

IN-DEPTH ANALYSIS

Requested by the ECON committee



Debt Sustainability Assessments: The state of the art

Euro Area Scrutiny



External author:

Cinzia ALCIDI

Daniel GROS



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Abstract

The approach to debt sustainability analysis (DSA) followed by the IMF and European Commission (EC) are broadly similar. The commonality derives from the fact that debt levels, deficits and interest rates costs are linked by universal accounting relationships.

DSA is a standard instrument of fiscal surveillance but it is also a tool for taking decisions about the provision of financial support. In the latter context, differences between the IMF and EC exist. One technical difference comes from the sensitivity parameters, which govern the feedback loop linkages between interest rates and debt. Such parameters are unobservable and small but powerful in driving results. The most important difference however is that the IMF has a fix and shorter horizon for the analysis and for the support, than the ESM. The Greek experience showed that that ESM support can be so large and long term that it can have a decisive impact on the DSA itself. This is not the case for IMF. This dissimilarity reflects specific perspectives of the two institutions associated with the different constituencies they represent.

Overall, given the uncertainty surrounding future paths of debt and the large costs of sovereign defaults, IMF and EC DSAs should be regarded as complementary rather than alternative.

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AUTHORS

Cinzia ALCIDI and Daniel GROS

ADMINISTRATOR RESPONSIBLE

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ABOUT THE EDITOR

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To contact EGOV please write to:
Economic Governance Support Unit
European Parliament
B-1047 Brussels
E-mail: egov@ep.europa.eu

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EXECUTIVE SUMMARY

One needs to distinguish between rather distinct functions of a formal Debt Sustainability Analysis (DSA):

- As an early warning signal of potential future fiscal stress: part of a typical surveillance exercises;
- As a key support for the decision whether or not to impose losses on bondholders in the context of a financial assistance program: we can call it “hard” DSA, usually applied in times of crisis.

These two functions of the DSA, in principle, require a different approach in the assessment and, certainly, involve different trade-offs for different institutions.

We find that overall the approach followed by the IMF and that of the various European institutions are broadly similar. The commonality in the approach derives from the fact that debt levels, deficits and interest rates costs are linked by universal accounting relationships. Moreover, both the IMF and the Commission use a variety of broadly similar indicators to assess medium to long- term debt sustainability as part of country surveillance exercises. The multiplicity of indicators used in the surveillance exercises usually leads to rather qualitative results, instead of a firm sentence, as different indicators often give different results and it is difficult to weight their relative importance. Partially as a result of this, the impact of DSA in surveillance of economic policies seems to be rather limited.

One general difference between the IMF and the European Institutions (especially the Commission) is that the IMF uses in general the five-year horizon of its World Economic Outlook projections for both “surveillance” and “hard” DSA, while the Commission has usually a 10-year horizon.

Differences are more important for a ‘hard DSA’, basically because the size and scope of the potential financial assistance differ of the IMF relative the European institutions. The IMF provides limited amounts of financing of a short- to medium-term nature and with a substantial top up over risk free rates. Accordingly, the DSA of the IMF focusses normally on the ability of a country to finance itself in the market and repay the IMF after 5 years. Financing by the European Stability Mechanism (ESM) in the Euro Area, by contrast, can be large, cheap and of such a long maturity that the program itself can have a major impact on the long-term debt sustainability. In extreme cases, like Greece, the program was designed in such as a way to help debt sustainability through financing at rock bottom rates for extremely long periods.

Given the fundamental relationships between debt, deficits, interest rates and growth, the result of a DSA depends ultimately on the assumption about parameters that are estimated on historical regularities about the political sustainability of high primary surpluses or the link between interest rates and debt. One caveat of this approach is that the application of empirical regularities from the rest of the world and the pre-euro period may be misleading for euro area countries. In practice, there is a small difference between the IMF and the Commission in the parameter linking the risk premium to the debt levels. This difference, however, can lead to quite different results in the longer term projections, because of the feed-back loop between interest costs and debt ratios.

In the EU, the Commission is the only institution that publishes regular and in-depth DSAs for economic policy surveillance purposes and - in the case of Greece - for “hard” DSAs. The ESM and the ECB have of course an interest in the issue and will continue to do analytical work and probably produce DSAs for internal purpose. However, there is no need for them to publish their own regular DSA as an official position. DSA is about fiscal policy and this is not the main business of a central bank. Currently, the ESM is relying upon the support of the Commission, which may change in the future. But only one official position should be associated with EU institutions, either Commission or ESM, in order to avoid noise in the assessment of a given country.

This means that there are essentially two published sources for the DSA, the IMF and the Commission. Their contributions should be regarded as complementary, rather than competing, given the rather different backgrounds and perspective explained above.

1. INTRODUCTION

Public Debt Sustainability Analysis (DSA) is an important tool for governments to assess sovereign vulnerabilities and can provide them with warnings concerning fiscal policy. Most international organisations, notably the International Monetary Fund (IMF), but also large financial institutions, use DSAs in their surveillance and monitoring procedures. For the IMF the DSA is a critical input for the decision to provide balance of payments assistance.

In the context of the euro area, the Treaty establishing the European Stability Mechanism (ESM) requires that the provision of financial assistance to Member States experiencing financing problems is conditional to a favourable debt sustainability assessment by the European Commission, in liaison with the ECB, and possibly the IMF. In the same framework, the DSA is also required for the design of policy conditionality linked to the financial assistance programmes. Lastly, the assessment of EU Member States' public debt developments is an important component of fiscal surveillance under the Stability and Growth Pact (SGP).

Determining whether a government's debt is sustainable or not is always a very difficult exercise. As it will be shown below, at the core of any DSA are the projections of fiscal, macroeconomic and financial variables over several years and projections are sensitive to the assumptions used in the DSA, which inevitably entail an important degree of judgement. Sensitivity scenarios are usually built to 'measure' the relevance of the assumptions, but the scenarios do not reduce the importance of the assumptions.

Another important complication of any DSA is linked to the distinction between liquidity and sustainability. This distinction is particularly relevant when DSA is conducted in the context of an economic or financial crisis.

In general terms, public debt sustainability means that a government should be able to service its debt at any point in time. This implies that a government must be both solvent and liquid. A solvent government is one whose budget constraint is fulfilled. Technically this means that the net present value of its future primary balances must be at least as high as the net present value of its outstanding debt. In practice, such condition is met if markets (actual and potential borrowers) believe that such government will be able to generate sufficient primary budget surpluses to repay its outstanding debt. By contrast, liquidity is a short-term concept and refers to a government's ability to maintain access to financial markets to service its obligations. While different in theory, the two concepts are linked and the difference becomes blurred in situations of crisis. If markets believe that there is a significant risk of insolvency, or unwillingness to fulfil outstanding obligations, access to financial markets becomes difficult and liquidity tightens. Experience suggests that this can happen even if the level of debt is relatively low (especially for developing and emerging economies), but it is more likely when debt is high. In such cases, access to market can become very costly and cause a deterioration in the conditions underpinning sustainability. This risk is likely to be more relevant in a monetary union, where the central bank cannot work as lender of last resort for a government.

Overall such considerations imply that in times of crisis, when the DSA can lead to a decision to provide or not emergency support to a country, uncertainty is higher and the assumptions underlying the projections are likely to entail a stronger judgement component. In the context of crisis, the distinction between liquidity and sustainability of debt is also more difficult. However, DSA is not only used in crisis environments and, in principle, it could work as warning signal mechanisms in normal times.

