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What should we include in the Fiscal Space Review?

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Abstract

One of the most important tasks of independent fiscal institutions (IFIs) is to assess and communicate fiscal risks. Draft budget evaluations, long-term sustainability reports or costings of policy measures all contain valuable information about potential risks associated with the central (baseline) fiscal scenario. By publishing a comprehensive Fiscal Space Review, independent fiscal institutions might be able to better "summarize" the current state of public finances and provide comprehensive measures of risks compared to some generally accepted definition of soundness, optimality or political acceptability. This paper discusses what should be included in such a review in order to provide clear signals to voters, policymakers and financial markets.

Keywords: fiscal risk, fiscal space, public sector balance sheet, fiscal limit, prudent debt level

JEL classification: H1, H6, H8

[1] Useful comments and suggestions from Xavier Debrun, Jean-Marc Fournier, Jason Harris, Michal Horváth, Geert Langenus, Gábor P. Kiss, Simon Wren-Lewis, members of the CBR´s Advisory Panel and participants of the OBR/CBR seminar on fiscal risks are gratefully acknowledged. The author alone is responsible for all views expressed.

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Content

Introduction

„For a long time to come, one of the priorities of macroeconomic policy will be slowly but steadily return debt to less dangerous levels, to move away from the dark corners."

Olivier Blanchard (2014)

„Absent adequate fiscal space, financial instability will be worse and may lead to price instability or sovereign default, which them selves will further impair the functioning of financial markets, at a great cost to the broader economy."

Maurice Obstfeld (2013)

Public debts have increased massively in the last eight years. Current government debt levels in advanced countries are by 40% of GDP higher compared to pre-crisis forecasts of the International Monetary Fund (IMF). As a consequence of escalating indebtedness, many countries were forced to adopt painful fiscal adjustments, especially in the euro area. Forecast errors of this magnitude call for much better understanding of fiscal risks. As the quotes from the former and the current chief economist at the IMF show, for a long time to come, creating adequate fiscal space[3] should be high on the agenda of policymakers. In this paper we argue that Fiscal Space Reviews prepared by independent fiscal institutions might help to achieve this important objective. We discuss this possibility in a general context and also in the special case of the Council for Budget Responsibility (CBR) in Slovakia. Our main goal is to start a discussion on the desirability and content of such a report and on the research agenda that should underpin it.

The Council for Budget Responsibility was established in 2012 via the constitutional Act No. 493/2011 on budgetary responsibility (the "Fiscal Responsibility Act") as an independent body to monitor and evaluate the fiscal performance of the Slovak Republic. One of the key CBR's tasks is to prepare and publish reports on various aspects of public finances. Evaluation of draft budgets, comparison of fiscal performance against targets, long-term sustainability reports or for example costings of major reform proposals all contain valuable information about *some* fiscal risks. More complete understanding of risks is possible only if one continually monitors all the various outputs of fiscal councils. By reading only some of the reports, it is hard for the general public to answer simple questions like: Are public finances in Slovakia in a good shape? Is the risk of a sovereign debt crisis high or low? What has been the effect of government policy on fiscal trends in the past few years? Is there a room for more discretionary fiscal policy?

By producing Fiscal Space Reviews (FSPRs) every four years, the CBR intends to help answering those basic questions. The FSPR can facilitate a more informed public debate on fiscal trends and highlight the tradeoffs and challenges policymakers are facing. From a theoretical point of view, the FSPR might contribute to the effectiveness of the signaling channel described in Beetsma and Debrun (2016).

[3] We define fiscal space in this paper as „a room for maneuver for fiscal policy to absorb fiscal risks without triggering substantial increases in sovereign risk premia" (see Section 2 for more details).

The first part of the paper discusses the main arguments in favor of publishing a comprehensive Fiscal Space Review, both in general and in the specific case of Slovakia. The second section describes the conceptual framework the CBR is considering to use in its first Fiscal Space Review. The third part - the core of the paper - introduces potential major building blocks of the initial CBR methodology. The fourth section introduces some additional considerations related to FSPRs. The last section concludes and presents five promising areas of fiscal research.

1. Why do we need a comprehensive Fiscal Space Review?

Well-designed fiscal frameworks should ensure long-term sustainability while allowing for counter-cyclical policy in the short run. None of these two basic objectives can be met if realizations of substantial fiscal risks push country debt levels into territories where market financing is very costly or non-existent. Absence of adequate fiscal space usually means significant welfare losses in crisis times, often for those at the lower end of the income distribution[4]. Therefore, early identification and management of fiscal risks together with an estimation of adequate fiscal space should be among the basic pillars of every fiscal framework.

