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The role of the Independent Fiscal Institutions in assessing the sustainability of high public debt in the post-Covid era

Abstract

Weakened growth along with automatic stabilisers and additional fiscal stimulus are leading to higher public debt levels as a result of the Covid-19 pandemic.

Against this background, this paper aims to assess the role of Independent Fiscal Institutions (IFIs), focusing on their public debt modelling. The paper draws on new data from a review of debt sustainability analysis (DSA) practices in the EU and a survey of members of the Network. More specifically, it explores the main challenges for IFIs in modelling public debt in times of greater unpredictability, higher public debt and low interest rates.

Drawing on the experiences of various IFIs, the paper comes up with preliminary insights into how to address these challenges.

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Disclaimer

This paper has been reviewed by the EU IFIs Network. The analysis and views expressed do not necessarily represent the positions of individual members of the Network.

Executive summary

Emergency supports, fiscal stimulus and economic contraction are leading to a further rise in public debt levels amid Covid-19, following the large post-Global Financial Crisis (GFC) increase. This rise in public debt is taking place against a backdrop of considerable uncertainty, narrowing forecast horizons and insufficient transparency on fiscal measures adopted by governments.

Despite very favourable financing conditions, the high level of debt raises sensitivity to a future increase in interest rates or shortfalls in growth. This paper looks at the role of Independent Fiscal Institutions (IFIs) and, specifically, how their assessments of debt sustainability might best respond to these new challenges.

Effective assessments of debt sustainability carried out by IFIs and other international institutions can require a number of approaches. Stochastic debt sustainability analysis (DSA) that incorporates uncertainties about key variables such as growth and interest rates is a useful tool in an IFI's armoury. This is particularly true in a steady state, where the need to be aware of and to communicate uncertainties and risks is high. Yet, simpler deterministic analysis has also proved useful – especially in times of crisis as with Covid-19 – to assess specific scenarios for how debt sustainability might evolve and when there is a need for a clearer narrative around projections. Indeed, we are finding new practices emerging among IFIs since the pandemic. There has been a widespread adoption of scenario analysis to help bring clarity to how the public finances might evolve, given the heightened uncertainty and range of potential outcomes. IFIs have also responded by changing their modelling approaches and assumptions about growth and interest rates.

Yet deep questions remain about the lasting impacts on growth arising from the pandemic and the persistence of low interest rates. Both have a critical bearing on the levels of debt that may ultimately prove sustainable. IFIs, like others, do not have ready answers to these problems.

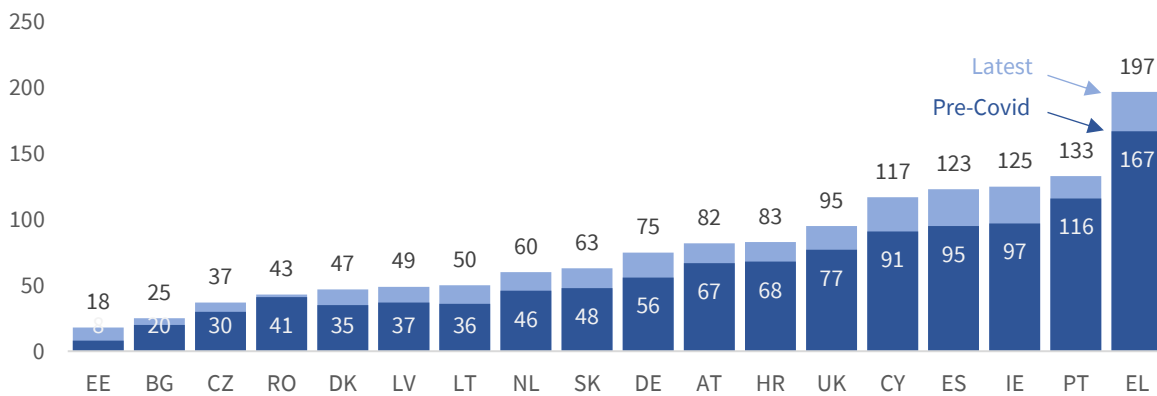
This paper provides a set of preliminary insights into how to address the uncertainties faced in the current high-debt environment. Namely, IFIs should (i) be upfront about their growth and interest rate assumptions, and be open to considering alternatives; (ii) continue to develop their scenario analysis, while also developing more advanced stochastic DSA tools; (iii) bring greater transparency to fiscal measures introduced; (iv) develop medium-term projections where these are lacking; and (v) remind us of the long-term fiscal challenges that have not gone away.

Introduction

The Global Financial Crisis (GFC) and Covid-19 led to a sharp increase in government debt ratios in many countries. Sovereign debt in many EU economies reached historical highs in 2020. The debt-to-GDP ratio in the EU rose from around 62.2% at the start of the GFC to about 93.9% in 2020 — a level not seen in peacetime. The collapse in revenues caused by the Covid-19 crisis and measures taken to mitigate the impact of the health crisis have been the key drivers of debt build-ups.

The increase in debt is somewhat heterogeneous across countries, depending on the intensity of the health crisis and national circumstances. According to the forecasts set out in September, the IFIs expect an average increase in debt ratios of about 16 percentage points for selected member states (see Figure 1). Larger increases are expected in Greece (+30%), Spain (+28.5%), Ireland (+28%) and Cyprus (26%). Countries that face larger increases traditionally have a larger share of employment in consumer-facing sectors such as retail and hospitality (see Figure 2).

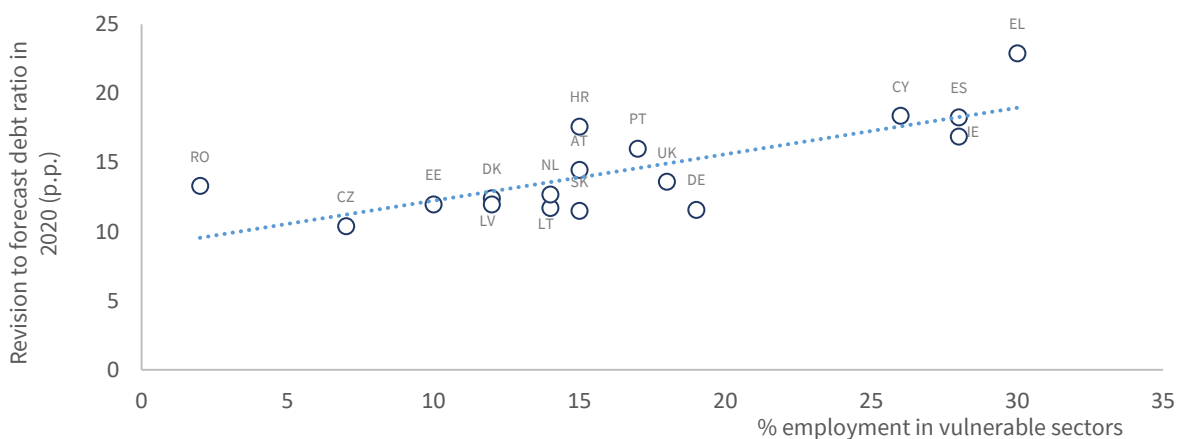
Figure 1. Projected government debt ratios in 2020 (% of GDP)



Note: % of GNI for Ireland.

Source: European Fiscal Monitor, September 2020.

