficit to GDP limit below 3%. The input data of the model calculation shows that the extents of the forecasted deficits range between -1.0 and -11.8% in 2020-2021 in the national economies of the EU. I forecast the end of the crisis to the beginning of 2022, the figures of the balance of the budget specified in the (EB, 2019) forecast are expected to be realized by this time. These values are expected to range between -1.3 and 2.4 in the member states of the European Union.

EXPECTED REAL INTEREST RATES: the permanently low inflation environment of the global economy experienced in the past period and the moderate economic growth also suggested a negative real interest rate looking ahead until the coronavirus outbreak. The applicable interest rates are also low in the EU. According to the flash estimate of Eurostat, the annual HICP inflation of the eurozone dropped from 1.4% in January to 1.2% by February 2020. In the medium term, the monetary policy measures of the ECB will support inflation therefore they are planned to be kept low. There is great uncertainty around the impacts of the coronavirus on inflation. This is possible because the downward

pressures related to weaker demand may be balanced by the upward pressures related to disruptions in supply (ECB 2020).

Despite the uncertainty, a fiscal and monetary recovery was started in developed national economies, and thus in the European Union, too, in the course of fighting against the coronavirus epidemic. Theoretically, this strengthens the persistence of current interest rates. It is my view however that financing the rising public debts will require the forced involvement of vast new resources. As a result, it is my perception that the current negative real interest rates will cease by the end of 2021 in the member states of the European Union, and by⁵ 2022 they are expected to amount to zero or be on the positive range in all national economies of the EU except for Luxembourg and Sweden. I incorporated this tendency into the model calculation. However, in 2022, the development of positive real interest rates mitigate the decrease in public debt starting as a result of the significantly improving state budget deficit (following the logic of the model), in almost all EU national economies.

In the four crisis scenarios, the real interests range between -0.7 and 2.4%, and in 2022 considered the year of recovery they are expected to be positive in the case of all national economies except for two countries. In the countries with a non-negative real interest rate today, financing the increasing public debt will entail significant explicit costs, due to the further increase of the real interest rates. The increase of the real interest rates of national economies in this situation will contribute to the increase of the public debt rate of these countries greatly, as it will be demonstrated by the results received.

There is no data estimate available for incorporating the values of the real interest rates into the econometry model, therefore I incorporated the estimated values of the short-term interest rates for 2020 (OECD, 2020a),

and those of the long-term interest rates for 2021 (OECD, 2020b), while for 2022, I forecasted a change with the dynamic that can be observed between the 2020 and 2021 forecasts⁶. See *Table 1*.

RESULTS

The data of *Table 2* summarise the results of the model calculation.

The data of *Table 1* demonstrate it well that if the recession continues into 2022, the decrease in public debt rates will start moderately in all EU member states except for Denmark, Spain, and Italy. Before that, however, in the years of 2020-2021, a significant rise in public debt can be expected in every member state of the European Union. The W course of the epidemic (where there are two downturns and bounce backs within a year) shows similar results to the crisis course of U/2 (with a lower crisis compared to the one before in the years of 2020 and 2021, but it is prolonged in time).

The extent of the public debt growth rate calculated for the end of 2021 varies by country. By categorizing them into groups, the following conclusions can be drawn. There are a total of seven national economies where the cumulated public debt growth rate of the two crisis years is expected to reach 8% or lower. In this group, the most moderate public debt growth rate can be forecasted in the case of Estonia, Luxembourg, and Bulgaria with 4.1%, 4.5%, and 5.5% values respectively. The last one in the group is Germany with an 8% value. The Scandinavian countries also belong to this group except for Finland, and a moderate public debt growth rate can be expected in their case, too, even compared to their low base, however, the rate of Denmark and Sweden will still only be around 40%.

The group encompassing most countries

(a total of 13) is the one suffering a public debt growth rate between 8 and 16%. This category is opened by Lithuania and Latvia with their 10.2% public debt growth rate figures and is closed by Slovenia with a 15.2% cumulated public debt growth rate out of the 13 countries. Within the group, the highest gross public debt to GDP can be expected in Austria at a value of 85.2%.