In order to account for the difference between 'normal' economic conditions and crisis times, we distinguish two functions of the DSA:

- As an early warning signal of potential future fiscal stress: part of a typical surveillance exercises;
- As a key support for the decision whether or not to impose losses on bondholders in the context of a financial assistance program: we can call it “hard” DSA, usually applied in times of crisis.

These two functions require a different approach and involve different trade-offs. In both cases, one has to be careful in applying to euro area countries the empirical regularities, which are at the heart of the formulation of the projections, based on the experience of countries from the rest of the world or from the pre-euro period. The first reason is that advanced economies are usually different from Emerging Market Economies (EMEs) in terms of financial markets development and level of debt that markets are willing to finance. The second is that a central bank in a stand-alone nation state, as opposed to a monetary union, can play a more active role when a government experiences liquidity or sustainability problems.

The rest of this briefing is organised as follows. The next section provides a general overview of the DSA conducted by the IMF and the European Commission as well as by the ECB and the ESM. It then investigates more in detail the use of DSA as tool for surveillance in normal economic times and compares the EC and the IMF approach. The case of Italy is used to show how the two approaches differ in practice. Section 3 introduces the concept of Gross Financing Needs and its use in the context of DSA. Section 4 runs a similar exercise to section 2 but focuses on the application of the DSA in context of a crisis, when the analysis is used for the purpose of taking decisions. The case of Greece is presented as an application of the analysis to compare the IMF and the EC outcomes. Section 5 draws conclusions.

2. DEBT SUSTAINABILITY ANALYSIS AS SURVEILLANCE TOOL: AN OVERVIEW ACROSS INSTITUTIONS

Until recently, the IMF was the only institution to have a formal framework for assessing public debt sustainability. This has been mostly used in the context of support provided to developing and emerging market economies (EMEs) hit by balance of payments crises. Until the sovereign debt crisis in the euro area, IMF DSA for advanced economies was just a simple routine exercise “with mechanical implementation of the DSA template, little discussion of the result [..]”.¹

The European Commission had the task of monitoring compliance with the SGP since its very introduction but the DSA was never a critical element of such exercise.² It is only after the Greek sovereign debt crisis and the setup of the European Financial Stability Facility (EFSF) and ESM that the Commission’s role of monitoring and surveillance of public debt has been enhanced and that the detailed framework for the DSA was published. Therefore, in the absence of financial distress, the DSA is a technical monitoring tool which serves the application of fiscal rules (the SGP and the Fiscal Compact) and complements the Macroeconomic Imbalances Procedure (MIP). Its general function is to reduce the likelihood of fiscal and financial stress and well as to warn about potential risks and vulnerabilities.

Fiscal stress rarely arises from a single cause, it rather results from a combination of several factors, which become more virulent when financing conditions change. The different factors are accounted

¹ See IMF (2011) p. 4.

² After the reform of the SGP, more attention has been put on debt and public debt is the critical variable to compute of the three alternative definition of medium term objectives (MTOs)

for in different frameworks: the SGP concentrates on the public sector deficit, the Fiscal Compact on the evolution of the debt to GDP ratio and the MIP on the private sector's stocks and the external dimension. In practice, this means that dozens of indicators which can concur to predict fiscal stress are monitored. As it often happens, different indicators give different messages from which clear signals are difficult to extract. As illustrated below, the Commission has developed a methodology to attempt to overcome this issue. Yet, in practice, it is most likely that only situations where all indicators point to the same conclusion will be taken as a serious warning.

Both in the case of the IMF and the Commission the results of the DSA are discussed with representatives of the country under consideration and can lead to warnings, but in the end the national government is sovereign and can use them in the way it deems it more opportune.

Other than the IMF and the European Commission, among the EU institutions the ECB has interest in the DSA exercise. The ECB joined the IMF and the Commission when emergency support was provided to Greece, and at that time debt sustainability was a crucial issue. But ECB interest is also justified by its public sector purchase programme.

Likewise, the ESM has an interest in the DSA of euro area countries. Given its mandate and its lending activity to countries under programme, the DSA should provide key information in the decision making process.

However, neither the ECB nor the ESM publish an 'institutional' DSA framework. The ECB published a working document in 2017³ with a framework for DSA in euro area countries but it is clearly stated that the views reflected in the paper are not to be considered as ECB. Similarly, the ESM has recently published some analytical working papers on debt sustainability related issues but no official DSA framework can be attributed to it. In addition, the DSA for Greece, mentioned on the ESM website, refers to European Institutions' DSA.

Below we summarize the main features of the IMF and Commission DSA in the context of normal economic times. We also highlight some of the main features of the ECB and ESM publications.

2.1 The IMF perspective and its DSA framework

The IMF applies its DSA framework worldwide, hence the 'standard' case for the analysis is a stand-alone country which has its own central bank and national currency. In addition, based on its mandate, the IMF interventions are triggered by balance of payment crises. In most of these cases, fiscal stress takes a different form from that observed in the euro area, although some elements are rather similar.

In many developing and emerging economies public debt is denominated in a foreign currency. Most of these countries do not have developed-enough domestic financial markets to allow a large public debt to be financing in local currency. This is why most IMF programs concern countries, which usually had rather small public debt, but contracted in foreign currency (usually the USD). Member states of the euro area usually have large public debt, but similarly to country where public debt is denominated in a foreign currency do not have control on the currency in which the debt is denominated. De Grauwe (2012) has articulated this idea in a forceful way.

³ Boubdallh et al. (2017).

These considerations explain why in 2011 the IMF proceeded to a modernization of its DSA framework, until then almost exclusively used for developing and EMEs⁴. The improvements were mainly aiming at creating a framework, which is more suitable for advanced economies and incorporating a more risk-based (both fiscal and financial) approach.

The IMF DSA is centred on the concept of fiscal policy sustainability. Fiscal policy is unsustainable if the government will not be able to service its debt. This can happen under two broad sets of conditions. First, a combination of no-policy-change and a current primary balance that is not able to stabilise the debt-to-GDP. Second, if the required adjustment of the primary balance to stabilise the debt-to-GDP is politically or economically not feasible.

In this assessment, the level of public debt matters a lot. The higher the level of the debt, the higher the probability of unsustainability, as higher debt requires a larger primary surplus for longer time and is usually associated with higher interest rates. The risk of roll over also increases with the size of debt and, beyond certain levels, long-term economic growth is negatively associated with debt.

Accordingly, the DSA begins with the trajectory of public debt relative to GDP, based on assumptions about i) economic growth, ii) interest rate on public debt, and iii) fiscal risks. Such assumptions must be realistic and should take into account that changes in the interest rates, which can be induced by changes in market sentiment, and lower than expected growth rates, can result in less favourable dynamics, requiring higher primary surpluses.

The IMF framework is implemented using a standardized template by country. In practice, this is an excel file where information about the country are introduced and a pattern for debt-to-GDP ratio is generated. The time horizon is five years⁵ and the baseline is generated for the debt-to-GDP ratio with sensitivity analysis based on alternative scenarios. In the baseline:

- Information about the country GDP growth is taken from the projections included in the IMF world economic outlook (WEO).
- Assumptions about the interest rates are made based both on market data and the literature which empirically investigates how interest rates depend on the level of debt;
- Assumptions about the primary balance are based on the no policy change hypothesis, relative to the current stance.

In order to assess the impact of shocks and the degree of uncertainty surrounding future developments of economic variables, the IMF uses three different methods: alternative scenarios, bound tests and stochastic simulations.