Figure 2. Debt ratios and vulnerable employment



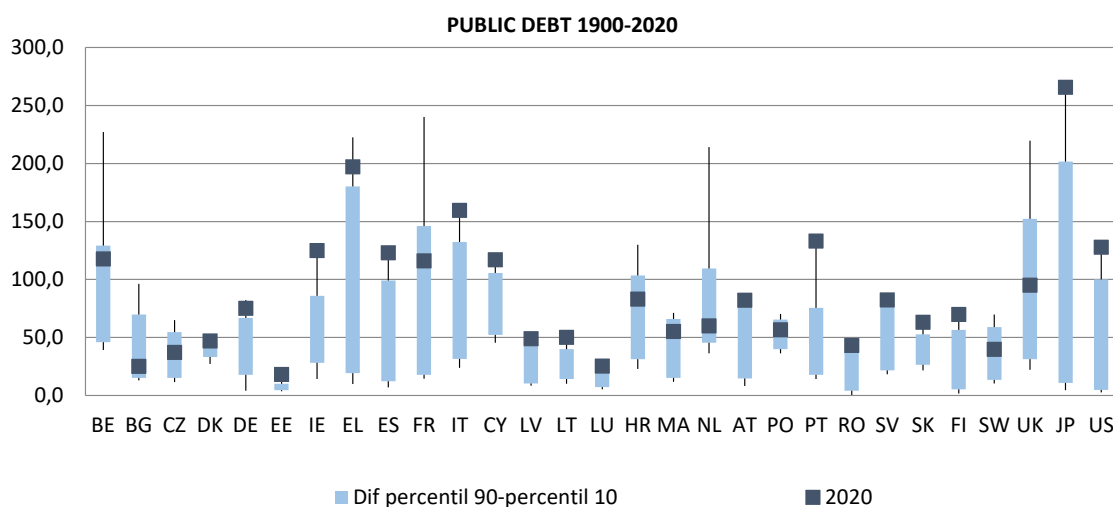
Note: employment in 'vulnerable sectors' refers to accommodation, food and beverage services and retail sectors.

Sources: Eurostat Q4 2019 data and European Fiscal Monitor, September 2020.

These levels of debt represent historical highs in most countries (in peacetime). Except for some specific countries (Bulgaria, the Netherlands and the United Kingdom), debt ratios registered in 2020 are in the

upper side of the historical distribution, representing a historical peak in most cases (in most cases information is not available for periods of war) (see Figure 3).

Figure 3. Historical evolution of debt ratios (% of GDP)



Note: % of GNI for Ireland for better comparability.

Source: Historical Debt Database (IMF), European Fiscal Monitor, September 2020 and European Commission AMECO Database.

High levels of debt increase have increased the sensitivity of debt ratios to changes in interest rates and shortfalls in growth meaning larger uncertainties and challenges surrounding current debt projections.

Low interest rates and issuance at long maturities have helped to mitigate risks in coming years. However, the sensitivity of the debt ratio to changes in interest rates, as well as to shortfalls in growth, increases with the level of debt. This reflects the magnifying role that higher debt ratios have in the standard debt accumulation equation. Other longstanding pressures also remain. The surge of age-related and health care spending will complicate the task of bringing down high debt. Combined with these gradual developments, recent abrupt increases in debt related to the GFC and the current health crisis point to the need to consider the possibility that some events, which in the past would have been regarded as extreme, may have become more frequent.

Reflecting historically high debt ratios, heightened sensitivity to interest and growth changes, and the unprecedented nature of monetary support, debt sustainability analysis (DSA) has become even more important. Effective DSA can provide guidance on which fiscal consolidation strategy – if any – may work best to reduce public debt to safer levels. It can also provide insights into what safe debt levels may actually be under different assumptions for growth and interest rates. This may also be useful to reassure investors that debt is sustainable.

Debt projections are also highly relevant in the context of the European surveillance framework, as the impacts of Covid-19 could influence the debate on how the fiscal rules are revised. The EU debt rule looks set to become the most stringent set of criteria when the EU fiscal rules framework is resumed and after excessive deficits (above 3% of GDP) are closed. The consensus emerging in the debate around potential reforms of the EU fiscal rules puts a debt rule or debt anchor at the centre of the framework (Carnot et al., 2021, European Fiscal Board, 2020; Blanchard, Leandro and Zettelmeyer, 2020). Therefore, it is important to obtain robust debt projections.

This paper provides a fresh look at how DSA is currently practised in IFIs, and provides a set of preliminary insights into how to address the uncertainties faced in the current high-debt environment. Building on an analysis of DSA activities as applied in EU countries and on a survey of EU IFIs practices,

the paper provides a useful perspective on how DSA is practised. It also provides some insights into how to assess public debt sustainability in the current context, which is characterised by high levels of debt, low interest rates and massive uncertainty.

The role of IFIs in DSA

Assessing the sustainability of public finances is one of the main goals of many of the Independent Fiscal Institutions in the European Union. Relatively new to the political and economic scene in the EU, IFIs are characterised by large heterogeneity in terms of their mandates and functions. Nevertheless, a common feature is that one of their main roles is to shed light on the sustainability of public finances. Analysis of debt sustainability by IFIs can contribute to promoting higher compliance with fiscal rules, and to providing information on the future path of the public finances. The assessment of EU member states' debt developments is a key component of fiscal surveillance under the Stability and Growth Pact (SGP).

DSA frameworks have been developed in IFIs and international organisations to analyse fiscal risks in the medium to long term. Many international organisations have developed a DSA framework not only for the analysis of fiscal risks, but also as part of providing financial assistance to countries in difficulty. IFIs can add to this analysis by bringing greater national expertise and ownership to the debate on fiscal risks, while also increasing transparency around national fiscal matters. Many fiscal risks are inherently long term in nature. These include risks related to climate change or costs related to an ageing population. This longer-horizon focus is an aspect that many IFIs have also expanded DSA to include at national level. The experience of the recent Covid-19 crisis suggests that enhancing the analytical toolkit for assessing and projecting debt levels is warranted.

Based on an analysis of DSA practices in the EU, and building on a survey of EU IFIs' forecasting and DSA practices, this paper sheds light on some of the roles that IFIs fulfil in terms of DSA through their various functions. IFIs engage in DSA through a variety of channels, including through the preparation or assessment of macroeconomic and budgetary forecasts; through their analysis of medium and long-term fiscal risks and stances; and through their presence in the national debate. Indeed, by their presence, IFIs have been associated with more accurate and less optimistic official forecasts (Beetsma et al., 2018). IFIs that are members of the Network could be categorised under four broad groupings in relation to their forecasting functions (see Figure 4. **IFI mandates in terms of macroeconomic and budgetary forecasting**

4).

Although only two of the IFIs surveyed have a mandate to produce official macroeconomic forecasts, most produce them on their own initiative. Only two of the IFIs surveyed (CPB in the Netherlands and IMAD in Slovenia)¹ have a mandate to produce official macroeconomic forecasts for the government that would underpin budgetary plans. Some 10 out of 29 IFIs surveyed² do not have a mandate to produce official forecasts, but do produce macroeconomic forecasts on their own initiative. Reasons for IFIs developing their own forecasts include the fact that these can help them to evaluate the official macroeconomic forecasts for endorsement or assessment:³ that is, IFIs can benchmark official estimates against the combination of their own projections and other forecasts. Actively producing macroeconomic forecasts can also help IFIs better assess current macroeconomic developments and hence better calibrate their policy advice, where applicable. Fiscal councils that do not produce their own forecasts mostly rely on various projections produced by national (e.g. ministries, statistical offices