Fiscal frameworks consist of fiscal rules, fiscal institutions, transparency requirements or for example budgetary procedures. Here we focus on the first three pillars of fiscal frameworks. Among **fiscal rules** the most direct link to fiscal risks and fiscal space is in case of debt limits. According to the IMF Fiscal Rules Dataset, more than 60 countries had some form of debt rule in 2012. The basic rationale behind a debt ceiling with well-defined escape clauses is to prevent fiscal space to evaporate completely.

Fiscal councils or **independent fiscal institutions** (IFIs) might play a very important role in identifying and communicating fiscal risks. In addition to that, they are useful complements to fiscal rules. Fiscal councils might have a role to play in triggering escape clauses or monitoring compliance with fiscal rules.

Transparency requirements are also essential in identifying fiscal risks. For example, the Fiscal Transparency Code prepared by the IMF explicitly mentions fiscal risk analysis and management: "Governments should disclose, analyze and manage risks to public finances and ensure effective coordination of fiscal decision-making across the public sector. IMF (2016) states that currently only a "small number of countries provide more sophisticated, model-based scenario analysis that explore the impacts of shocks to a number of macroeconomic parameters simultaneously." The OBR (2016) lists Finland, Ireland, New Zealand and the Netherlands as prime examples of countries publishing fiscal risk reports.

Now we turn to the question: why should analyses and considerations regarding fiscal risks and fiscal space appear in one comprehensive report? We identify three general motivations and four country-specific reasons in case of Slovakia.

[4] Low income individuals/households have significant liquidity constraints and are more likely to lose their jobs in a recession.

1.1 Better signal extraction

The first reason to publish FSPRs has to do with better signal extraction. Roel Beetsma and Xavier Debrun (2016) describe an important channel through which fiscal councils might operate (in addition to easing trade-offs associated with fiscal rules). Asymmetric information between voters and elected policymakers is in the heart of their model. Because of lack of information, voters find it difficult to distinguish between bad luck and bad policy and between good luck and good policy. If this is the case, society might benefit from the presence of an independent fiscal institution tasked to minimize the noise surrounding signals of competence of the incumbent government. Importantly, the positive value added of the fiscal council in taming the deficit bias applies regardless of the type of government (competent or not).

A comprehensive evaluation of fiscal trend through the publication of a FSPR towards the end of the election period might increase the effectiveness of this "signaling" channel. Thus voters can make more informed decisions at the ballots[5].

1.2 Comprehensive risk assessment

Here we draw a parallel with financial stability reports prepared (usually) by central banks. Financial stability reports review the condition of the financial system *as a whole* by identifying risks to the system and suggesting policy changes to address the most important shortcomings. One of the main reasons to produce those reports is to see the forest and not just individual trees.

One can argue that the same might be true for fiscal stability[6]. Independent fiscal institutions have a number of reports focusing on some part of the puzzle, but rarely put together the whole picture in one report. Policy makers might benefit from a comprehensive risk assessment when preparing fiscal policy plans, especially when putting together election manifestos or at the beginning of the election period (working on a government program).

1.3 (Re-)creating fiscal space

In order to evaluate the current state of public finances, benchmarks are inevitable. One has to have an idea what does it mean to be sustainable or to have the main fiscal indicators in sound (or optimal) positions. On the one hand, this exercise of defining benchmarks might promote fiscal research, on the other hand it can help quantify the magnitude of fiscal space needed to have acceptable (low) probability of fiscal stress. This way there will be more pressure on policymakers to create or re-create adequate fiscal spaces. This is very important especially in good times.

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[5] However, when deciding about the timing of publication, it is important to take into account and minimize potential costs, i.e. politicization of the IFI.

[6] Actually, financial stability is one aspect of fiscal stability.

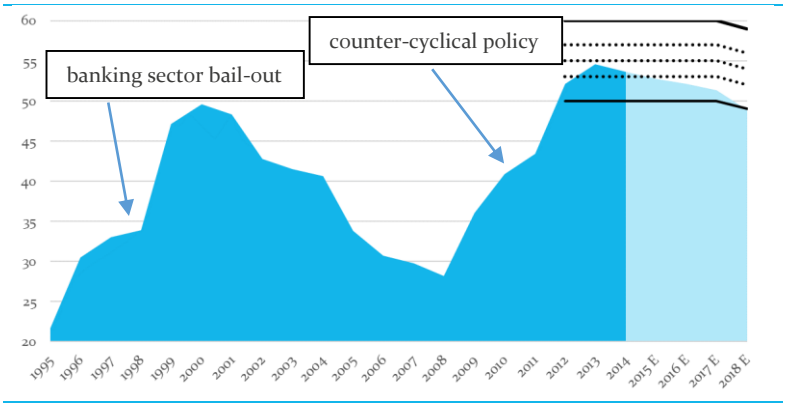
To sum up, we see the main value added of Fiscal Space Reviews in delivering clear signals to voters, policymakers and financial markets. Apart from general justifications, there are four important country-specific reasons to publish FSPRs in case of Slovakia.