The alternative scenarios are generated assuming different hypothesis, e.g. on the policy behaviour, on certain variables, usually the three listed above. Bound tests are meant to focus on tail risks and consist in shocking one variable at the time and, in specific cases, a combination of them. Both the bound tests and the alternative scenarios are quite mechanistic. The template generates charts to compare the baseline and the alternative scenarios. Stochastic simulations are meant to account for the uncertainty surrounding the baseline scenario and point to fiscal risks. This is made possible by the fact that in the simulations shocks have feedback effects on macro variables and linkages among variables are taken into considerations.

⁴ IMF (2011)

⁵ As it will be explained later in more detail, five years is the usual time line of the IMF lending, which matches the forecasts data published by the IMF, i.e. WEO.

From a conceptual point of view, the DSA exercise has to account for three additional dimensions:

- the realism of the underlying hypotheses: past record of fiscal adjustment and historical evidence. Large and persistent adjustments have low track record and should not be credible. Most advanced economies are characterised by a negative growth-interest rate differential, which implies negative dynamics on debt and the need for primary surpluses for debt stabilization. A different assumption may not be credible over the long term and has to be well justified
- the debt composition: this affects the probability of distress; therefore, it should be accounted for in the formulation of risks
- whether stabilization of debt requires an effort which is politically acceptable and economically feasible without being harmful to growth.

Every year, the IMF publishes the result of the Article IV consultation with each country. This is the usual context where the DSA, described above, is used as a monitoring tool. The report of the consultation is comprehensive and combines identification of major macroeconomic issues with policy recommendations. Two are the main areas of interest in the report: the external sector assessment (given the IMF mandate) and the DSA.

In practice the DSA is presented in an Annex, which contains the projections for the debt-to GDP ratio under the baseline and alternative scenarios, among them the no-policy change. The DSA also contains fan charts with stochastic simulations to account for the degree of uncertainty and assess the risks, which then feed into a heat map of risk. A concrete example is presented in section 2.3.

2.2 The European Commission perspective and its DSA framework

The framework for the Commission's assessment of debt sustainability has evolved considerably over the last years. Currently the Commission publishes, on annual basis, the public Debt Sustainability Monitor (DSM). This monitor constitutes the annual update of the 3-year cycle of the Fiscal Sustainability Report (FSR).⁶ The FSR evaluates the fiscal sustainability challenges faced by Member States according to a comprehensive horizontal framework, which brings together results on debt sustainability analysis (DSA) and fiscal sustainability indicators and identify challenges across different time horizons (short, medium and long-term). This is done for all EU countries that are not under macroeconomic adjustment programme.

The Commission distinguishes between three time horizons in its DSA and different sets of indicators. The medium- and long-term sustainability indicators, S1 and S2, reflect the concept of fiscal sustainability meant as solvency. Both indicators are based on the government inter-temporal budget constraint. The difference between the two indicators is the time horizon considered (2030 for S1 and the infinite horizon for S2) and the requirement to reach a specific debt target (the 60% for gross public debt over GDP to be reached by 2030 according to the "standard" definition of S1, versus no specific debt ratio target for S2).

The short-term sustainability indicator, S0, is an early-detection indicator, designed to capture short-term risks of fiscal stress stemming from the fiscal and the macro-financial sides of the economy.

The European Commission applies systematically its DSA framework to all EU countries to assess their degree of vulnerability in terms of risk to public debt sustainability.

⁶ https://ec.europa.eu/info/sites/info/files/file_import/ip018_en_2.pdf

When a country is found 'vulnerable' an enhanced DSA is required. This implies that the DSA has to be written and ad hoc sensitivity tests have to be prepared. The European Commission (2014) identified a list of criteria which act as trigger for the enhanced DSA⁷:

- the country has a value of the composite indicator of short-term fiscal stress risk above the critical threshold, and/or a value of the fiscal sub-index above threshold;
- the country's current and/or forecasted gross public debt is at, or higher than, 90% of GDP;
- the country's current and/or forecast change in gross public debt over GDP is at, or higher than, 5 p.p.;
- the country's gross financing needs are at, or higher than, 15% of GDP;
- the country is under a macroeconomic adjustment programme, under post-programme surveillance or enhanced surveillance as from the Two-Pack regulation

Similar to the IMF, the European Commission conducts both deterministic and stochastic public debt projections, but the time horizon is longer, ten years, instead of five.

Box 1 describes the set of different scenarios which is more extensive than the IMF one. Like the IMF, the baseline scenario is defined as a no-fiscal policy change scenario. It relies on Commission forecasts for the next two years, after which fiscal policy is assumed to remain constant as of the last forecast year for the remaining of the projection period.

As illustrated in Box 1, sensitivity analysis is run on the key variables' assumptions. For vulnerable Member States which under enhanced DSA, this is adapted to account for country specificities.

Box 1. Debt projection scenarios

The debt projection scenarios included in the European Commission's (DG ECFIN) Debt Sustainability Monitor report are the following:

1. Baseline no-fiscal policy change scenario (European Commission forecasts; assumption of unchanged fiscal policy after forecasts; Economic Policy Committee-agreed long-run convergence assumptions of underlying macroeconomic variables)
2. No-fiscal policy change scenario without age-related costs (same as scenario (1) but without ageing costs)
3. Historical scenarios (European Commission forecasts; assumption of gradual convergence of structural primary balance, interest rate, real GDP growth – one at the time and then all together – to historical average(s) after forecasts)
4. SGP institutional scenario (full compliance with excessive deficit procedure, EDP, recommendations and convergence to the medium-term objective (MTO))
5. Stability and Convergence Programme (SCP) scenario (SCP assumptions for main macro-fiscal variables; assumption of unchanged fiscal policy after programme horizon)

Sensitivity test scenarios run around the baseline no-fiscal policy change scenario are the following:

1. "Standard" sensitivity tests on short- and long-term interest rates (-1p.p./+1p.p. on short- and long-term interest rates on new and rolled over debt over whole 10-year projection period)

⁷ See European Commission (2014) p. 7.

2. "Enhanced" sensitivity tests on short- and long-term interest rates (-1p.p./+2p.p. on short- and long term interest rates on new and rolled over debt for first 3 projection years, followed by -1p.p./+1p.p. over remaining of projection period)
3. "Standard" sensitivity tests on real GDP growth (-0.5/+0.5 p.p. on real GDP growth over whole 10-year projection period)
4. "Enhanced" sensitivity tests on real GDP growth (-1 standard deviation/+1 standard deviation on real GDP growth for first 2 projection years, followed by -0.5/+0.5 p.p. over remaining of projection period)
5. Sensitivity tests on inflation (-0.5/+0.5 p.p. on inflation rate over whole projection period)
6. Sensitivity test on primary balance (negative shock to primary balance equal to 50% of forecasted cumulative change over the 2 forecast year; primary balance kept constant at lower last forecast year level over remaining of projection period)
7. Sensitivity test on nominal exchange rate (shock equal to maximum historical change in the exchange rate, over last 10 years, applied for first 2 projection years)

Source: EC, 2014, p. 11

Like the IMF, the Commission also includes stochastic simulations in the DSA to account for uncertainty of macroeconomic conditions on debt sustainability dynamics. This exercise allows to generate fan charts and attach probabilities to different debt simulated paths. Concrete examples are illustrated in the next sections.

In practice the DSM presents an overview of the EU countries and specific country fiches. Each country fiche contains tables and charts with debt projections, the underlying macro-fiscal assumptions are made explicit and also heat maps are included to identify risks. Section 2.3 provides a concrete example.

2.3 The case of Italy in 2017: Comparing the IMF Article IV consultation and the Commission debt sustainability monitor

In order to get a better sense of the difference between the IMF and the Commission approach it is instructive to look at a specific application. For this purpose, we look at the case of Italy in 2017.