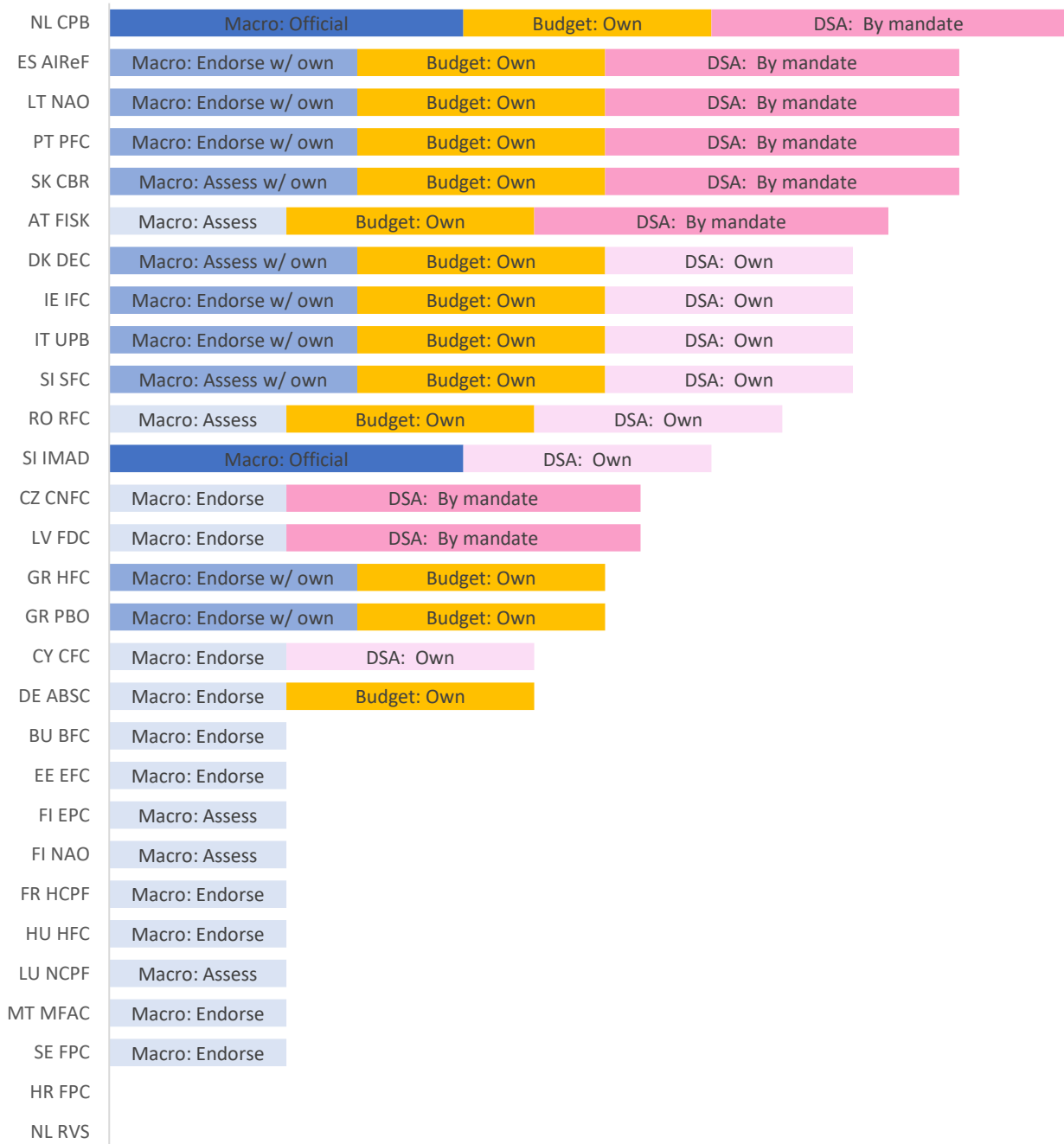
¹ Both the Netherlands and Slovenia have two fiscal councils, however only one (CPB in the Netherlands and IMAD in Slovenia) has an official mandate to produce macroeconomic forecasts for the government.

² DK DEC, ES AReF, GR HFC, GR PBO, IE IFC, IT UPB, LT NAO, PT CFP, SI SFC and SK CBR. IFIs in Denmark, Slovakia and Slovenia (SFC) assess rather than endorse official macroeconomic forecasts.

³ Endorsement refers to a formal step required in the forecast process. Assessment is a statutory task, independent from the forecast process.

and think tanks) and international (e.g. the European Commission, European Central Bank and International Monetary Fund) organisations. Additionally, historical trends and expert judgement are regularly used for the endorsement or assessment of official forecasts.

Figure 4. IFI mandates in terms of macroeconomic and budgetary forecasting



Note: mandates relating to macro, fiscal and DSA forecasts.

Source: Network of EU IFIs (2020).

A similar situation holds for budgetary forecasts, as most of the IFIs surveyed produce them on their own initiative. Although none of the IFIs surveyed have a mandate to produce official budgetary

forecasts, some 14 fiscal councils⁴ produce budgetary projections on their own initiative. Internal budgetary forecasts are often used to help with the endorsement or assessment of official forecasts, and to assess compliance with fiscal rules. Fiscal councils that endorse but do not produce budgetary forecasts mostly rely on projections of other national institutions in addition to their own estimates (e.g. adjustments of the latest available results for fiscal multipliers, cycles, one-offs, discretionary measures and policy changes).

In the case of DSA, around one-third of IFIs surveyed have an official mandate to produce this, while another third of IFIs surveyed do so more generally, regardless of their mandate. DSA that looks at the medium to long-term risks to the public finances is part of the official mandate for eight fiscal councils that were surveyed.⁵ Additionally, seven IFIs⁶ carry out such an assessment on their own initiative. Unlike macroeconomic or budgetary forecasts, DSA can often be performed over longer time horizons. This is important when evaluating certain fiscal risks that will only materialise in the long term (e.g. population ageing and climate change).

⁴ AT FISK, DE ABSC, DK DEC, ES AIReF, GR HFC, GR PBO, IE IFC, IT UPB, LT NAO, NL CPB, PT CFP, RO RFC, SI SFC and SK CBR.

⁵ AT FISK, CZ CNFC, ES AIReF, LT NAO, LV FDC, NL CPB, PT CFP and SK CBR.

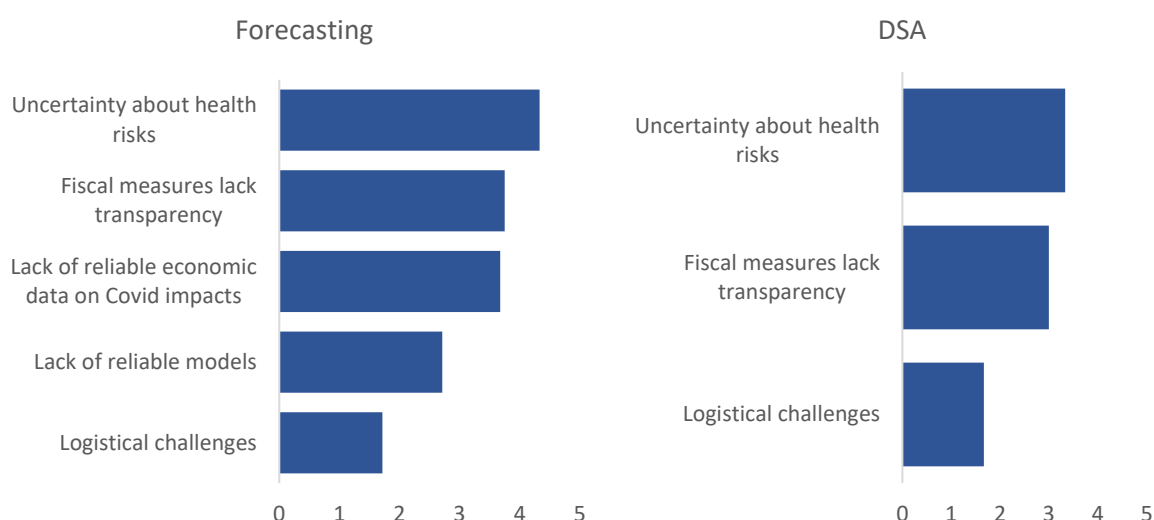
⁶ CY CFC, DK DEC, IE IFC, IT UPB, RO RFC, SI IMAD and SI SFC.

New challenges for IFIs

High levels of debt and high uncertainty suggest a greater role for IFIs in the future fiscal governance framework. Thus, new challenges emerge regarding how DSA needs to be practised and how to adapt it to consider various sources of risks.

Confronted with the challenges of the pandemic, IFIs have shown capacity to adapt their work practices. This has required a careful rethink of how macroeconomic and budgetary forecasts are to be assessed and/or produced in light of the uncertainties and risks associated with the pandemic. When asked about the main difficulties faced in terms of forecasting and in terms of DSA assessments, IFIs noted that uncertainties about health risks were by far the most pressing challenge they faced (see Figure 55). Second to that was the view that fiscal measures introduced by various governments lacked transparency. Interestingly, IFIs did not rank logistical challenges (such as staff working remotely) as being important at all, with average responses the lowest ranking of all challenges faced. IFIs did not seem overly concerned with the lack of reliable models that could cope with the exceptional nature of the Covid-19 shock. However, a greater use of expert judgement was noted by some IFIs as being necessary to supplement standard modelling approaches.