Five countries must face a rise of state indebtedness rate between 16-24% qualifying as extraordinarily high at the end of 2021 based on the already presented scenarios. This group encompasses Croatia, France, Belgium, Portugal, and Spain with their 18.5, 19.1, 19.2, 22.3, and 23.2% values. In terms of the rise in the public debt rate, it is concerning in the case of France and Spain that the rise will hit the second and fourth-largest economies of the EU, and the absolute value of the debt rise of the two countries gives more than one-third of the entire rise forecasted in the member states of the European Union. See *Figure 2*.

Out of 27 member states of the European Union, the forecasted public debt growth rates of 29.6% and 37.1% are extremely high in the case of Italy and Greece. Growth of such extent is not unprecedented in the history of the European Union.⁷ In terms of Greece, it can be stated that its public debt to GDP will exceed 200% in the case of either of the scenarios of the coronavirus epidemic presented before.⁸ And this will be a level of state indebtedness that is unprecedented in the history of the European Union. Italy is the third-largest economy in the European Union, therefore funding the forecasted rate of public debt increase will require major efforts. The absolute value of the gross debt rise of the country gives more than 24% of the total public debt growth of the European Community.

The indebtedness figures of the latter three countries (Spain, Italy, and Greece) are

Table 1

THE INPUT VALUES OF THE MODEL AS A PERCENTAGE OF GDP (2020–2022)