2.3.1 IMF: Italy – 2017 Article IV Consultation

As mentioned above, every year, the IMF publishes the results of the Article IV consultation with individual countries. The report combines identification of major macroeconomic issues with policy recommendations. Below we summarize the main findings and features of the consultation with Italy closed in July 2017.⁸

As explained above, the starting point of the DSA is the level of debt and the primary balance that can stabilize the level of debt in the short term and the conditions for a decline of the debt to GDP ratio. Given the low level of growth in Italy, both past and expected, the degree of uncertainty on growth is very limited. By contrast, interest rates and the primary balance are surrounded by large uncertainty and are the crucial variables to determine future patterns as well as risks.

⁸ There is not yet a IMF publication available for the Art. IV consultation with Italy in 2018

On the side of the interest rates, the consultation report focused mostly on the risks associated with the exit of the ECB from its extraordinary loose stance and the increasing effect of the normalization of monetary policy on interest rates – both the risk free component of it and the risk premium. This resulted in a rather conservative projections of an effective interest rate always above 3% after 2019. More specifically, the IMF assumes an increase in spreads of 200 bps. The higher borrowing costs are passed on to the real economy, and depress growth by 0.4 p.p. for every 100 bps increase in spreads. Under this assumption the implicit average interest rate on debt rises to 3.8 percent by 2022. Debt declines but only very modestly to around 128 percent by 2022.

With regard to fiscal policy, the IMF points to a need for a large adjustment in order to stabilize debt ratio as well as to high risks associated with this assumption. A primary surplus of about almost 4 percent of GDP is considered needed to maintain a structural balance for several years. Italy has a history of running primary surpluses, but not that large. A large fiscal surplus is, in general, considered rather unrealistic if it need to persist over several economic and political cycles. The assumption of lower primary surpluses is more realistic but it has a significant impact on the debt pattern. A primary balance of less than 2% of GDP would lead to a very small decline of public debt, which would end up being 10 percentage points higher, by 2022, than in the baseline.

The IMF analysis is usually summarized in the heat map and the predictive densities for debt-to-GDP (stochastic simulations), under unrestricted and restricted shocks.

In the heat map the red colour is associated with high risk, while the green signals no risk. In 2017, the heat map for Italy was largely red, both in the terms of debt-to-GDP patterns and in terms of gross financing need. By contrast, risks were not seen as coming from the debt profile.

The distribution of the possible debt paths derived from the stochastic simulation pointed to similar high risky environment and to the serious possibility that the Italian debt will not decline in the next 5 years.

2.3.2. European Commission: Italy – 2018, debt sustainability monitor

Unlike the Article 4 Consultation Report by the IMF, the debt sustainability monitor by the Commission is a document which looks at short, medium- and long-term sustainability analysis for all EU countries at the same time and then presents a country fiche for each MS, with detailed assumptions and charts and tables with debt patterns.

The analysis of the risks related to the structure of public debt financing (by maturity, creditor base, currency of denomination) is part of the DSA exercise and its results are presented in the form of a heat map for three variables: change in the share of short-term public debt, share of public debt by non-residents, and share of public debt in foreign currency.

The colours of the cells are derived based on thresholds. Red, if indicators are at or above the critical threshold of fiscal risk from the signals' approach; yellow, if they are below the threshold, as obtained from the signals' approach, but at or above a benchmark of around 80% of the same threshold, highlighting an intermediate level of fiscal risk; iii) green otherwise.

In relation to the situation of Italy, the Commission highlights that the debt ratio would remain almost unchanged compared to the previous year. A positive interest-growth rate differential (unfavourable snow-ball effects) would be an important contributor of debt increase given the initial debt burdens. This makes Italy vulnerable to unfavourable shocks. This completely in line with the IMF report.

The alternative scenarios suggest that assuming that interest and growth rates were to evolve in line with historical averages will result in higher debt ratios given the weak historical growth performance.

More in general, even assuming fiscal consolidation to ensure strict compliance with the SGP and decreasing debt ratios, the public debt burden would still linger well above 90% of GDP on average in 2028. The Commission also noticed that the assumption of strict compliance with the SGP represents a significant deviation from historical patterns and the likelihood of a persistent and large primary balance is low, hence not realistic.

Similar to the IMF, the European Commission considers the potential effects of the end of an extremely accommodative monetary stance. Under the baseline scenario, market interest rates are assumed to gradually converge back to 'normal' value of 3% in real terms within a 10- year horizon in all Member States. Despite the slow increase in implicit interest rates, the cumulative impact on Italy's public debt ratios through 2028 is projected to be of the order of 9 percentage points of GDP.

The Commission's stochastic projections for Italy debt-to-GDP are rather similar to the one of the IMF. They suggest that most likely the debt-to-GDP will not change in the next 5 years, but the Commission's results point higher risk of increase of the debt ratio.

2.4 The ECB DSA methodological framework

For the ECB there is no need to publish a regular and detailed DSA of each euro area Member State. However, it is reasonable to assume that the ECB staff conducts DSA for internal purpose to provide advice to the leadership of the institution in case there is a request for an ESM program and a potential request for the activation of the OMT.

In 2017, the ECB published a methodological framework for debt sustainability analysis for euro area sovereigns, Boubdallh et al. (2017). As mentioned above, while not official, the paper highlights the key elements of the analysis from the ECB perspective. It builds and it is consistent with other's institutions analysis, most notably IMF and Commission. In practice, it is based on three blocks, deterministic DSA, stochastic DSA and additional indicators. The overall objective is to produce a quantitative assessment which is summarized in heat maps.

It is interesting to note, for the purpose of comparison with the IMF and the Commission, that the ECB baseline scenario, presented in the paper for illustrative purpose, is based on the Commission's estimate for growth in the short term and beyond the short term of a stylised model based on the Commission' potential growth estimates. The horizon is also 10 years like in the Commission DSA. The benchmark assumes that governments broadly comply with the minimum fiscal requirements to avoid significant deviations and, potentially, sanctions under the SGP. Concerning the interest rate, projections are largely based on market information, which does not seem to be the case in the IMF and Commission DSA. More specifically, sovereign yields beyond the short-term forecast horizon are derived from the implied forward rates from national yield curves.⁹

Once the baseline is prepared, shocks scenarios are simulated and the results are summarized in the heat map. A similar sequence is followed in the context of the stochastic simulations. Like for the IMF and the EC, the stochastic exercise allows for a very large number of simulated shocks based on the historical behaviour of the relevant macroeconomic variables and feedback linkages. The distribution of public debt paths provides crucial information about the probability of certain patters and works as

⁹ When this exists the country-specific long-term interest rate assumption can be defined as the ten-year (five-year, one-year) benchmark bond extended with the forward par yields derived on the cut-off date from the corresponding country-specific spot yield curves. For the other countries, the interest rate projections can be computed by assuming certain dynamics of spreads to the first group of countries.

cross-check of the plausibility of the benchmark and of selected shock scenarios from the perspective of past macroeconomic volatility.

As for the deterministic block, the overall results are summarized in a heat map. The two heat maps produced are then combined with another one based on additional indicators, ranging from the debt structure to the governance.

2.5 The ESM perspective and its changing role

The ESM does not publish its own framework for DSA, and unlike the ECB, no DSA methodological framework has ever been published. However, ESM researchers have recently published a number of working documents on issues related to monitoring of vulnerabilities associated with public debt in countries under programme as well to risks related to financing conditions of sovereign, which is relevant also in comprehensive DSA.¹⁰ In relation to financing conditions, the ESM research has put a lot of emphasis on the concept of Gross Financing Need (GFN). This concept, which has become widely in use also by other institutions, is discussed more in detailed in the section 3.