Figure 5 Challenges faced by IFIs



Note: for forecasting, respondents were asked “What were the main challenges you faced in terms of forecasting during Covid-19? Importance was ranked from 1 – unimportant to 5 – very important. For DSA, respondents were asked “What were the main challenges related to DSA? How would you evaluate their importance?” On average, 13 IFIs responded.

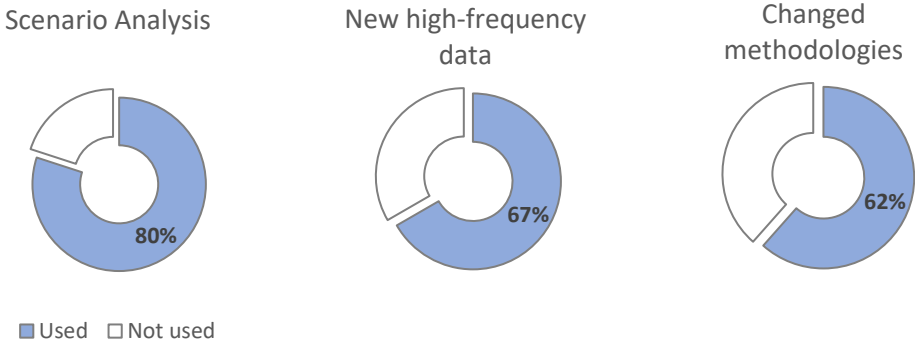
Source: Network of EU IFIs (2020).

These challenges are clearly important to IFIs that have an explicit mandate to produce macroeconomic or budgetary forecasts. However, even IFIs that do not have a specific mandate to produce forecasts are still faced with substantial challenges due to the uncertainty caused by the pandemic. Monitoring compliance with fiscal rules requires great care when standard measures of the output gap, structural balances and temporary versus long-lasting expenditure changes are difficult to unravel. The perceived lack of transparency on new fiscal measures, coupled with the shortening of official forecast horizons, adds to these difficulties. It is also extremely difficult to assess how realistic official macroeconomic and budgetary forecasts are in a world where the path for the economy depends heavily on the path of the pandemic. This is something that economists generally have little expertise on. Moreover, assessing the risks that surround official forecasts and the potential implications for debt sustainability is also made

difficult by the range of disparate outcomes possible in an exceptionally uncertain environment. Policy decisions about confinement measures created large structural shifts in the economy that were difficult to foresee. The rapidly changing landscape therefore made it very difficult to rely on other forecasting agencies’ forecasts as a basis for assessing or endorsing official forecasts.

To grapple with the uncertainties arising from Covid-19, IFIs have responded in a number of ways, including through greater use of scenario analysis. Scenario analysis has been adopted on a widespread basis in response to the uncertainties of the pandemic, with four out of five responding IFIs reporting its use in some form (see Figure 66). In addition, IFIs have also reacted to the challenges of Covid-19 by availing of new high-frequency data sources, as well as by revisiting their core models (recalibrating these where necessary). Others have responded by publishing additional reports to provide more insight into the crisis.

Figure 6. Share of IFIs using new analytical approaches (% of total respondents)

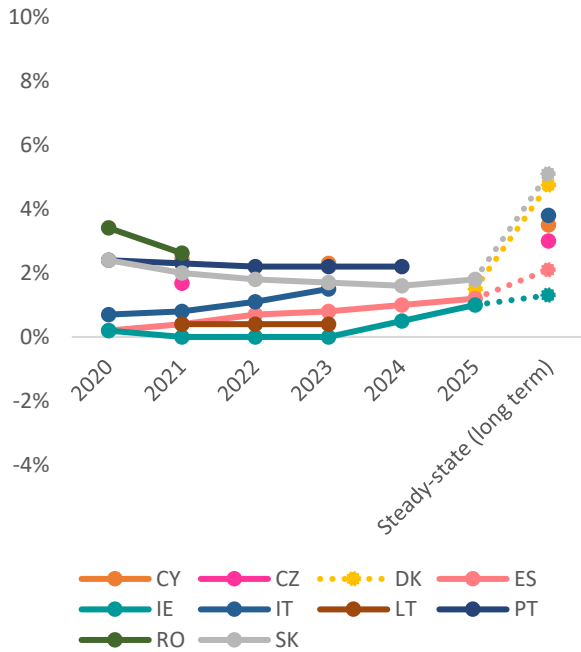


Notes: respondents were asked: “Did the new forecast distinguish between baseline and OWN scenarios?”, “Did your institution use new sources of high frequency data?” and “Did you change the methodology of your forecast due to Covid-19?”. On average, 14 IFIs responded.
Source: Network of EU IFIs (2020).

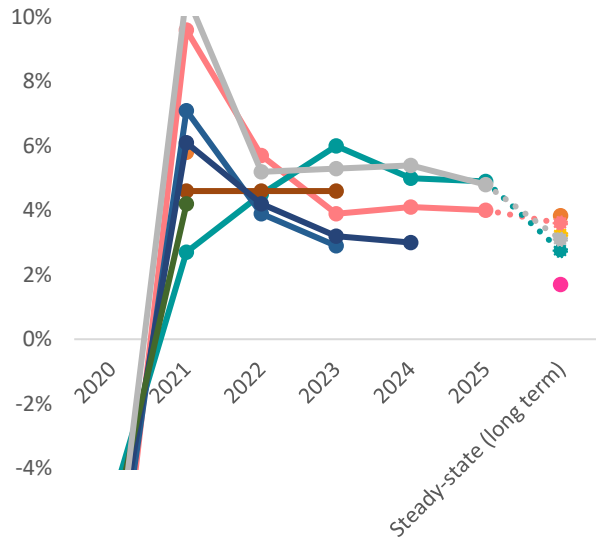
In terms of how DSAs are set, IFIs tend to assume that interest rates will remain low, and that growth will be lower over the medium term. However, interest rates are expected to rise to varying degrees over the long run, such that there is a wide range of assumptions for the interest-growth differential. As Figure 7 shows, IFIs appear to have built expectations of low interest rates and reasonable output growth rates into their DSAs. All but two of the 15 institutions surveyed used deterministic DSAs for these most recent exercises, or a mixture of both deterministic and stochastic. Only two relied solely on stochastic models. Based on the survey, it is rare that IFIs assume that interest rates and growth rates will converge over the medium or long term (only one IFI reported that this assumption was used). Most IFIs practising DSA tend to model or evaluate these separately.

Figure 7. IFI assumptions used for recent DSA

A. Nominal marginal interest rates (i)



B. Nominal output growth rates (g)



C. Steady state/long-run interest-growth rate differentials assumed (i-g)



Notes: the timing of steady state/long-run values assumed differed by respondent. For IE, this refers to 2050; for ES, there is no such steady state estimate, but from 2027 to 2050 there is a range of variation of ± 0.5 points from i-g of -1%; for CY, this refers to 2033; for CZ, this refers to 2030; for DK, this refers to 2050; for NL, this refers to 2060; and for SK, this refers to 2070.

Source: Network of EU IFIs (2020).

A review of DSA methodologies

This section presents pros and cons of debt projection methodologies currently used by IFIs, given the current environment. Box 1 includes a comparison of the main features of DSA used by the European Commission (EC), the International Monetary Fund (IMF) and the European Central Bank (ECB).

Box 1. DSA in the EC, the IMF and the ECB

Most international organisations and financial institutions have developed a DSA framework to support decisions in their macroeconomic surveillance and provision of financial support. The assessment of EU member states' debt developments is a key part of fiscal surveillance under the SGP. Moreover, under the Treaty establishing the European Stability Mechanism (ESM), the provision of financial assistance to euro area member states experiencing financing problems requires, inter alia, a favourable debt sustainability assessment by the EC, in liaison with the ECB and possibly also the IMF. DSA is also a necessary component of IMF financial assistance programmes. This box summarises the main features of DSA frameworks used by these institutions.