1.4 The case of Slovakia

First, Slovakia has a constitutional debt ceiling, currently at 60% of GDP (with gradual sanction mechanisms kicking-in at 50% of GDP). This ceiling is legislated to gradually decline to 50% of GDP by 2027. Fiscal Space Reviews might reconsider[7] from time-to-time the adequacy of the level defined in the legislation, the desirability and time path of the decline of the ceiling or for example, the speed of the adjustment when actual debt levels are breaching one of those sanction thresholds.

The public debt level in Slovakia is currently at 52.5% of GDP (2015), but there were two episodes in the past, when debt jumped up by 20-25% of GDP within five years (Figure 1). This shows the importance of having sufficient fiscal space below the debt limit. The two episodes of massive debt increases give us two additional reasons to prepare FSPRs.

Figure 1 – Gross public debt in Slovakia (as a % of GDP)



Source: CBR

Slovakia had a banking sector bail-out at the beginning of the new millennium, pushing gross debt up by 10% of GDP (directly). In addition to that, the government had to help also to state-owned enterprises continually operating with significant losses[8]. This shows the significance of monitoring *contingent liabilities*. Despite the fact that new resolution schemes are being implemented and the euro area is slowly heading towards a banking union, bail-out costs cannot be eliminated completely or transferred to the private sector.

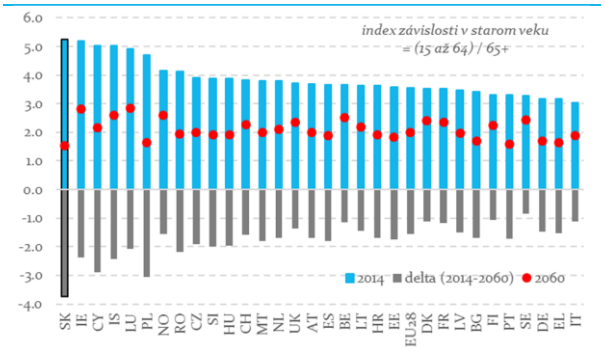
[7] Reasons for re-assessment might include: updated demographic projections, realization of large contingent liabilities, significant macroeconomic shocks, etc.

[8] In theory, there is an important difference between bail-outs in the financial sector and the savings of state-owned entreprises. While in the former case the government can refuse to help, in the latter there is no possibility to transfer the cost to the private sector. However, in practice, if the private entity is too-big-to-fail, the government has no real choices, but to bail-out the bank using taxpayers´ money. This was the case also in Slovakia at the beginning of the new millenium.

The second episode of a significant increase in public debt had nothing to do with bail-outs. It was a classic case of a materialization of macroeconomic tail-risks. Significant drop of economic activity triggered by the Great Recession created a hole on the revenue side of the budget and pushed deficits significantly upward. Counter-cyclical fiscal policy aimed at macroeconomic stabilization called for only gradual fiscal consolidation and let automatic stabilizers to operate freely. This resulted in a significant increase of the debt level. In other words, in case of negative macroeconomic shocks, public debt should play a shock-absorber role. Without adequate fiscal space this is simply not possible and welfare consequences can be significant. IMF (2016) shows that precisely macroeconomic risks and contingent liabilities related to the financial sector were the two most relevant fiscal risks in 80 countries during the period of 1990-2014 (Figure 4).

The last reasons to be prudent with government debt in Slovakia is population ageing. As Figure 2 illustrates, demographic trends are extremely adverse in case of Slovakia. Old-age dependency ratio is currently at 5, however, it is projected to fall to 1.5 by 2060. Since this is a very slow-moving risk factor, governments usually do not attach too much weight to demographic trends. Fiscal space reviews might help to keep this important topic on the radar screens of policymakers.

Figure 2 – Old-age dependency ratios in Europe



Source: Eurostat

2. Conceptual framework

Before we describe the conceptual framework, the CBR is planning to use in its FSPRs it is important to define the relevant concepts.