The role of the ESM is at present in flux. Originally, the ESM had been an instrument (the precursor, EFSF, was also legally 'special purpose vehicle') in the sense that its purpose was to arrange the financing for ESM programs, with its staff executing mainly decisions taken by Ministers and without having an official role in program design and management. This latter function was executed by three institutions (also called Troika), namely the ECB, the IMF and the Commission, which collaborated to design and manage the programs in detail. At the beginning, it would not have been materially possible to involve the ESM in program design and management since simply did not have the professional staff necessary for these tasks.

Moreover, when the ESM was created firefighting was the key issue, not monitoring debt sustainability in general. Today, the situation is very different, with no country experiencing acute fiscal stress so that more general concerns about longer-term sustainability come to the fore.

Now that the phase of program design and surveillance is over and the staff of the ESM has grown, the ESM could take over other tasks. In particular, it could engage in the process of debt sustainability surveillance and produce directly the DSA for the ESM programs, should the need arise and assuming that it has access to all the relevant information.

Whether or not the ESM will be transformed into the 'European Monetary Fund' and the changes this will imply in terms of division of responsibility between the Commission and the ESM, has not been decided yet. Given the existing tools, in the framework of the SGP, and the experience developed by the Commission, it does not seem necessary for the ESM to formally monitor in depth each and every Member State on a continuous basis. The ESM should be involved and add its analysis only in cases where the DSA gives a strong signal of potential problem ahead.

3. GROSS FINANCING NEEDS

GFNs is an indicator that has become to the forefront in recent times and increasingly used as complement in the standard DSA by the IMF and the Commission, among others. It is used as indicator of vulnerability in regular surveillance exercises but, above all, in turbulent times when changes in liquidity conditions can affect sustainability.

¹⁰ See Gabriele et al. (2017), Lennkh et al. (2018) and Athanasopoulou et al. (2018)

GFNs is a flow variable and emphasizes the flow dimension of the debt sustainability. This is different from a typical DSA where the focus is on the path of the debt to GDP ratio, a stock variable.

GFNs measures the amount a government needs to refinance in the market in a given year. This variable provides an indication of how vulnerable to government is changing market sentiment or simply higher interest rates.

Technically, the GFNs in a given year is simply the sum of the public debt falling due and the current deficit. In a long run perspective, it is not determined by the deficit, but mainly by the interplay between the debt to GDP ratio and the average maturity of public debt. This implies that countries that have to reduce their debt ratio must anyway run surpluses, which contribute to financing needs. However small surpluses are unlikely to reduce GFNs in a significant way because the amounts to be refinanced out of a large debt are usually an order of magnitude larger than any feasible surplus. Similarly, in the short term small deficits are unlikely to increase GFNs. As a rule of thumb, the refinancing needs as a percentage of GDP is determined simply by the debt to GDP ratio divided by the average maturity of public debt.¹¹

As an example of calculation of the GFNs, in one of its DSA for Greece, the IMF explicitly states that “Borrowing from the market is assumed at an average maturity of 5 years ...”. This means that even at a zero deficit the GFN will be equal to one fifth of the debt ratio. An implication of such assumption is that a GFNs of less than 25% of GDP can only be reached with a debt ratio below 125 % of GDP.

The Commission seems to use a similar assumption since it assumes that in the very long run (when ESM financing has been fully replaced by market financing) a debt ratio of close to 100% of GDP would entail a GFN of about 20% of GDP.

Based on this consideration, there seems to be some consensus that a GFN above 20% is considered a source of vulnerability. In the IMF guidelines, a GFN exceeding 20% puts the country in the category of “higher scrutiny”.

For countries under programme, in the short to medium run, the GFNs can be heavily influenced by the maturity of the financial support. In the case of Greece, financing conditions agreed under the EFSF/ESM were exceptional and the average maturity was in the end set to over 30 years. This reduced GFNs for decades. But the reduction of the GFNs to acceptable level, given the very high level of debt, requires that amounts of financing are large enough and at long enough maturities.

In the case of IMF lending, the impact on the GFNs is usually marginal. This is because of the limited size of IMF programs and its standard terms, which are much more short term than for the ESM. The latter does not have any formal limit. Interestingly, given that IMF credits have to be repaid quickly, repayments to the IMF can contribute significantly to GFNs within a decade.

The longer term financing of the ESM also lowers the effective interest rate cost for the country concerned, thus improving fiscal sustainability and making the path of the debt level less dependent on future interest rates. This is clearly the case of Greece.

¹¹ This calculation is not exact since very short term debt has been re-issued more than once per year and is usually anyway excluded from haircuts.

Box 2. GNF and interest costs in the IMF approach

The IMF assumptions on which interest costs are based, and those on which GNFs are calculated contain a subtle inconsistency. The key assumption for the calculation of the GNFs is that the average maturity of future debt will be five years. The calculations for the interest rate cost are de facto based on ten-year rates. This is not made explicit, but it appears from the data. This difference in the time horizon, 5-year average maturity and 10-year rates to calculate interest rates, applies both to the risk free rate and the risk premium.

An important implication of this inconsistency is that IMF GNFs might be over-estimated.

5-year rates have been below 10-year ones over the last decades and the difference between the two is even more important for risk premia, which are usually larger for longer dated bonds, than for short term ones.

4. DSA AS DECISION-MAKING TOOL IN DISTRESS SITUATIONS

Any decision to grant financial assistance to a country (or rather its government) must be preceded by an analysis of the sustainability of public finances. This is common sense: lending to a country whose debt is not sustainable is unlikely to improve the situation and is likely to result in losses for the lender.

But this is also a legal obligation for the IMF and the ESM. Neither of them has the mandate to lend to a country whose debt is unsustainable.

The crucial question in the context of a crisis is how to define sustainability. The most commonly accepted definition is that the debt to GDP ratio should come to a (pre-defined) acceptable level without requiring unrealistic primary surpluses. Regarding the latter there is some convergence on the view that a primary surplus of 3 % of GDP, sustained over a long period, seems to constitute the maximum effort one could expect.

4.1 The EU and the IMF roles and perspectives

Within the EU, and the euro area in particular, economic, financial and political interlinkages are very strong, and much stronger than at the global level. In addition, the EU/euro area which is the main constituency of the ESM, is much smaller than the one of the IMF.

The larger and more dispersed constituency of the IMF implies that the fiscal risk (i.e. potential losses) generated by IMF programs tend to be negligible for IMF members. Certainly they are much smaller than for euro area member states in the case of ESM programs. The tight linkages within Europe also mean that financial conditions attached to the ESM tend to be more flexible than the one of the IMF, potentially affecting sustainability patterns, as it was the case for Greece. This would be at odds with the IMF role as global lender.

That said, Article 13, indent b) of the ESM Treaty stipulates that:

“An ESM Member may address a request for stability support to the Chairperson of the Board of Governors. Such a request shall indicate the financial assistance instrument(s) to be considered. On receipt of such a request, the Chairperson of the Board of Governors shall entrust the European Commission, in liaison with the ECB, with the following tasks:

b) to assess whether public debt is sustainable. Wherever appropriate and possible, such an assessment is expected to be conducted together with the IMF.”

Likewise, Article 3 of the ESM Guidelines for Precautionary Financial Assistance repeats verbatim the indent b), except that ‘public debt’ is substituted by ‘general government debt’.