In the EU, the EC is the only supranational institution that publishes regular DSA. Nevertheless, it was only after the GFC and the setup of the European Financial Stability Facility (EFSF) and the ESM that the Commission's role of monitoring public debt was enhanced and the methodology for its DSA published (see EC, 2014 and 2016). The ESM relies on the EC DSA, whilst the ECB only produces DSA for internal use, although its methodology has been published (ECB, 2015). The IMF proceeded to revise its DSA framework in 2011, with the main goals being to create a framework more suitable for advanced economies and to enhance the analysis of risks both from a fiscal and financial perspective (IMF, 2013; and Cottarelli and Moghadam, 2011).

There is no consensus definition of debt sustainability across institutions. For example, the IMF (2013) considers that "public debt can be regarded as sustainable when the primary balance needed to at least stabilise debt under both the baseline and realistic shock scenarios is economically and politically feasible, such that the level of debt is consistent with an acceptably low rollover risk and with preserving potential growth at a satisfactory level [...]" (IMF, 2013; 2021). This definition has also been adopted by the ECB. On its side, the EC considers that sustainability of public debt is achieved when a government can sustain its current spending, tax and other related policies in the long run without threatening its solvency or defaulting on some of its liabilities or promised expenditures. It is easy to see that under these definitions, sustainability assessment requires a lot of judgement.

From a methodological standpoint, DSA frameworks have substantially evolved since the GFC in all of the institutions considered, in order to improve the detection of risks. Currently, most DSA makes use of an increasing number of indicators and follows a multidimensional approach (see Cotarelli, 2018; and Alcidi and Gross, 2018). In all cases, DSA begins estimating the trajectory of public debt relative to GDP using both a deterministic and a stochastic approach to obtain public debt projections.

In the deterministic case, the baseline scenario is built using projections about the country's GDP growth in the short term (taken from the IMF World Economic Outlook (WEO) or EC forecasts). Beyond the short-term horizon, real GDP growth rates ensure convergence with potential growth estimates. Assumptions about interest rates are typically derived from market expectations; inflation rates based on the GDP deflator are assumed to converge to a rate consistent with the ECB's monetary policy reference data; and assumptions about the primary balance are based on the no policy change hypothesis relative to the current stance. Only the ECB benchmark scenario assumes that governments will take fiscal measures as necessary to meet the minimum requirements under the SGP.

The approach for stochastic projections adopted by the EC is based on the variance-covariance matrix of historical shocks, as explained in Berti (2013), while the IMF or ECB rely on a vector autoregressive model (VAR).

The time horizon for debt projections is 10 years in the case of the EC and ECB, and five years in the case of the IMF, though a 10-year horizon has been proposed for its revised DSA framework (IMF, 2021).

In addition to debt projections, all of the institutions under consideration use a variety of broadly similar indicators to integrate the assessment of medium to long-term debt sustainability challenges with an assessment of more immediate challenges and risks. For example, the EC approach has included the development of a weighted set of fiscal, financial and macro-competitiveness indicators to detect fiscal stress and to give an early warning of risks within a one-year timeframe (the S0 indicator). In all cases, gross financing needs are included, as stressed by the ESM (Gabriele et al., 2017). In addition, the EC estimates the S1 (and S2) indicator measures and the fiscal effort required to bring the debt-to-GDP ratio to 60% (to stabilise debt) in a specific year (over an infinite horizon) including the costs related to an ageing population.

The multiplicity of indicators used in the surveillance exercises usually leads to elaborate heat maps based on thresholds, or to qualitative assessments, in order to help identify countries with sustainability risks. For example, the EC (2014) established a list of criteria that act as trigger for considering a country as 'vulnerable' based on the level of debt and debt dynamics (e.g. whether the country's current and/or forecasted gross public debt is higher than 90% of GDP; and whether the country's current and/or forecast change in gross public debt over GDP is at, or higher than, 5 p.p.). The ECB uses the Treaty reference value of 60% as a threshold to identify risks to debt sustainability, while the IMF uses the 85% threshold (20% in the case of gross financing needs).

Deterministic DSA

The deterministic DSA approach is the simplest and most common approach followed in many countries and institutions to obtain debt projections. Some 13 out of 15 IFIs that carry out DSA⁷ rely on the deterministic approach to greater or lesser extent. A few IFIs use more complex methodologies such as overlapping generations models, full-scale computable general equilibrium models and other approaches.

The deterministic approach comprises the design of debt scenarios based on explicit – somewhat ‘ad hoc’ – assumptions for the underlying variables (GDP growth, interest rates and fiscal position) over a long-term horizon. From an analytical perspective, such debt projections rely on the accounting debt accumulation equation:

$$\Delta D_t = D_{t-1} * \left(\frac{i_t - g_t}{1 + g_t} \right) - PB_t + dda$$

This equation decomposes the change in the government gross debt-to-GDP ratio (ΔD_t) into its key drivers, consisting of: (i) the ‘snowball effect’, i.e. the impact from the difference between the average nominal interest rate charged on government debt (i_t) and the nominal GDP growth rate (g_t), multiplied by the debt-to-GDP ratio in the previous period (D_{t-1}); (ii) the primary budget balance ratio (PB_t); and (iii) the deficit-debt adjustment as a share of GDP (dda_t), sometimes referred to as the ‘stock-flow’ variable, comprising factors that affect debt but are not included in the budget balance (such as acquisitions or sales of financial assets, valuation effects, etc.). When $dda=0$, the debt ratio remains stable if $pb_t \approx (i_t - g_t) b_{t-1}$. Thus, if $i_t > g_t$, a primary surplus is needed to stop the debt burden from rising and an even larger surplus is needed to reduce the debt burden.⁸ The higher the initial debt ratio, the larger primary surpluses will need to be. However, when $i_t < g_t$ the debt ratio stabilises even with primary deficits. If $i_t < g_t$ and the country maintains a primary surplus, debt will steadily decline.

Within this simple framework, debt projections depend crucially on the assumptions about GDP growth and fiscal variables. Most of the IFIs surveyed that rely on the deterministic approach feature in assumptions on the nominal GDP growth and evolution of the primary balance. In the short term, growth is based on EC or IFI projections; beyond the short-term horizon, it is very common to assume that real GDP growth rates converge to potential growth estimates based on demographic projections. The latter, however, must consider pressures relating to an ageing population, which presents a substantial risk in the long run. The primary balance is considered to evolve according to the government or IFI’s projections most often based on the no policy change hypothesis relative to the current stance. Usually the assumptions about growth, interest rates and other parameters are bound by some considerations about the state of the economy. For instance, most IFIs assume that the output gap will close in about five years, or that it is already closed for their projections. Assumptions about interest rates tend to be derived from market expectations. Inflation assumptions, such as for the GDP deflator, are typically assumed to converge to a rate consistent with the ECB’s definition of its price stability mandate. The methodology can also feature assumptions on interest rate spreads and the timing of future debt rollovers, repayments and contingent liabilities. However, the results of the survey show that these assumptions are typically used to a lesser extent.

There are several limitations of the deterministic framework that, in the current context, could undermine the results of DSA. In particular, there is a well-documented optimism bias that derives in

⁷ AT FISK, CY CSC, CZ CNFC, DK DEC, ES AIREF, IE IFC, IT UPB, LT NAO, LV FDC, NL CPB, PT CFP, RO RFC and SK CBR.

⁸ This condition ($r-g$) only applies for a one-time increase in debt. The dynamic condition is more complex and restrictive (Sims, 2020).

some cases from: (1) the standard assumption that real GDP growth rates will converge to their potential growth rate; and (2) a tendency to downplay the feedback effects of fiscal consolidation on growth (Guzman and Heymann, 2015). Additionally, recent abrupt increases in government debt seen since the GFC emphasise the importance of sources of risk and uncertainty that can lead to insufficient fiscal buffers and jeopardise the sustainability of public finances. An appropriate policy response to reduce debt should include taking precautionary measures against the possibility of worse-than-expected outcomes.