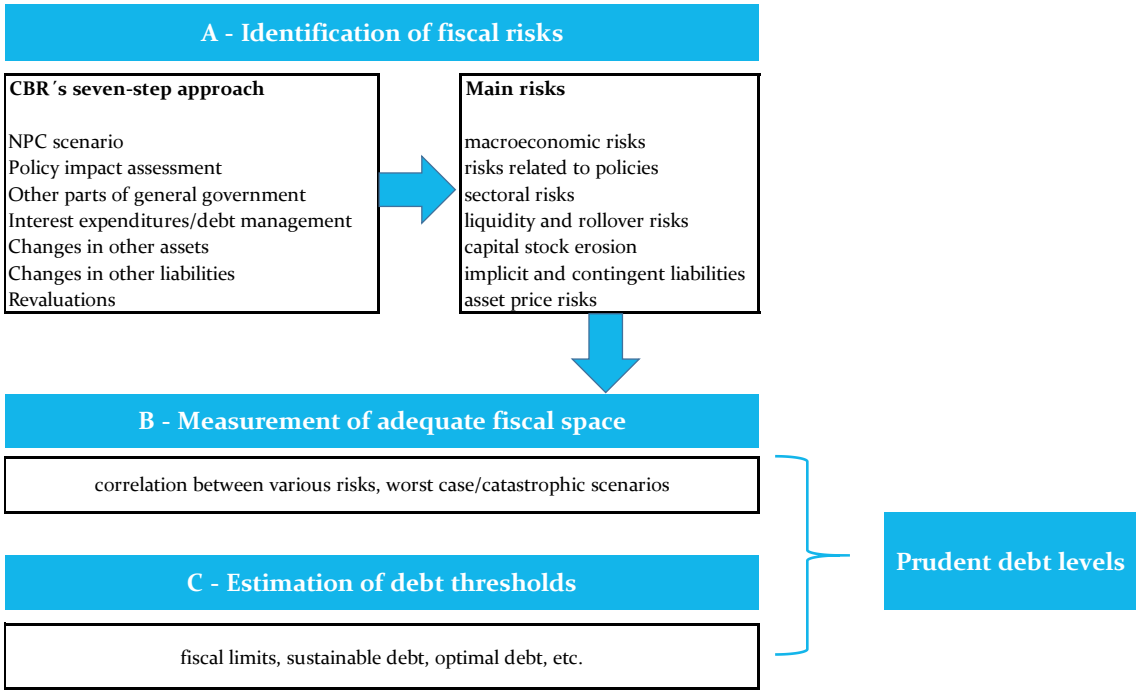
The IMF (2016) defines **fiscal risks** as "factors that may cause fiscal outcomes to deviate from expectations or forecasts". This is a very broad definition, since deviations from fiscal targets can occur for many different reasons: macroeconomic shocks, bailout costs, population ageing, policy mistakes, etc. It is impossible to capture all of them in one coherent and tractable economic model. Fiscal risk is therefore a multifaceted concept (see for example Polackova Brixi and Mody, 2002 or Kopits, 2014) and its measurement is inherently difficult. Therefore, as the IMF (2016) states, "comprehensive, reliable and timely fiscal data covering all public entities, stocks and flows are a necessary foundation of such analysis".

Fiscal space is also a general concept and it is often used somewhat differently in different situations. When defined in a narrow sense, it means room for discretionary (non-mandatory) fiscal policy. Steuerle (2014) for example shows to what extent are the hands of current politicians tied by decisions of previous parliaments. Many policymakers understand fiscal space exactly in this sense. However, here we focus on the broader definition of fiscal space. For the purposes of the FSPR it is useful to define fiscal space as: *a room for maneuver for fiscal policy to absorb fiscal risks without triggering substantial increases in sovereign risk premia*. By absorption we mean stabilization of net worth/net debt after a negative shock without the need for urgent fiscal adjustment. It is important to note that the definition implicitly assumes endogenous policy responses to tail events (working of automatic stabilizers or even a discretionary fiscal stimulus). However, our definition should not be interpreted as an automatic call for a Keynesian stimulus, if there is a positive fiscal space. Our goal to estimate a safety margin is also different compared to the definition of fiscal space in Heller (2005). Heller emphasizes potential benefits from public investments and recommends (often in a fiscally neutral way) adjustments of revenues and expenditures in order to create more space for spending with higher marginal benefits.

Debt threshold in this paper is defined as: the maximum level of gross/net debt the government can service without a significantly negative reaction of financial markets.

Figure 3 presents the conceptual framework the CBR intends to use in its Fiscal Space Reviews. It has three important parts: A) identification of fiscal risks, B) measurement of adequate fiscal space and C) estimation of debt thresholds.

Figure 3 – Conceptual framework for Fiscal Space Reviews



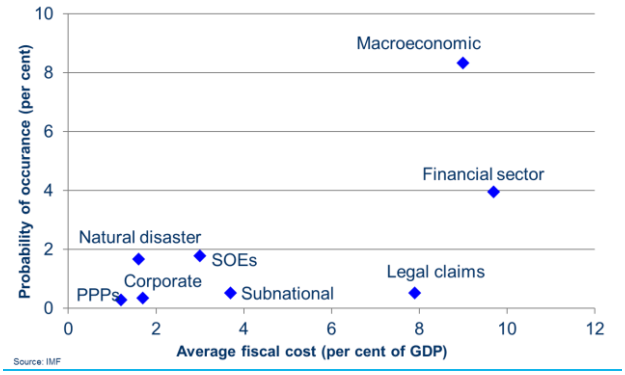
2.1 Identification of fiscal risks

The conceptual framework for risk identification (**step A**) is described in Ódor (2014). Contrary to other methods in the literature, the intertemporal net worth serves as the organizing principle to assess fiscal risks. It has the following advantages over more conventional methods:

- It is not ad-hoc and does not contain very general categories. Basically it is a compact manifestation of the inter-temporal budget constraint.
- Allows an inter-linked analysis of revenues, expenditures, stocks and cash-flow.
- It is easily understandable to policymakers, since it follows the basic logic of the budget preparation process. *Ex ante* and *ex post* analysis of fiscal policy is thus straightforward.
- The concept of net worth in Slovakia has a strong legal backing, since it is one of the key elements of the constitutional Fiscal Responsibility Act adopted in 2011.
- As Koen and van den Noord (2005) and Horváth and Ódor (2009) show, fiscal gimmickry is much harder if the transactions are analyzed through the lens of the inter-temporal net worth.

As Figure 3 shows, the seven-step procedure can identify many kinds of risks from macroeconomic ones to those associated with asset price changes. Some of those risks (for example related to policies) can be identified only qualitatively.

Figure 4 – Costs and frequency of fiscal risk realizations



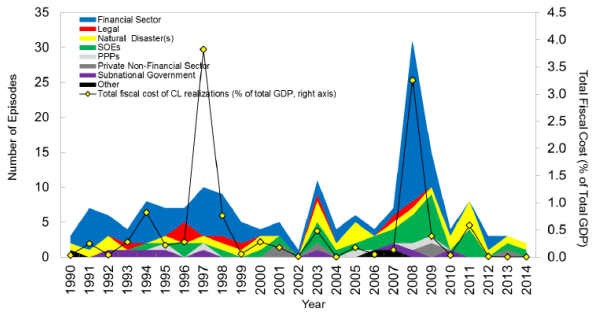
Source: IMF

The identification procedure has to assess the *size*, *timing* and *nature* of fiscal risks. The IMF (2016) looked at sources of shocks to government debt in 80 countries between 1990 and 2014. Four important conclusions emerged from the analysis:

1. *Fiscal shocks can be very large*. On average, countries have experienced a significant fiscal shock (6% of GDP) once every 12 years, with large events (9% of GDP) occurring every 18 years. As Figure 4 shows, the most important ones are macroeconomic shocks and contingent liabilities related to the financial sector. Surprisingly, legal claims are the third largest category, however, their value is heavily affected by court decisions mandating compensation payments after the collapse of the Soviet Union and the former Yugoslavia.

2. *Negative shocks are more common than positive ones.* Governments are usually much more willing to incorporate positive shocks in their baseline scenarios than negative ones. Moreover, revenue forecasts in some countries exhibit substantial optimistic bias.
3. *Fiscal shocks are highly correlated.* In other words, "when it rains it pours" (Figure 5). For instance, financial crises usually cause significant debt increases both because of bail-outs and huge macroeconomic shocks.
4. *Fiscal shocks can have highly non-linear impacts.* Larger macroeconomic shocks tend to be more damaging than smaller ones.

Figure 5 – Contingent liability realizations



Source: IMF

2.2 Measuring adequate fiscal space

The third conclusion (high correlation) identified by the IMF calls for comprehensive understanding of the inter-relationships between various fiscal risks. However, it is not straightforward how to combine all identified risks in step A into a single probability distribution. Therefore, in **step B** (measuring adequate fiscal space) it is necessary to analyze cross-correlations between various risks and calculate worst case scenarios. It is important to bear in mind that in this step not only potential impacts of various risks have to be calculated, but also likely endogenous policy responses should be taken into account. This kind of analysis should yield in an estimation of a buffer (fiscal space) countries should have in order to have the risk of losing market access at acceptable levels.

2.3 Estimating debt thresholds

Step C represents the estimation of debt thresholds, which can trigger adverse market reactions, leading to substantial rise in risk premia on sovereign debt. This threshold is clearly time-varying and depends not only on macroeconomic shocks, but also policy regimes and private sector expectations.

The combination of results from steps B and C should yield in an estimate of a "prudent" debt level which should serve as the basis for the evaluation of the current state of public finances.

3. Initial methodology of the CBR

This section describes the initial methodology (major building blocks) the Council for Budget Responsibility is planning to use in its FSPR. Obviously, all the tools presented here should be viewed as work in progress.