This suggests that from a European perspective, the IMF analysis of debt sustainability is relevant and should be taken into account when deciding about financial assistance.

i. The IMF approach

As mentioned in Section 2.2, the IMF DSA always starts with a standard exercise described above. This becomes more detailed and elaborated in the case of countries with “higher- scrutiny” and those requesting financial support.

As already mentioned above, the IMF states that “In line with the time horizon of the WEO, assessments of debt sustainability should generally be based on a 5-year projection horizon.”¹²

There are two reasons for this choice: First, as noted above, an assessment of debt sustainability is based on projections for debt burden indicators. The uncertainty associated with these projections grows significantly with the projections’ horizon. Thus assessments of sustainability made on the basis of debt burden indicators far in the future risk undermining the credibility of the DSA.

The second and more pressing reason for IMF-supported programs to base sustainability assessments on developments within the projection horizon, is that repayments to the Fund start between 3¼ and 4½ years after the start of a program. Prospects for the IMF to be repaid would be undermined if debt is not sustainable and the country is not able to access markets to repay the loans.

The IMF admits exceptions to this general rule, which need to be justified and requires the support of IMF management. Departures from the standard 5-year projection horizon could be considered where a 5-year horizon may not capture relevant risks to debt sustainability, such as from long-term spending pressures from an aging population, growing debt service and persistent negative output gaps. In cases of prolonged fiscal adjustment where debt burden indicators remain high during the 5-year period, teams could propose to present complementary analysis based on a longer timeframe.¹³

ii. The European Commission

Similar to the IMF, the EC DSA goes one step higher in case of identified vulnerabilities or request for financial support.

The individual elements which make up the Commission’s fiscal scoreboard are based on a careful empirical analysis of indicators which would be useful to predict fiscal stress. In this framework of particular interest is the signals’ approach described in EC (2014)¹⁴ This approach is used to determine thresholds on a number of variables: indicators of public debt structure, banking sector vulnerabilities and yields spreads. It consists in generating an optimal threshold that is chosen in a way to minimise, based on historical data, the sum of the number of fiscal stress signals sent ahead of no-fiscal-stress episodes (false positive signals: Type-I error) and the number of no-fiscal-stress signals sent ahead of fiscal stress episodes (false negative signals: Type-II error), with different weights attached to the two components.

As acknowledged in the text, by construction “It is straightforward to understand that in the minimisation problem False Negative signals are weighted more than False Positive signals:

$$(1) \ 1/ F_s > 1/N_f_s, \text{ where } F_s \text{ stands for fiscal stress.}$$

This is due to the fact that the total number of fiscal stress episodes recorded over a (large enough) panel of countries will be typically much smaller than the total number of non-fiscal-stress episodes. This is a positive feature of the model as we might reasonably want to weigh the Type II error more than the Type-I, given the more serious consequences deriving from failing to correctly predict a fiscal stress episode relative to predicting a fiscal stress episode when there will be none.

¹² IMF (2013)

¹³ Ibidem.

¹⁴

The key problem is that if debt is unsustainable imposing a haircut on private investors as a condition for financial support from the ESM can have very high costs. These costs are very difficult to quantify, as some of monetary but others are intangible. A default is very likely to increase perception of uncertainty, leading to a reduction in investment. Moreover, government bonds play a central role as safe asset in the financial system. Within the euro area, the bonds of national governments are still treated as riskless, although the case of Greece showed that this is not the case. At present, holdings of national debt remain concentrated in the national financial system (banks, but also insurance companies and other financial intermediaries). A hair cut on public debt can thus be very destructive to the national financial system. Banks and insurance companies would typically have to be recapitalized; but even after recapitalization they might not work as well as before.

A dysfunctional financial system and weaker investment demand is likely to impair growth, at least in the short and medium run, thus increasing the uncertainty about one crucial variable in any DSA.

Moreover, ratings agencies are likely to put the country's rating into 'default', or 'selective default'. This will increase the (external) financing cost of the corporate sector as well as most corporates and especially banks are subject to the rating ceiling of the government (reflecting the expectations that a government default usually goes hand in hand with a steep fall in GDP).

In short, imposing a haircut on private creditors, massively increases the uncertainty about key elements in the DSA.

Another important practical consideration is that the IMF can base its DSA on the experiences of almost 200 countries over 50 years, with dozens of programs. The euro area, by contrast, is a construction 'sui generis' and the ESM was created at the height of a financial crisis, whose basic pattern might have been familiar, but which was unprecedented in terms of the virulence of the financial instability and its global spread.

Moreover, defaults among advanced economies have historically been very rare. Greece represents the first case in over 70 years of the default of a country classified as advanced economy. It is unlikely that the ESM will be able to accumulate much experience with defaults, given that in the next decades its membership will not rise much above 20-25 countries, which mostly developed economies.

Given the high uncertainty surrounding any DSA made in the context of financial crisis, which is likely to accompany any request for an ESM program, it becomes important to consider what would be the cost if the DSA turns, ex-post, out to have been wrong.

Table 1 below considers the four possible cases in terms of the DSA finding debt sustainable or not, and the ex post realization that debt was, or was not, sustainable.

The most straightforward case is when the DSA finds debt to be sustainable, the ESM support is granted and the program succeeds, with the country regaining market access at rates which allow it to service its debt in full.

At first sight, the opposite case seems also clear: the DSA finds debt is not sustainable and this was really the case. In this case a large enough restructuring of the debt, involving the private sector (PSI), should bring debt on a sustainable path. In this is case cost could be high, but also inevitable.

In the case the ESM program succeeds after a haircut, it will always remain difficult or even impossible to prove that the hair-cut had been necessary for success. All one can observe ex-post is a successful program. In the last case, where support is provided without haircut, while the debt was unsustainable, it is very likely that the programme goes off track and losses materialize, potential for private and public sector.

Overall the relative weights of Type I and II errors need to be reconsidered for the decision to grant ESM support:

Table 1. Ex-ante and ex-post debt sustainability

Ex-ante	Ex-post	
	Debt was not sustainable	Debt was sustainable
Debt judged not sustainable => Private sector involvement (PSI) needed for ESM support	ESM support granted after haircut for private sector, program successful if PSI large enough	Cannot be observed. ESM support granted after haircut for private sector (PSI), program successful unless cost of PSI very high. Cost of default for home country very high, low for public sector of rest of EA, but only if contagion (transitory or permanent) low.
Debt found sustainable	ESM support granted, but program might go astray (unless conditionality changes trajectory), with losses for ESM (and private sector if any remain): Cost of eventual default for home country very high, potentially also for rest of EA if there is contagion	ESM support granted and program successful. Ireland, Portugal, Cyprus

Source: own elaboration

The next subsection illustrates difference between the IMF and the EC approach with application to the case of Greece.

4.2 The case of Greece: Comparing IMF and Commission ‘hard’ DSAs

The experience of Greece provides a good case to compare the application of the DSA of the IMF and the EC.

In the Summer 2017 both the Commission and the IMF published their DSA for Greece (required for the finalization of the second review). The analyses incorporate new estimates and assumptions, as well as political agreements on the primary surplus targets and on the short-term measures adopted to re-profile Greece’s debt with EFSF/ESM. Nevertheless, the two DSAs differ substantially. The European Parliament (2017)¹⁵ compares the GDP growth and primary surplus projections of IMF and European Commission of the 2017 Review and find that assumptions about future growth are rather close. However, the IMF baseline projection for the Greek debt-to-GDP clearly appears on an explosive pattern. This is not the case in the projections of the European Commission according to which debt-to-GDP is expected to fall under all scenarios.¹⁶

¹⁵ See [http://www.europarl.europa.eu/RegData/etudes/IDAN/2017/602088/IPOL_IDA\(2017\)602088_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/IDAN/2017/602088/IPOL_IDA(2017)602088_EN.pdf) (page 12)

¹⁶ See European Commission (2017) Table p. 26 and IMF (2017) p. 21, *Greece: GG Debt and GFN-- Baseline, 2014-2080*

What can explain the difference in the overall judgement about sustainability of the Greek debt?