| Country | Evolution of GDP (<i>g</i>) | | | | | Real interest (<i>r</i>) | | | | | Budget deficit (<i>pb</i>) | | | | |
|----------------|-------------------------------|----------|------------|------------|-------------|----------------------------|----------|------------|------------|-------------|------------------------------|----------|------------|------------|-------------|
| | 2020 | | | 2021 | 2022 | 2020 | | | 2021 | 2022 | 2020 | | | 2021 | 2022 |
| | V course | W course | U/1 course | U/2 course | Post-crisis | V course | W course | U/1-course | U/2 course | Post crisis | V course | W course | U/1-course | U/2-course | Post-crisis |
| Belgium | -6.9 | -8.6 | -5.5 | -4.0 | 1.2 | -0.4 | -0.4 | -0.4 | 0.0 | 0.4 | -8.9 | -11.1 | -6.7 | -4.4 | -0.3 |
| Bulgaria | -4.0 | -4.6 | -3.0 | -1.9 | 3.3 | -0.6 | -0.6 | -0.6 | 0.1 | 0.8 | -3.2 | -4.0 | -2.6 | -1.4 | 0.1 |
| Czech Republic | -6.5 | -8.1 | -5.2 | -3.2 | 2.2 | 0.3 | 0.3 | 0.3 | 1.1 | 1.9 | -5.0 | -6.3 | -4.0 | -2.3 | -0.4 |
| Denmark | -3.0 | -3.8 | -2.9 | -1.5 | 1.1 | -0.4 | -0.4 | -0.4 | -0.4 | 0.0 | -6.5 | -8.1 | 3.2 | -2.0 | 0.1 |
| Germany | -6.7 | -8.3 | -5.3 | -3.3 | 1.0 | -0.4 | -0.4 | -0.4 | -0.4 | 0.0 | -5.5 | -6.8 | -4.4 | -2.4 | 0.5 |
| Estonia | -7.5 | -9.3 | -5.9 | -3.8 | 1.8 | -0.4 | -0.4 | -0.4 | 0.0 | 0.4 | -8.3 | -10.4 | -6.6 | -3.8 | 0.4 |
| Ireland | -6.8 | -8.5 | -5.4 | -3.5 | 2.5 | -0.4 | -0.4 | -0.4 | 0.0 | 0.4 | -5.2 | -6.5 | -4.1 | -2.4 | 0.5 |
| Greece | -9.9 | -12.3 | -7.9 | -4.4 | 2.6 | -0.4 | -0.4 | -0.4 | 1.6 | 2.0 | -9.0 | -11.2 | -7.2 | -4.0 | -0.7 |
| Spain | -8.0 | -9.9 | -6.3 | -3.6 | 1.8 | -0.4 | -0.4 | -0.4 | 0.6 | 1.6 | -9.5 | -11.8 | -7.6 | -4.2 | -1.3 |
| France | -7.2 | -9.0 | -5.8 | -3.2 | 1.4 | -0.4 | -0.4 | -0.4 | 0.0 | 0.4 | -9.2 | -11.5 | -7.3 | -4.2 | -0.6 |
| Croatia | -9.0 | -11.2 | 8.1 | 3.1 | 2.3 | -0.7 | -0.7 | -0.7 | 0.0 | 0.7 | -8.0 | -9.9 | -6.4 | -3.5 | 0.7 |
| Italy | -9.1 | -11.3 | -8.2 | -3.1 | 0.8 | -0.4 | -0.4 | -0.4 | 1.5 | 1.9 | -8.3 | -10.3 | 6.6 | -3.7 | -1.3 |
| Cyprus | -6.5 | -8.1 | -5.9 | -2.1 | 3.0 | -0.4 | -0.4 | -0.4 | 0.0 | 0.4 | -1.8 | -2.4 | -1.4 | -1.0 | 1.1 |
| Latvia | -8.6 | -10.8 | -7.8 | -3.0 | 2.9 | -0.4 | -0.4 | -0.4 | 0.1 | 0.6 | -5.2 | -6.5 | -4.1 | -2.4 | -0.2 |
| Lithuania | -8.1 | -10.1 | -7.3 | -2.8 | 2.3 | -0.4 | -0.4 | -0.4 | 0.3 | 1.0 | -7.6 | -9.5 | -6.1 | -3.4 | 0.1 |
| Luxembourg | -4.9 | -6.1 | -4.4 | -1.7 | 3.0 | -0.4 | -0.4 | -0.4 | -0.3 | -0.2 | -2.8 | -3.5 | -2.2 | -1.3 | 2.4 |
| Hungary | -3.1 | -3.9 | -2.8 | -1.1 | 4.2 | 0.2 | 0.2 | 0.2 | 2.2 | 2.4 | -3.5 | -4.4 | -2.8 | -1.6 | -0.2 |
| Malta | -2.8 | -3.5 | -2.5 | -1.0 | 5.0 | -0.5 | -0.5 | -0.5 | 0.0 | 1.0 | -7.2 | -9.0 | -5.7 | -3.3 | 1.1 |
| Netherland | -7.5 | -9.4 | -6.8 | -2.6 | 1.0 | -0.4 | -0.4 | -0.4 | -0.2 | 0.0 | -6.2 | -7.7 | -5.0 | -2.7 | 1.5 |
| Austria | -7.0 | -8.7 | -6.3 | -2.4 | 1.6 | -0.4 | -0.4 | -0.4 | -1.1 | 0.2 | -7.1 | -8.8 | -5.6 | -3.2 | 0.1 |
| Poland | -3.2 | -4.0 | -2.9 | -1.1 | 3.3 | 0.2 | 0.2 | 0.2 | 1.1 | 2.0 | -8.0 | 9.9 | -6.4 | -3.5 | -0.6 |
| Portugal | -8.0 | -9.9 | -7.2 | -2.7 | 2.0 | -0.4 | -0.4 | -0.4 | 0.5 | 1.4 | -7.1 | -8.8 | -5.7 | -3.1 | 0.3 |
| Romania | -5.9 | -7.4 | -7.2 | -2.8 | 5.0 | 0.9 | 0.9 | 0.9 | 1.4 | 1.9 | -6.7 | -8.4 | -5.4 | -3.0 | -0.9 |
| Slovenia | -8.0 | -10.0 | -7.2 | -2.8 | 2.7 | -0.4 | -0.4 | -0.4 | 0.0 | 0.4 | -6.6 | -8.2 | -5.3 | -2.9 | 1.3 |
| Slovakia | -6.2 | -7.8 | -5.7 | -2.1 | 2.5 | -0.4 | -0.4 | -0.4 | 0.1 | 0.6 | -5.9 | -7.3 | -4.7 | -2.6 | 0.1 |
| Finland | -6.0 | -8.0 | -5.8 | -2.2 | 1.0 | -0.4 | -0.4 | -0.4 | -0.1 | 0.2 | -6.7 | -8.4 | -5.4 | -3.0 | 1.2 |
| Sweden | -3.9 | -4.9 | -3.6 | -1.3 | 2.0 | 0.0 | 0.0 | 0.0 | -0.1 | -0.2 | -3.8 | -4.7 | -3.0 | -1.7 | 0.9 |