We propose the following structure/content for the review:

1. Description of current fiscal trends – main indicators, *ex post* evaluation of risks, compliance with fiscal rules, etc.
2. Identification of major fiscal risks (seven-step approach).
3. Measuring prudent fiscal space via synthesis of identified risks.
4. Discussion of prudent/optimal debt levels.
5. Recommendations (institutional aspects, pace of consolidation (if needed), elimination of risks, etc.)

Since the first part of the report is descriptive and can be interpreted as an executive summary of all the main reports[9] produced by the CBR, here we focus on the remaining 4 sections.

3.1 Identification of major fiscal risks

As discussed in Ódor (2014) the CBR´s framework to identify fiscal risks rests firmly on the concept of inter-temporal net worth. It is defined in the constitutional Fiscal Responsibility Act as "the total equity of general government equities, the National Bank of Slovakia, public companies, municipal corporations, adjusted for the implicit and contingent liabilities, as well as for other assets and liabilities". Figures 6 and 7 show how the seven-step approach of the CBR is related to all three main statistics in public finances: budget balance, public sector balance sheet and cash flow.

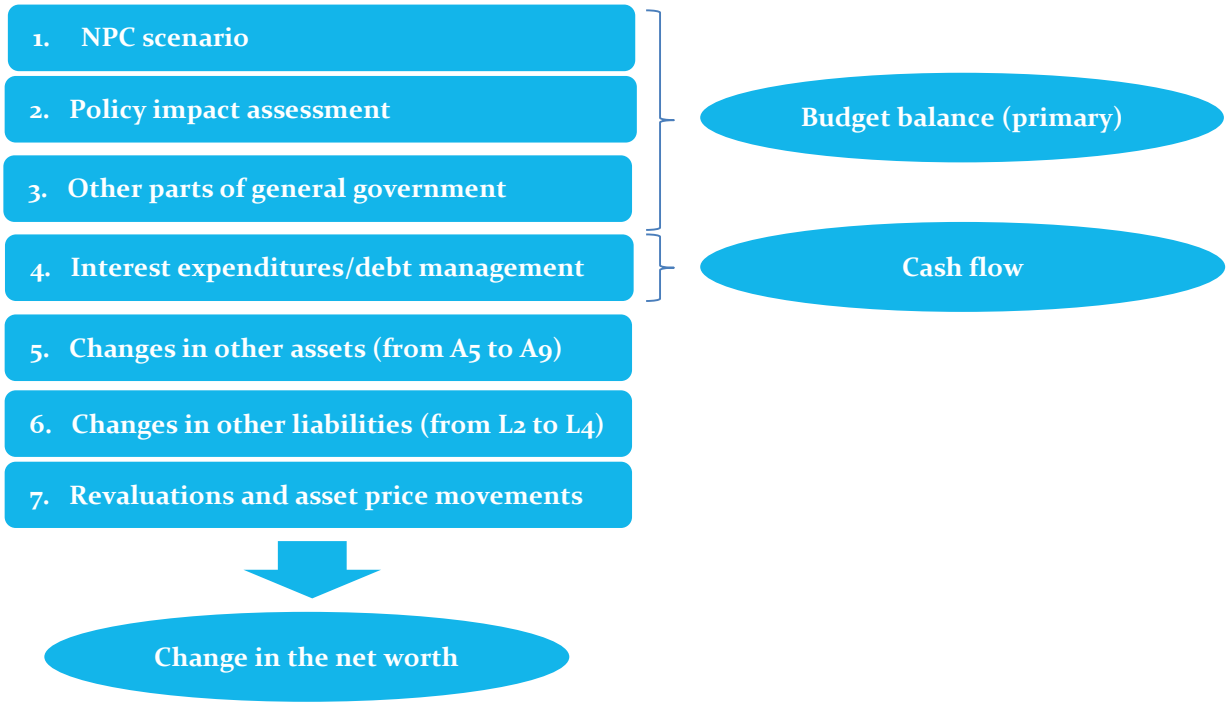
Figure 6 – Illustrative inter-temporal balance sheet of the sovereign

ASSETS	LIABILITIES
A1 Buildings	L1 Explicit debt
A2 Infrastructure	L2 Implicit liabilities
A3 Public sector capital stock	L3 Contingent liabilities
A4 Liquid financial assets	L4 Other Liabilities
A5 Net worth of the central bank	
A6 Net worth of state enterprises	
A7 Natural resources	**NET WORTH**
A8 Ecological wealth	
A9 Other assets	

Source: Horváth and Ódor (2009)

[9] An alternative option is to produce two independent reports: a synthetic summary of CBR reports (on a yearly basis) and a separate Fiscal Space Review (every four years).

Figure 7 – CBR´s seven-step approach



It is important to stress that the seven-step approach uses the concept of inter-temporal net worth as an *organizing principle* and not as a direct quantitative measure. In other words, the main objective is to cover all potential fiscal risks through one concept, even if some of the assets and liabilities are plagued with valuation problems. Complete coverage of risks ensures that the government has less motivation to enter into transactions which do not change the general government balance on a medium-term horizon, but negatively affect the level of the inter-temporal net worth.