To account for uncertainty surrounding the future development of economic variables and to assess the possible impact of shocks, two methodologies can be applied. First, adverse scenarios are usually incorporated into this accounting framework to measure the sensitivity of debt developments to, for example, a lower medium-term growth path, higher interest rates or different consolidation efforts with reference to a baseline projection scenario. Second, to improve the detection of risks, scenarios should be designed to show the importance of contingent liabilities. That is, to add debt related to an ageing population or other contingent liabilities associated with, for example, possible financial assistance provided by the state to firms during the Covid-19 crisis, risks emerging in the financial sector, or the effects of climate change on long-term growth, as done by the Congressional Budget Office (CBO, 2020).

When building these scenarios, it would be convenient to consider fundamental interactions between key variables. All the terms in the standard government debt accounting equation respond endogenously to each other. For example, the primary balance deteriorates in the presence of negative real growth shocks according to country-specific budgetary elasticities – as revenues fall and as cyclical spending rises. A larger fiscal consolidation would be associated with lower GDP growth in line with estimated fiscal multipliers. Finally, higher levels of debt can be reflected in higher sovereign spreads, which can be captured estimating the historical sovereign bond spread's reaction to changes in the level of debt.⁹ Most IFIs and international institutions have tried to incorporate these interactions (see ECB, 2016; AIReF, 2020; the Irish Fiscal Advisory Council's Fiscal Feedbacks Model or the IT-UPB DSA template). In any case, these alternative scenarios are quite mechanistic and depend on assumptions about the size of fiscal multipliers or the elasticity of spreads to debt levels. The integration of models that better account for the mutual dependence of growth, inflation, interest rates and fiscal policy in debt projections is needed (see Box 2 for an example applied to the Spanish case).

Stochastic DSA

The stochastic approach to DSA allows the uncertainty surrounding debt paths and its fundamental determinants to be captured, considering the historical behaviour of the relevant macroeconomic variables and their feedback linkages. This probabilistic tool has become part of fiscal policy assessments in many international institutions and in some IFIs. In fact, eight out of 15 IFIs¹⁰ that carry out DSA use some form of a stochastic approach. Approaches used by the Irish, Italian and Slovak IFIs are developed in-house, while the Lithuanian IFI and both of the Slovenian IFIs make use of the IMF's market access countries (MAC) DSA methodology. Most IFIs that carry out DSA use stochastic models in addition to the main deterministic model for a more in-depth analysis of debt sustainability risks (e.g. fan charts, and sensitivity and scenario analysis). Only the two Slovenian IFIs rely solely on a stochastic methodology.

The methodology can be based on the estimation of a Vector Autoregressive Model (VAR) (Medeiros, 2012). In this framework, debt outcomes reflect the interplay of model-consistent macroeconomic

⁹ The ECB implements this impact through a 25 basis point increase in spreads for every 1 percentage point increase in the deficit-to-GDP ratio, and a 4 basis point increase in spreads for every 1 percentage point increase in the debt-to-GDP ratio.

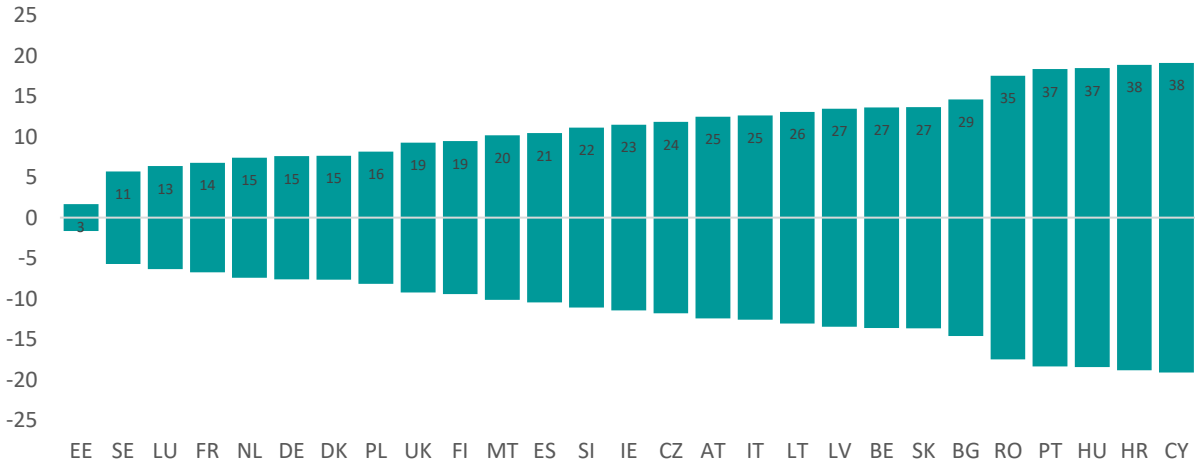
¹⁰ CY CFC, ES AIReF, IE IFC, IT UPB, LT NAO, SI IMAD, SI SFC and SK CBR.

projections for growth, prices, real interest rates and the expected fiscal policy response. Based on the historical volatility and co-movement of the macroeconomic variables entering into the debt accumulation equation, the probabilistic distribution of debt can be obtained. The methodology allows users to produce fan charts that can help assess the plausibility of a specific benchmark or the probability of debt being above a specific level. In contrast with the standard DSA, the VAR methodology is not anchored in any specific growth scenario, neither does it assume unchanged policies. In particular, IFIs tend to step away from the no policy change scenario and employ several projections of public revenues and expenditures.

Alternatively, structural models can be used to produce stochastic DSAs. Other tools used to produce stochastic DSAs include structural models that incorporate some of the key relationships between different variables. For example, the Irish Fiscal Advisory Council’s recently developed “Maq” model (Casey and Purdue, 2021) is a small-scale structural model with three core equations: a Growth equation; a Phillips curve equation; and a Marginal Interest Rate equation. Other approaches such as full-scale computable general equilibrium models can also be used to develop stochastic DSAs.

Despite their advantages Stochastic DSAs can be problematic. Stochastic DSAs assume that historical correlations and co-movement are a good guide for assessing future macroeconomic dynamics. This assumption may prove unreliable, especially if there is a severe crisis with no recent historical precedent, such as the 2008-2009 GFC or the Covid-19 crisis (for a good discussion, see Pamies Sumner and Reut, 2020). Other frequent shortcomings include inappropriate distributional assumptions, a lack of standardisation in modelling, and the impact that optimism/pessimism has on the baseline (IMF, 2021). The levels of uncertainty underlying stochastic debt projections can also be very high, as measured by the projection range between the 10th and 90th percentiles. Figure 8 shows this range based on the EC’s stochastic projections, with five-year-ahead forecasts showing ranges of almost 40 percentage points for countries such as Cyprus, Croatia, Hungary and Portugal. A high degree of uncertainty with no clear narrative is often unhelpful for policy advice.

Figure 8. Stochastic debt projection ranges (percentage points, 10th to 90th percentile)



Notes: the figure shows the differences between the 10th and 90th percentiles for stochastic projections of debt ratios in 2024 (in p.p. of GDP) based on the EC’s (2020a) Debt Sustainability Monitor 2019.
 Source: Network of EU IFIs (2020).

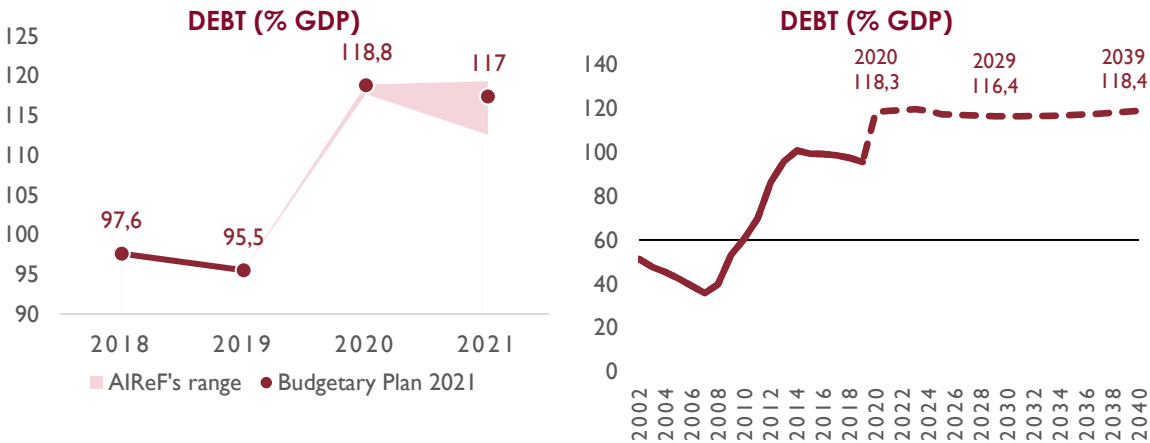
Although the state-dependent nature of debt makes sustainability a probabilistic concept, both methodologies should be regarded as complementary rather than competing. Given the different perspectives explained above, there are significant advantages and disadvantages to both deterministic and stochastic DSAs. The challenge of incorporating pressures such as those associated with an ageing

population and climate change will be essential considerations in the long run. These elements are difficult to be factored in using the stochastic approach. On the other hand, in this uncertain world, the importance of qualitative assessment by independent institutions should not be neglected to gain transparency on the impact of different DSA assumptions. In this sense, stochastic DSA offers a useful means of communicating uncertainty, especially in steadier times when policymakers may perhaps be lulled into some degree of complacency.