Source: EP (2020), WB (2020), IMF (2020), EP (2019), EB (2019), MNB (2020), TE (2020), edited by the author

Table 2

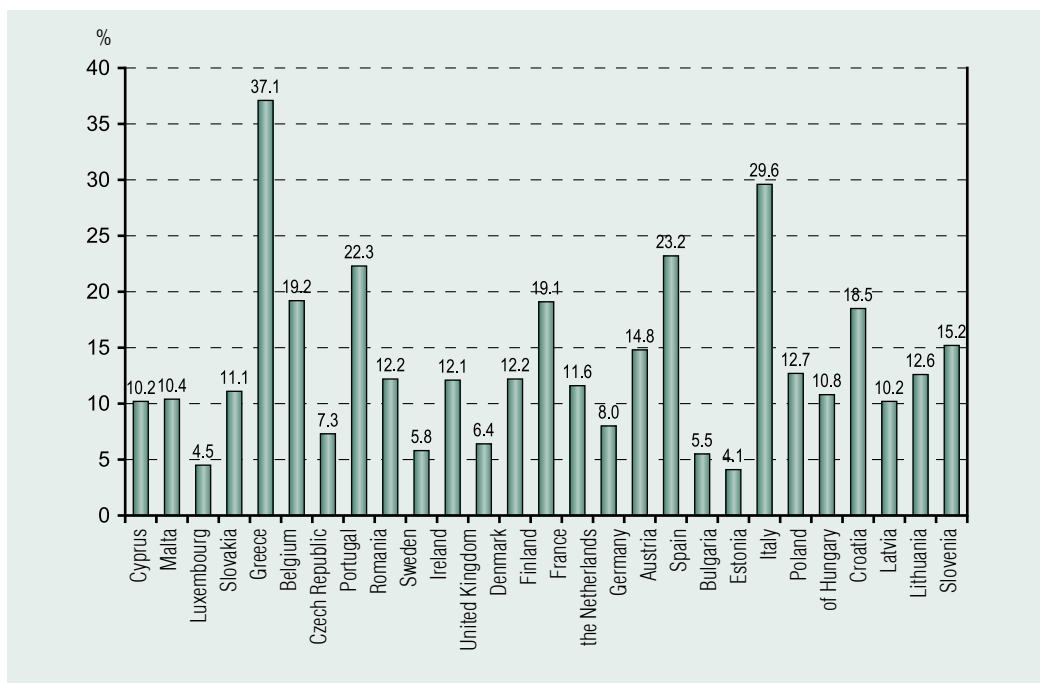
THE EX-ANTE VALUES OF THE OUTPUTS OF THE PUBLIC DEBT TO GDP AS A PERCENTAGE OF GDP (2020–2022)