In the DSA framework, other than GDP growth and primary balance, the hypothesis on the interest rate is crucial. According to the IMF report Greece was assumed to access markets by end-program at an initial rate of 6%, reflecting a prolonged absence from markets, a weak track record on delivering fiscal surpluses, and a substantial debt overhang. This rate is consistent with a risk-free rate of 1-1½ percent in 2018 and a risk premium of 450-500 basis points. As to its evolution over time, the rate is expected to fall/rise by four basis points for every one percentage point decline/increase in debt-to-GDP ratio, in line with the literature (Laubach (2009), Ardagna et al. (2007), Engen and Hubbard (2004)), fluctuating between a ceiling of 6% (to avoid non-linearity and reflect the likelihood of loss of market access at high levels of debt/interest rates) and a floor of 4½ percent (consistent with a small long-run risk free premium of 75 basis points).

By contrast, according to the Commission market rates, modelled at the expected risk-free rate plus a risk premium, are expected to reach 5.1% in 2019, to increase to 5.5% in 2021 in line with the projected increase in the risk free rate, and to slowly converge to 4.3% by 2060 thereafter. The average market re-financing rate after the end of the programme averages 4.9% in the projections.

4.2.2 Technical assumption matters: the interest rate hypothesis

The expected future interest rate on government bonds plays a central role in all DSA exercises.

The standard procedure is to view the interest rate on government bonds as the sum of a risk free rate and a risk premium, here again IMF and Commission follow a similar approach.

For most IMF programs, foreign debt is mostly in USD and the risk free rate is thus given by the US Treasury rate. For the ESM the risk free rate is usually taken to be the rate on German government bonds (there exists another risk free rate, namely the OIS, which has usually tracked the Bund rate very closely, but since the financial crisis these two indicators of the riskless rate have differed by up to 50 basis points).

The IMF assumes that the risk premium (on new government bonds, presumably for the average maturity of 5 years (see below)) falls by 4 basis points for every 1% reduction in the debt/GDP ratio, but with a floor on the risk premium. IMF (2017) adds that equivalently it could consider the average euro area rate of France and Germany since 1999 and add a risk premium of 4 basis points for increases of the debt ratio above 60%.

The Commission uses a similar mechanism, but with slightly different parameters: the risk premium increases by 3 basis points for every 1 % increase in the debt to GDP ratio above 60%.

However, in the case of Greece, both the Commission and the IMF arrive end up using a floor for the interest rate, of 4.5 % for the IMF and above 5 % for the Commission. The reason given was that in the long run, the risk free rate is assumed to return to its historical average of between 3.5-4.0 %. The IMF states this assumption explicitly; the Commission just states that the floor for interest rates on Greek government bonds will be above 5 % (for most scenarios).

The assumption that (market) risk free rates returning to their historical average seems reasonable at first sight. It is, however, difficult to reconcile with present long term interest rates for German government bonds, which remain below 1.5%, even for maturities as long as 30 years, thus indicating that market participants do not expect rates to increase much. The key question for future DSAs (in the

euro area) is thus whether the key assumption on (risk free) interest rates should be based on available market rates, or whether one should follow today's practice of assuming a return to past averages. Moreover, the latter will also change over time. In ten years, any backwards looking 20 years average of the German Bund rate would be below 1%.

For the IMF (or rather for all cases involving USD debt) the assumption of a return to the past average seems more appropriate since both long term (ten years) and very long term US interest rates (e.g. 30 years Treasuries) are close to the historical average.

Overall, minor differences in the parameters that govern the feedback loop between interest rates and debt pattern make the end-results of the Commission and the IMF very different although, both assume that the nominal interest rate on market financing will be around 5%. Next subsection provides an illustration of how this happens, by generating simulated debt patterns.

4.3 Risk premium and debt levels: A technical comparison

The assumption that the risk premium, and thus (market) interest rate on public debt depends on the debt level (as a % of GDP) introduces important self-reinforcing mechanism which can easily lead to a widely divergent results even if the initial conditions change only marginally.

The reason is the following: at a higher debt level, the interest rate cost of debt will be higher not only because there is more debt to service, but also because the cost of each unit of debt (i.e. the interest rate) will increase. An example can illustrate this mechanism. The IMF uses the rule of thumb that the interest is given by the riskless rate plus a risk premium, which increases by 4 basis points for every one percentage point increase in the debt ratio above 60% of GDP. This would imply that the interest rate of a country with a debt/GDP ratio of 130 % (like Italy today) would be 2.8 percentage points above the riskless rate (e.g. 10 year German government bonds). This formula for the 'spread' yields results which were actually close to what one could observe during the summer of 2018, at least for Italy.

To continue with the general case as an illustration, one can take today's riskless rate of around 0.5%, yielding an interest rate for a country with a 130 debt ratio of $2.8+0.5=3.3$ %. The total interest rate cost would then be $1.3*3.3 = 4.29\%$ of GDP.

If the country had a lower debt ratio, say only 110 %, the interest rate would be only 2.5%, and the total interest cost for the government would be $1.1*2.5 = 2.75\%$ (of GDP). This means that as the debt ratio increases from 110 to 130% of GDP, an increase of less than 20%, the interest cost would have increased by over 55%.

Moreover, even seemingly small changes in this multiplier effect of the debt ratio on the risk premium have a very strong impact on debt dynamics. This is illustrated in Figure 1 and 2 below. The five lines in the chart show the evolution of the debt ratio over 20 years, starting from different levels, e.g. 150% of GDP for the uppermost line (D0150), 140 % of GDP for the second line, and so on, with 110 % of GDP representing the lowest starting point.

Figure 1 shows the evolution of the debt ratio using the parameter 0.04 from the IMF, while Figure 2 uses the parameter (0.03) from the Commission. All other assumptions (growth rate, riskless rate and primary balance) are the same in both cases.

A comparison of the two figures shows that this small difference in one parameter leads to a very different dynamic of the debt ratio. At one extreme, i.e. starting from a debt ratio of 150 % of GDP, the parameter of the IMF would lead in 20 years to over 320 % of GDP, whereas the parameter of the Commission would lead to a debt ratio of 'only' 200 % of GDP. In both cases debt would be judged not sustainable. However, comparing the middle line in both panels of the chart shows that, starting from

a debt ratio of 130 %, the IMF and the Commission would arrive at different conclusions from their respective DSAs: For the IMF this level would be unsustainable, since debt would increase to over 150 of GDP, whereas for the Commission this debt would be sustainable as it would fall in 20 years to about 110 % of GDP.