Next, we very briefly summarize the methods/approaches the CBR plans to use in those seven steps of fiscal risk identification (more in Ódor, 2014).

The starting point of the analysis is the baseline/no-policy-change (NPC) scenario. It builds on the most probable macroeconomic scenario taking into account current government policies. It covers not only the medium-term horizon, but also long-term trends (Bugyi, 2015). Macroeconomic models of the CBR (ECM/DSGE)[10] will be used to identify major macroeconomic risks. Long-term projections are based on sectoral models for pensions (SLOPEM) and healthcare expenditures (MiMOZA).

The second step is to look at planned and likely future policy changes through the lens of microsimulation models, distributional impacts and political economy considerations. The CBR

[10] See Klúčik (2015) and Múčka (2016).

has developed a behavioral microsimulation model linked to a parsimonious macroeconomic search and matching model (Horváth et al., 2015).

In order to understand potential fiscal risks better, the third step analyzes the most problematic sectors/areas of general government. In case of Slovakia, these are: healthcare, municipalities and EU funds[11].

The first three steps should give us a clear indication of risks related to the primary balance. The fourth one will look at interest expenditures using macro-finance models (UMOD). Recent research at the intersection of macroeconomics and finance has brought a lot of dynamism into the analysis of the term structure of interest rates. Following Diebold and Li (2006) it is relatively straightforward to link small scale yield factors model with parsimonious macroeconomic models. These approaches might be also helpful in analyzing permanent and temporary components of interest expenditures consistent with equilibrium path of macroeconomic variables.

In order to arrive at a complex evaluation of fiscal risks, one has to look beyond general government data (step 5). Change in the value of the following assets can be particularly relevant:

- net worth of the central bank, especially after large-scale non-standard monetary policy operations; governments might have to inject more capital into their central banks,
- net worth of public companies and entities outside the general government but inside the public sector (i.e. healthcare providers),
- fixed assets – investment vs depreciation, for example, savings on maintenance costs might generate more investment needs in the future,
- ecological assets and natural resources,
- other assets – human capital in the public sector.

Official net debt is just one (smaller) part of the liabilities of the sovereign. Without assessing implicit and contingent liabilities the picture of fiscal risks cannot be complete. Therefore, the sixth step will analyze risks related to ageing, public-private partnerships (PPPs), potential financial sector bail-outs, state guarantees, legal claims, etc.

The last step is to measure potential changes in the inter-temporal net worth due to asset price movements (including exchange rate shocks).

3.2 Synthesis of fiscal risks

The main objective of this part of the Fiscal Space Review is to "combine" the most relevant risks into a summary measure: change in the net worth/net debt/gross debt. In other words, by the synthesis of fiscal risks one should get an estimate of fiscal space needed to cope with tail events (in case of a combination of bad shocks and bad policies). Looking at changes to the gross debt, net debt and net worth simultaneously gives the researchers a more complete picture of risks

[11] EU funds currently represent a substantial share of public investments in Slovakia. In case of a successful catching-up, part of these funds will have to be replaced by national funding.

including the likely time profile of their materialization. In other words, one has to bear in mind that the value of the adequate buffer may change in time. For example, ageing-related risks are slow to materialize, while asset price risks can have an impact on public finances almost immediately. In addition to that, sound buffers may change also due to changes in international investors risk appetite or for example because of significant shocks to public debt.

Early warning indicators might also help to assess the time profile of fiscal risks. The CBR is developing a "budgetary traffic light" approach to estimate deviation from fiscal targets on a short-term horizon. For example, the European Commission uses various indicators in its Macroeconomic Imbalance Procedure to signal potential problems. Current account deficits, total private debt, house prices, leverage ratios or sectoral composition of economic growth might all play a useful early warning role.

There are several other possibilities how to estimate prudent buffers quantitatively. Here we list 6 of them:

- Macro-finance models,
- Value-at-risk approach (VaR),
- Correlation/covariance analysis (VAR models),
- Fiscal stress tests (FST)
- Worst case/catastrophic scenarios,
- Historical episodes in other countries.

Macro-finance models - by putting together macroeconomic variables, financial indicators (such as yield curves) and fiscal policy functions - can help to combine some of the risks in the seven-step approach. These can be complex (like large-scale DSGE models), but there are also more tractable models available in the literature. For example, Kameník et al. (2013) build a semi-reduced form model with non-Ricardian and neo-Keynesian features able to incorporate public debt management simulations.

Value-at-risk techniques might be also employed to understand the probability distribution of aggregate fiscal risks. Barnhill and Kopits (2003) applied this methodology to estimate uncertainty around Ecuador´s public sector net worth.