Box 2. DSA in Covid-19 times – the case of Spain

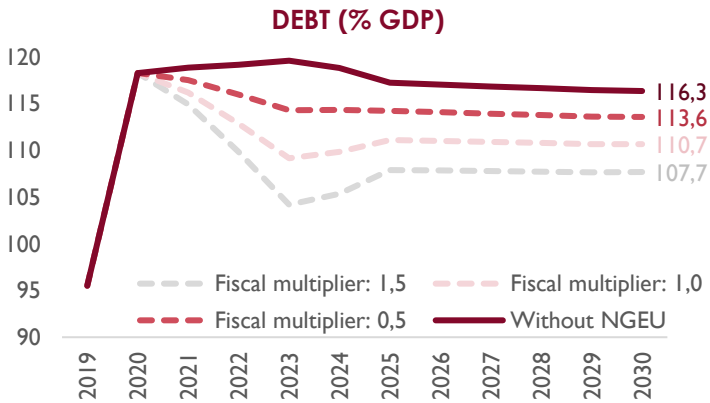
When producing debt projections in times of high uncertainty, various macroeconomic aspects should be considered. For instance, AIReF derives debt projections for the Spanish economy within a deterministic framework. One aspect of this is that, in order to take into account the interactions between the path of fiscal consolidation and GDP growth, growth projections are based on a simple model. In particular, real GDP growth is driven by its potential growth, as well as by persistence effects (through an autoregressive process), and growth is affected by any additional fiscal consolidation (or stimulus) considered in the benchmark (through the fiscal multiplier assumed).

Spain has faced the Covid-19 crisis without having been able to generate much fiscal space in the years of economic recovery (a reduction of five of the 65 points of the increase in the debt ratio). As a result of the sharp decline in activity and of the fiscal measures taken, AIReF projects an increase in the debt-to-GDP ratio to 118.8 p.p. of GDP before declining to 117 p.p. of GDP in 2021 (an increase of 23 points by 2020 and a reduction of up to 2.4 points by 2021); levels not seen in peacetime.



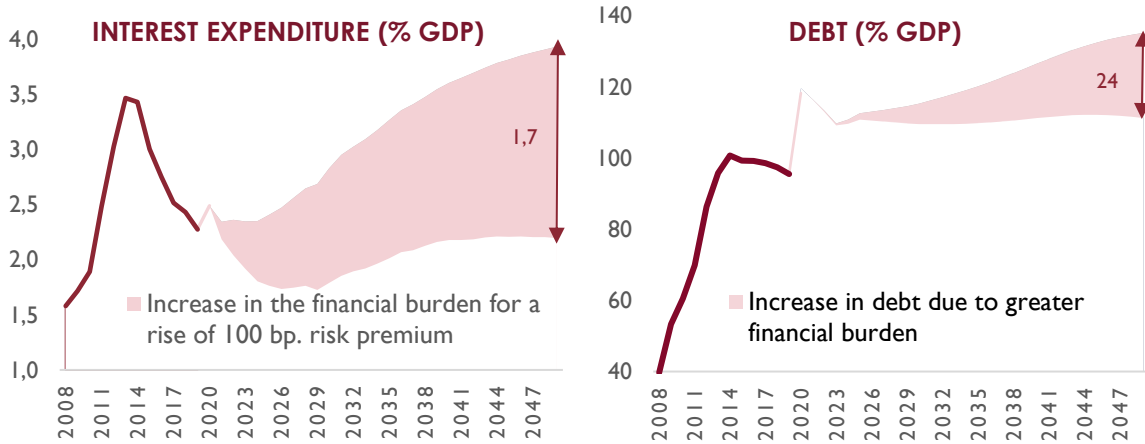
Public debt dynamics largely depend on the economic recovery path. Assuming that GDP growth returns to its potential within the next five years, simulations suggest that – in the absence of fiscal consolidation measures – debt will remain stable at levels close to 120 p.p. of GDP. However, given the large uncertainty surrounding current health and economic crisis, the economic recovery can take a different path.

There are other factors that could indirectly influence the dynamics of public debt by hindering or boosting economic recovery. For instance, the European Next Generation EU Plan (simulated in the following chart assuming different multipliers) will have a positive effect on the economic recovery and potential long-term growth in Spain, which will result in an improved evolution of the fiscal position. However, it will be insufficient to bring debt levels down by a significant amount.

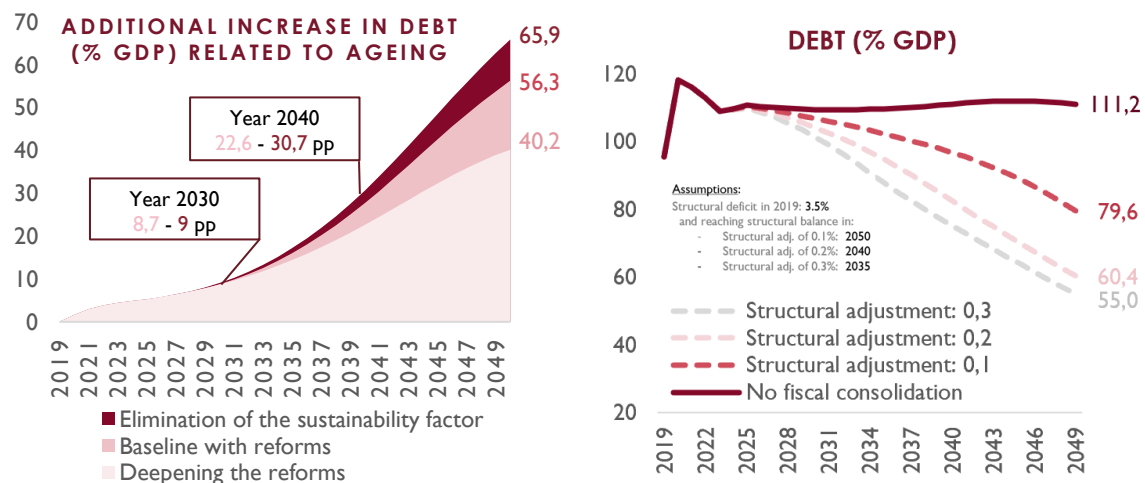


The simulation considers direct transfers from the EC under the NGEU programme for an amount of €72 billion, of which €27,463 million is allocated in 2021 (as recorded in the 2021 budget) and the rest is distributed in the remaining two years.

Furthermore, debt dynamics are much more dependent on maintaining a low interest rate environment over a long period of time. Although low levels of interest have brought the debt burden to 2.3% GDP, the level of debt is so high that a rise in interest rates can quickly generate an increasing dynamic in the ratio. For example, an increase of 100 basis points of interest rates will lead to an increase in the financial burden of 1 point of GDP in 2030 and 1.4 in 2040, placing the interest expenditure at 2.8% and at 3.6% of GDP respectively. This would result in an increase of 6 p.p. in the debt ratio in 2030 and 15 in 2040.