| Country | 2019 | 2020 | | | 2021 | 2022 | Change by the end of the crisis |
|----------------|-----------|----------|----------|------------|------------|-------------|---------------------------------|
| | Base year | V course | W course | U/1 course | U/2 course | Post-crisis | (2021–2019) |
| Belgium | 98.6 | 114.4 | 118.5 | 110.6 | 117.8 | 116.1 | 19.2 |
| Bulgaria | 20.4 | 24.3 | 25.3 | 23.5 | 25.9 | 25.8 | 5.5 |
| Czech Republic | 30.8 | 38.0 | 39.9 | 36.6 | 38.1 | 39.1 | 7.3 |
| Denmark | 33.2 | 40.6 | 42.5 | 37.3 | 39.6 | 39.7 | 6.4 |
| Germany | 59.8 | 69.3 | 71.8 | 67.3 | 67.8 | 66.2 | 8.0 |
| Estonia | 8.4 | 17.3 | 19.9 | 15.5 | 12.5 | 12.5 | 4.1 |
| Ireland | 58.8 | 68.0 | 70.5 | 66.0 | 70.9 | 68.8 | 12.1 |
| Greece | 176.6 | 202.5 | 207.3 | 196.5 | 213.7 | 211.9 | 37.1 |
| Spain | 97.6 | 115.2 | 119.7 | 111.3 | 120.8 | 122.3 | 23.2 |
| France | 98.1 | 114.5 | 118.9 | 111.0 | 117.2 | 115.6 | 19.1 |
| Croatia | 73.2 | 87.9 | 91.8 | 85.5 | 91.7 | 89.6 | 18.5 |
| Italy | 134.8 | 156.0 | 161.7 | 154.0 | 164.4 | 166.7 | 29.6 |
| Cyprus | 95.5 | 103.5 | 105.9 | 102.5 | 105.7 | 101.9 | 10.2 |
| Latvia | 36.9 | 45.4 | 47.7 | 44.0 | 47.1 | 45.8 | 10.2 |
| Lithuania | 36.3 | 46.9 | 49.7 | 45.1 | 48.9 | 47.4 | 12.6 |
| Luxembourg | 22.1 | 25.9 | 26.9 | 25.2 | 26.6 | 23.2 | 4.5 |
| Hungary | 66.3 | 72.1 | 73.5 | 71.1 | 77.1 | 73.2 | 10.8 |
| Malta | 43.1 | 51.3 | 53.4 | 49.7 | 53.5 | 50.4 | 10.4 |
| Netherland | 48.6 | 58.5 | 51.9 | 56.9 | 60.2 | 57.6 | 11.6 |
| Austria | 70.4 | 82.5 | 85.6 | 81.0 | 85.2 | 83.6 | 14.8 |
| Poland | 46.0 | 55.6 | 57.9 | 53.9 | 58.7 | 58.4 | 12.7 |
| Portugal | 117.7 | 134.5 | 138.9 | 132.0 | 140.0 | 139.5 | 22.3 |
| Romania | 35.2 | 44.4 | 46.8 | 42.9 | 47.4 | 46.9 | 12.2 |
| Slovenia | 66.1 | 78.2 | 81.4 | 76.2 | 81.3 | 78.2 | 15.2 |
| Slovakia | 48.0 | 56.9 | 59.2 | 55.4 | 59.1 | 57.9 | 11.1 |
| Finland | 59.4 | 69.6 | 72.7 | 68.2 | 71.6 | 69.2 | 12.2 |
| Sweden | 35.1 | 40.3 | 41.6 | 39.4 | 40.9 | 38.7 | 5.8 |

Source: calculated and edited by the author

Figure 2

PUBLIC DEBT GROWTH RATE IN THE MEMBER STATES OF THE EU, AS A PERCENTAGE OF GDP (2019-2021)



Source: calculated and edited by the author

shocking, no matter what the course of the coronavirus epidemic will be. The absolute values of the rise in public debt of these three countries give more than 40% of the total debt rise in the European Union. The financing of the drastically rising public debt of these

countries also gives rise to the probability of resorting to orderly default. Hopefully, the fiscal and monetary expansion steps of the mentioned three member states as well as the European Union will be sufficient to prevent this from happening.

NOTES

¹ In 2012, the Greek government reached an agreement with private creditors on the general terms of debt relief, applicable to all bondholders in the private sector. The agreement set out that the representatives of the private sector would write off 53.5% of their claims pertaining to the nominal value of Greek sovereign debt instruments (they

suffer a loss, or depreciation of approx. 53.5%), which is a loss larger than that planned, and meant more than 70% in terms of the net present value. This way a so-called orderly default was applied, as the Greek state was not able to repay its debt in accordance with the original conditions (Török, 2018).