Figure 1. Dynamic evolution of debt-GDP ratio from different starting levels - IMF assumption

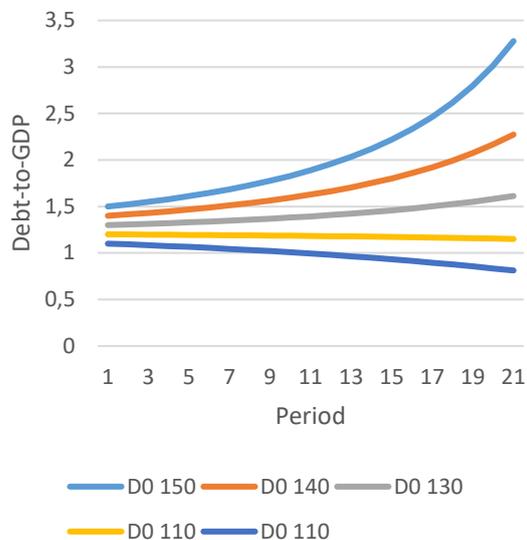
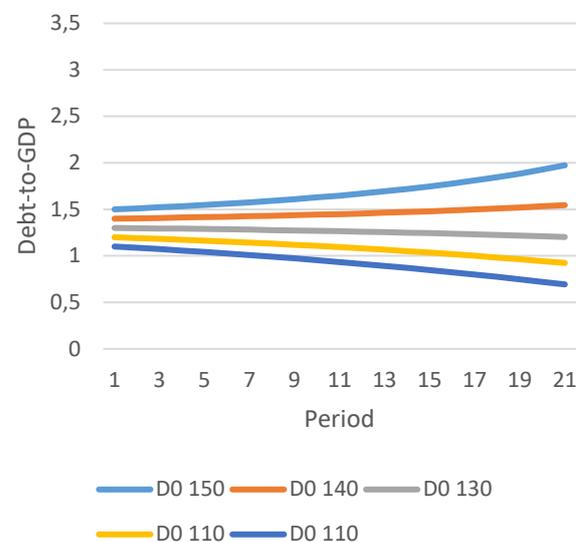


Figure 2. Dynamic evolution of debt-GDP ratio from different starting levels - European Commission Assumption



Source: own calculations assuming 3% primary surplus, risk free rate equal to growth rate and risk premium increasing with 4 basis points for every percentage point increase in debt ratio above 60% of GDP (IMF assumption, left hand panel) or increasing by 3 basis points for every percentage point increase in debt ratio above 60 % of GDP (Commission assumption, left hand panel)

Note: D0 110 stands for Debt at time 0, equals 110% of GDP, D0 120 stands for Debt at time 0, equals 120% of GDP etc.

Another implication of this link between the risk premium is that once a country has a high debt level it becomes increasingly difficult to get debt down again. This has an important implication for the time profile of an adjustment program (and the attendant DSA). A front-loaded adjustment which brings the debt ratio down early is much more likely to result in a finding that debt is sustainable than when the adjustment is back loaded.

An example can illustrate this finding: It is regularly assumed that a primary balance of 3 % of GDP represents the maximum than can be expected from any country over the long run. But a 3 % primary balance could be distributed differently over time. In a front-loaded adjustment the country might run a primary balance of 4% of GDP, for the first ten years and then one of only 2 % of GDP. The other extreme would be a back-loaded adjustment which does the opposite: a first decade with a surplus of only 2% of GDP and then one decade with a surplus of 4 % of GDP. The results of this thought experiment are tabled below, which uses the Commission's risk sensitivity (3 bps per percentage point debt to GDP ratio). The other parameters were chosen such that an initial debt ratio of 130 % could be reduced slowly with a constant primary surplus of 3 % of GDP (see middle column where the debt ratio declines from.

With an initial debt ratio of 140% of GDP a front-loaded adjustment would achieve a rough stabilization, but a back-loaded one would result in a steep increase of the debt ratio, to over 170 %, a difference of about 30 percentage point. In this case, a back-loaded adjustment program would have meant that debt is not sustainable. But sustainability could have been achieved (just) with a strongly front-loaded program.

Table 2: Simulation of debt ratio after 20 years with adjustment program of average primary surplus of 3 % of GDP.

Initial debt ratio	Back loaded	Evenly distributed	Front loaded
1.5	2.24	2.02	1.84
1.4	1.71	1.56	1.43
1.3	1.31	1.19	1.10
1.2	0.98	0.90	0.83
1.1	0.72	0.67	0.62

Note: Own calculations, parameters primary surplus varying over time in fourth and second column. Risk premium increases by 0.03 percentage points for every percentage point increase in debt ratio

As general conclusion to the comparison of the IMF and EC/ESM approach to Greece one can say the formal approach is rather similar but as matter of fact differences in small parameters can lead to different outcomes. A bigger difference between the IMF and EC/ESM is not technical but rather political, in the sense that reflects different perspective of the constituencies the IMF and the EC/ESM represents.

The DSA of the IMF is designed to find out whether a country could finance itself on the market after a few years and with only limited medium term financing at rates which already incorporate a significant premium. Repayment of the loan is prior objective. The first EU support to Greece was based on a similar approach, but over time the European DSA has evolved towards the question what financing package (in terms of size, duration and interest rate) would render the debt burden sustainable in the very long run. One may read this has putting the priory on ensuring future sustainability rather than quick repayment of loans. It remains to be seen whether this approach will also be taken in future requests of ESM assistance.

5. CONCLUSIONS

Assessing the sustainability of public finances is not mainly a technical task. It is always somewhat arbitrary to distinguish between 'ability to pay' and 'willingness to pay'. Both are determined by political choices, which are extremely difficult to anticipate.

DSA with a purpose of economic surveillance in normal times is somewhat less judgmental: on the one hand, certain indicators have proven to be useful warning signals of future fiscal stress, on the other hand, they often point to different directions and it is difficult to extrapolate a univocal conclusion, which is taken seriously by the country concerned.

A DSA, no matter who prepares it, essentially consists in producing projections of debt-to-GDP ratio, which are generated based on assumption about fiscal, macro and financial variables as well as few parameters. The latter are not observable and usually estimated based on historical regularities. As illustrated above, these parameters are usually quite powerful in affecting the projections and very often are derived from analysis based on developing and emerging economies, which are not necessarily valid for advanced economies. But there have simply been too few cases of fiscal stress among developed economies to constitute a reliable empirical base. Due to these factors, a DSA may have a limited impact as a preventive surveillance mechanism by itself.

When a DSA becomes one of the decision criteria for the granting of financial assistance, political and wider financial stability considerations become de facto paramount. This is somewhat less the case for the IMF than for European institutions because IMF has global stakeholders, its programs are much smaller and no program country (at least to date) has been large enough to endanger global financial stability.

The European experience has been shaped by the Greek case. The financial assistance attached to the program (or rather the sequence of programs, after the PSI) was designed with the aim of making public finances sustainable with low interest rates and exceptionally long maturities and grace periods. This may have been just a first and exceptional case. It is difficult to say whether future interventions will see the application of similar conditions.

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Abstract

The approach to debt sustainability analysis (DSA) followed by the IMF and European Commission (EC) are broadly similar. The commonality derives from the fact that debt levels, deficits and interest rates costs are linked by universal accounting relationships.

DSA is a standard instrument of fiscal surveillance but it is also a tool for taking decisions about the provision of financial support. In the latter context, differences between the IMF and EC exist. One technical difference comes from the sensitivity parameters, which govern the feedback loop linkages between interest rates and debt. Such parameters are unobservable and small but powerful in driving results. The most important difference however is that the IMF has a fix and shorter horizon for the analysis and for the support, than the ESM. The Greek experience showed that that ESM support can be so large and long term that it can have a decisive impact on the DSA itself. This is not the case for IMF. This dissimilarity reflects specific perspectives of the two institutions associated with the different constituencies they represent.

Overall, given the uncertainty surrounding future paths of debt and the large costs of sovereign defaults, IMF and EC DSAs should be regarded as complementary rather than alternative.