In addition to the high uncertainty about economic growth, there are other high risks and challenges to the sustainability of public finances in the medium and long term. The deepening health crisis might cause structural damage with additional increases in the public debt ratio and a greater structural deficit. Size and magnitude of Covid-related measures are a source of risk for debt sustainability as some liquidity measures can materialise predominately in the long term. The increase in pension expenditure linked to an ageing population is also one of the major challenges for the sustainability of public finances. This could contribute to an increase of more than 50 p.p. in public debt by 2050 in the baseline scenario.



Finally, DSA allows a consolidation plan to be designed that places debt on a downward path to more prudent levels. Careful design of fiscal consolidation is needed because debt is sensitive to different consolidation paths. In line with the literature, front-loaded consolidations could increase public debt in the short run, once the cost of lower economic activity (sensitivity to different multiplier effects) is taken into account. While credibility effects can ease the pain of fiscal adjustment through lower risk premiums, this is unlikely to fully offset the short-run adverse impact on economic activity (Abbas et al., 2013).

Conclusions

Debt sustainability analysis has evolved significantly during the past few years to include richer quantitative debt projections and different sources of risks. The current practices among IFIs and other institutions, as outlined in this paper, involve a mix of both deterministic and stochastic DSA projections. Stochastic projections incorporate uncertainties about key variables such as growth and interest rates and complex interactions, and are useful for communicating risks, particularly in steadier times. As well as being central to how debt ratios might evolve, these give a glimpse of the probability of various outcomes being realised. However, simpler deterministic exercises also play a key role. These offer a clearer narrative and are more easily applied to specific scenario analyses — something that has been crucial for the Covid-19 era as well as for assessing the role of other factors such as pressures associated with an ageing population, climate change and risks related to major contingent liabilities. The latter could be especially relevant in the coming months and years, given the extent of supports that governments are providing to businesses across the EU.

As debt rises to high levels once again, the importance of and need for rigorous analysis of debt sustainability rises with it. The current practices cited in this paper should serve as a useful benchmark for IFIs to gauge themselves against. But even a well-designed DSA should not be seen as a panacea. Probabilistic assessments of debt are an important tool, for example, but they do not give ready answers to the deep questions that now exist about “what level of debt is sustainable”? Stochastic DSAs also rely heavily on recent and historical dynamics to give a sense of the likely path for and uncertainty surrounding debt projections. Yet there are many uncertainties that are not captured by backward-looking assessments of the economy and public finances. Deterministic DSAs have proved useful when a range of particular scenarios are foreseeable, but often lack the richness of variable interactions and the recognition of uncertainty that other models offer.

There are many challenges to making stochastic DSA the central tool for operationalising fiscal rules. Broadly speaking, the idea behind using probabilistic debt ratio projections for fiscal rules, as advocated by Blanchard et al. (2020), would be that assessments of the probability of going above some level of debt could be made in advance. Governments would then be required to avoid exceeding a certain probability of this occurring. Some key challenges to this approach are that: (i) uncertainties captured by stochastic DSA might not be informative for the uncertainties now faced, especially if extreme events, such as climate events, become more relevant; (ii) in many cases, stochastic projections have a hideous level of uncertainty after just a few years; and (iii) rather than simplifying the fiscal framework, stochastic DSA could magnify its complexity. While the approach would provide a sensible means of objectively assessing debt sustainability challenges, stochastic DSAs have their limitations and might not be quite ready to serve as the anchor of fiscal policy.

What should IFIs confronted with this uncertainty do? IFIs have the unenviable task of performing DSA in an environment where debt sustainability as a concept is highly unclear. There are five things that IFIs can do to help to cut through this uncertainty.

First, it is important that IFIs, now more than ever, are honest and transparent about their assumptions. If they assume that interest rates revert to long-run averages, then this should be clear. If they call for debt ratios to be brought down to safer levels, then they should be upfront about the fact that it is exceptionally difficult to assess what safe levels might actually be.

Second, a welcome innovation brought about by IFIs in response to this crisis is a greater use of scenario analysis to assess the path for public finances. Developing scenarios for how key variables such as interest rates and growth rates will evolve can offer a key contribution to the wider understanding of current challenges. Given their mandates and their independence, IFIs may be best placed to continue

to shed light on the risks surrounding debt sustainability. While this work is demanding and has its limits (not every scenario can be assessed), IFIs should continue to develop scenarios for how the economy and public finances might evolve under different assumptions. This should complement rather than replace ongoing efforts to develop more sophisticated stochastic DSA tools.

Third, IFIs can bring greater transparency to the nature of fiscal measures introduced, including contingent liabilities, many of which will have a significant bearing on debt sustainability. With many policies being introduced at haste to respond to the Covid-19 crisis, there is a clear need for independent bodies to shine some light on what the eventual impact of these policies might be. Guarantees extended to businesses may incur very low costs in the present, but could become a significant burden on governments if losses mount and businesses fail. It is important that IFIs bring clarity to areas where this is not forthcoming, and that policymakers ultimately provide more information.

Fourth, a common response to increased uncertainty has been to retrench and produce forecasts with shorter time horizons. For instance, the most recent set of budgetary projections produced by finance ministries across the EU were not required to go beyond one year. This was true of budgets and stability and convergence programme documents published in 2020. Yet many of the policies introduced to respond to Covid-19 involve multi-year commitments, and there is a greater need for clarity about the levels of debt that governments might come out of the crisis with. IFIs – with or without mandates to produce forecasts – can fill in the blanks, as it were. They can produce medium-term assessments where these are lacking, either by developing their own medium-term simulations, or by drawing on the work of others to give an assessment of how debt ratios might evolve in the coming years.

Fifth, IFIs can remind us of the long-term fiscal challenges that have not gone away, even though Covid-19 has dwarfed what previously seemed like major challenges. In particular, IFIs can draw attention to the possible costs associated with an ageing population and climate change. These challenges are likely to disappear from the radar of policymakers, which could result in larger transition costs being incurred in the future if appropriate measures are not introduced sooner.

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Annex: List of members of the Network of EU IFIs

Acronym	Fiscal Council
AT FISK	Austrian Fiscal Advisory Council (FISK)
BG BFC	Bulgarian Fiscal Council
CY CFC	Cyprus Fiscal Council
CZ CNFC	Czech Fiscal Council
DE ABSC	German Independent Advisory Board to the Stability Council
DK DEC	Danish Economic Council
EE EFC	Estonian Fiscal Council
ES AIReF	Spanish Independent Authority for Fiscal Responsibility
FI EPC	Finnish Economic Policy Council
FI NAO	Finnish National Audit Office
FR HCPF	French High Council of Public Finances
GR HFC	Hellenic Fiscal Council
GR PBO	Hellenic Parliamentary Budget Office
HR FPC	Fiscal Policy Commission
HU HFC	Hungarian Fiscal Council
IE IFC	Irish Fiscal Advisory Council
IT UPB	Italian Parliamentary Budget Office
LT NAO	Lithuanian National Audit Office
LU NCPF	Luxembourg National Council of Public Finance
LV FDC	Latvian Fiscal Discipline Council
MT MFAC	Malta Fiscal Advisory Council
NL CPB	Netherlands Bureau for Economic Policy Analysis
NL RVS	Netherlands Council of State
PT PFC	Portuguese Public Finance Council
RO RFC	Romanian Fiscal Council
SE FPC	Swedish Fiscal Policy Council
SI IMAD	Slovenian Institute of Macroeconomic Analysis and Development
SI SFC	Slovenian Fiscal Council
SK CBR	Slovak Council for Budget Responsibility

The Network of EU Independent Fiscal Institutions

The Network is composed of 30 Independent Fiscal Institutions representing 25 EU countries and the UK. It is a voluntary and inclusive institution, open to all independent fiscal oversight bodies operating in the EU. It provides a platform to exchange views, expertise and pool resources in areas of common concern. The Network supports the efforts to review and reinforce the EU fiscal framework, seeking to better exploit the synergies between rules and institutions, as well as between different levels of administration whilst respecting the principle of subsidiarity and enhancing local ownership and accountability.

For further information, visit the website: www.euifis.eu



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