- ² The study does not aim to present the economic policy measures and state spendings that trigger the rise in government debt in detail. For more details on this, see (Benczes, Kutasi, 2010; Panizzab, Presbiteroc, 2013).
- ³ Other authors, including (Czeti, Hoffman, 2008) also incorporate inflation and other factors in their models. It is my view that by including the real interest in the model presented in the main text, there is no need to add the inflation as a separate explanatory variable, as the real interest is none other but $[(1+\text{nominal interest rate}) / (1+\text{inflation rate})]-1$. Therefore, the equation already takes the inflation in the real interest rate into consideration. Other factors may include the privatisation proceeds - the weight of these may be so insignificant that the study does not examine their role in mitigating public debt.
- ⁴ If an indebted state pays lower interests for the sovereign debt instruments than the change of the consumer price level in percentage, this allows for the rapid and radical mitigation of the public debt, which will also result in the decrease of interest costs of government debt. This process is called financial repression. In the case of financial repression, the government takes regulatory measures directing the property of savers artificially to the mitigation of the public debt, thus market coordination is repressed by economic policy (McKinnon R. I., 1990).
- ⁵ Probably the Outright Monetary Transactions (OMT) program launched in the EU previously will not be able to halt the rise of real interest rates either. This program allows central banks to purchase sovereign debt instruments directly. Following the financial crisis, the program was able to efficiently contribute to the reduction of the bond market yields and thus allowed national public finances to improve their financing capabilities (Lentner, 2015).
- ⁶ In the case of the countries where there were no data available in the referenced databases of OECD (Estonia, Croatia, Cyprus, Malta and Romania), the data of national economies with similar economic fundamentals were used in the calculation.
- ⁷ Following the global financial crisis of 2008, Ireland's public debt to GDP increased by 34% between 2010-2012, that of Spain increased by 25.8% between 2010-2012, Cyprus' rate increased by 23.9% between 2010-2012, Portugal's increased by 25.2% between 2008-2010, while Greece's public debt to GDP increased by 45.4% between 2009-2011 (Eurostat, 2020).
- ⁸ Greece's gross public debt to GDP exceeding 200% was already forecasted by the study of Török (2018) as a consequence of a global crisis only existing conditionally at the time. The study forecasted the Greek public debt rate to reach 203.2% by the year 2022.

REFERENCES

ARESTIS, P. (2014). Coordination of Fiscal with Monetary and Financial Stability Policies Can Better Cure Unemployment, University of Cambridge, UK. pp. 1-17, <https://doi.org/10.4337/roke.2015.02.07>

BALATONI A., TÓTH G. Cs. (2011). Fenntartható makrogazdaság és államadósság-kezelés. (Sustainable macroeconomics and public debt management.) National Council for Sustainable Development, Budapest

- BENCZES I., KUTASI G. (2010). *Hiány, államadósság és fenntarthatóság. Költségvetési pénzügyek. (Deficit, public debt and sustainability. Public finances.)* Akadémiai Kiadó, Budapest, p 358
- BLANCHARD, O., DELL'ARICCIA, G., MAURO, P. (2010). Rethinking Macroeconomic Policy. IMF staff Position Note, sPN/10/03
- CZETI T., HOFFMAN M. (2006). A magyar államadósság dinamikája: elemzés és szimulációk. (The dynamics of the Hungarian public debt: analysis and simulations.) MNB-tanulmányok/ MNB Occasional Papers, No. 50
- HERNDON, T., ASH, M., POLLIN, R. (2014) Does high public debt consistently stifle economic growth? A critique of Reinhart and Rogoff. Cambridge. *Journal of Economics*, Vol. 38 (2), pp. 257-279
- HOFFMANN M. (2011). Az eladósodott állam: Kockázatok és mellékhatások. (Indebted states: risks and side effects) Hungarian Central Bank Financial Analyses
- LENTNER, Cs. (2015). *Adózási pénzügytan és államháztartási gazdálkodás. (Taxation, Finance and Public Finance Management.)* Nemzeti Közszerkesztő Intézet Szolgáltató Kft., Budapest 858 pages
- MCKINNON, R. I. (1990). Financial repression and the productivity of capital, Empirical findings on interest rates and exchange rates. Stanford University, Stanford, California, pp. 1-26
- MOSOLYGÓ Zs. (2010). A new approach to the basic issues raised by the PAYE system. *Közgazdasági Szemle/Economic Review*, Vol. LVII., 2010, July-August, pp 612-633
- PANIZZAB, U., PRESBITEROC, A. F. (2013). Public Debt and Economic Growth in Advanced Economies: A Survey. *Swiss Journal of Economics and Statistics*, 2013, Vol. 149 (2), pp. 175-204, <https://doi.org/10.1007/BF03399388>
- REINHART, C. M., ROGOFF, K. S. (2010). Growth in a time of debt. *American Economic Review: Papers & Proceedings*, 100, pp. 573-578
- TÖRÖK, L. (2012). The possibilities and impossibilities of Hungarian public debt. *Competitio*, pp 26-43, <https://doi.org/10.21845/comp/2012/2/2>
- TÖRÖK, L. (2012). Reducing state debt by privatization in PIIGS countries *Perspective - Kitekintés*, pp 160-170
- TÖRÖK, L. (2018). Future legal and economical barriers of Greece's public debt crisis management - to what extent can privatization be a solution? *Külgazdaság*, Vol. 62, 2018/1-2, pp 4-26
- TÖRÖK, L. (2018). How does public debt change when the next crisis comes - and it will come! (The expected evolution of Greece's state debt in the next crisis period). *International Journal of Engineering and Management Sciences (IJEMS)* Vol. 3. No. 5, pp 91-104, <https://doi.org/10.21791/IJEMS.2018.5.11>.
- European Commission (2019). The 2019 Stability & Convergence Programmes /An Overview and Assessment of the Euro Area Fiscal Stance/ pp. 1-80
- European Commission (2020). European Economic Forecast, Winter 2020 (Interim), Institutional Paper 121, https://ec.europa.eu/info/sites/info/files/economy-finance/ip121_en.pdf
- European Central Bank (2020). Gazdasági jelentés pénzügyi és gazdasági áttekintés. (Economic report, financial and economic review.) <https://www.mnb.hu/letoltes/2020-issue-2-overview-to-pl-hu.pdf>
- European Parliament (2020). The economy and coronavirus: Weekly Picks. [https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/645717/IPOL_BRI\(2020\)645717_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/645717/IPOL_BRI(2020)645717_EN.pdf)

Eurostat (2020). General government gross debt - annual data. <https://ec.europa.eu/eurostat/databrowser/view/teina225/default/table?lang=en>

Eurostat (2020). Gross domestic product at market prices, <https://ec.europa.eu/eurostat/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=tec00001&language=en>

FC (2020). U-shaped or V-shaped recovery? Here's your guide to the geometry of recessions. <https://www.fastcompany.com/90494041/u-shaped-or-v-shaped-recovery-heres-your-guide-to-the-geometry-of-recessions>

IMF (2020). World Economic Outlook, April 2020: Chapter 1. Online: <https://www.imf.org/en/Publications/WEO/Issues/2020/04/14/weo-april-2020>

MTA (2020). Recommendation of the Hungarian Academy of Science on the management of the COVID-19 epidemic in the short and long term. <https://mta.hu/data/dokumentumok/Koronavirus/Akademiai%20ajanlas%20Covid19%202020.%20aprilis%2022..pdf>

OECD (2020a): Short-term interest rates forecast, Online: <https://data.oecd.org/interest/short-term-interest-rates-forecast.htm#indicator-chart>

OECD (2020b): Long-term interest rates forecast, Online: <https://data.oecd.org/interest/long-term-interest-rates-forecast.htm>

World Bank (2020). Fighting COVID-19, Office of the Chief Economist. <https://openknowledge.worldbank.org/bitstream/handle/10986/33476/9781464815645.pdf?sequence=5&isAllowed=y>