The third possibility is to use correlation/covariation analysis between some of the major risks. For example, VAR or CoVAR models might be used to shed more light on the linkages between some of the risks included in the analysis.

The fourth potentially useful approach is to carry out fiscal stress tests (FST) as advocated by the IMF (2016). FST integrates analysis of macroeconomic shocks and the realization of contingent liabilities using historical data. The impact is calculated not only on flow variables but also on the comprehensive public sector balance sheet. Fiscal stress tests provide three summary indicators to assess the degree of fiscal pressure: fiscal solvency, government liquidity and government financing burden. Fiscal stress tests represent a more comprehensive tool to assess fiscal sustainability compared to the traditional debt sustainability analysis (DSA) carried out by the IMF (IMF, 2013).

The fifth option is to present worst case (tail risk) scenarios: financial crisis, break-up of the euro area, no consolidation due to political problems, etc. Some of the scenarios might be relevant to more than one fiscal council, which is a good argument to facilitate international cooperation in identification of some of the global risks. It is important to present not only the "war game" scenarios, but also to highlight some of the policy options available to respond to those highly negative shocks.

The sixth possibility is to look at historical episodes in other countries (case studies) in order to estimate the size of a sufficient fiscal space. International organizations (IMF/OECD) have a large cross-country evidence on fiscal events.

In all these methods, analysts should estimate also likely policy responses to the materialization of fiscal shocks in order to stabilize net debt/net worth. In reality, some risks are extremely hard to quantify, therefore analytical judgement is expected to be included in the final estimate of the sufficient fiscal buffer.

3.3 Debt thresholds

One of the main value added of Fiscal Space Reviews should be the discussion of prudent/ optimal/sustainable debt levels in a country-specific (and time-varying) context. Model-based estimation of debt thresholds representing real threat of losing market access should be viewed as an integral part of FSPRs. Since the understanding of those phenomena is still relatively limited, FSPRs might also motivate fiscal research.

Before we discuss the various concepts in the literature, we would like to raise three important points. First, we assume that sovereign default is costly and the government intends to avoid it, at least *ex ante*.

Second, it is important to note that prudent debt levels in the euro area should be lower than in countries with independent monetary policy. For individual member states it is not possible to inflate debt away, since monetary policy is based on collective decisions. If there are no sovereign lender of last resort functions, adverse market reaction to rising debt levels come earlier. The introduction of the outright monetary transactions (OMT) facility is a good illustration what can an unlimited (although conditional) support from the central bank achieve. The bottom line is that analyses of prudent debt levels cannot be separated from current and expected central bank policies.

Third, in this section we present a list of approaches without discussing the advantages and disadvantages of those. However, when writing a FSPR not all methods will receive equal attention. More robust and better performing models will be preferred.

As far as the debt threshold is concerned, there is a relatively wide diversity of concepts in the literature. Optimal debt levels are usually motivated by simple theoretical models with risk free debt. On the other hand, sovereign default models or fiscal limits are built to understand market reactions to policy choices. In reality, there can be a conflict between the two types of models. There are situations in which "optimal debt" levels cannot be reached, simply because the

market is not willing to provide more funds at reasonable prices. On the other hand, one can also imagine a situation, when a country is able to borrow at a low interest rate, but the debt is already higher than the optimal amount.

Since we defined debt thresholds with reference to sovereign risk premia, our **primary objective** is to study models with endogenous market pricing of government bonds. However, it is important to note that theoretical models of optimal debt might be also useful to better understand some of the channels through which public debt is influencing the economy. Therefore, we recommend to use optimal debt models as a secondary (complementary) tool.

Last, but not least, one has to take into account also political economy factors. For example, in case of Slovakia, the current political consensus on a specific debt limit should be a relevant starting point of the discussion on prudent debt thresholds.

In order to estimate debt thresholds, the following toolkit might be useful[12]:

- fiscal space analysis (concept of Ghosh et al., 2011),
- fiscal limit (concept of Bi, 2012),
- optimal debt limits (based on the debt dilution literature),
- growth-maximizing debt levels (Aschauer, 1997),
- other optimal debt models (incomplete markets, public investment),
- empirical research (growth effects of high debt)
- research of international organizations (such as the IMF and OECD).

3.3.1 Fiscal space analysis/Fiscal reaction functions

Ghosh et al. (2011) developed the concept of debt limit using stochastic ability-to-pay model of sovereign default based on an estimated non-linear fiscal reaction function. Debt limits in their model represent levels of public debt beyond which fiscal solvency can be questioned. It is a critical point above which the country´s historical fiscal response to rising debt becomes insufficient to stabilize the debt-to-GDP ratio.[13] Fiscal space is calculated as a difference between debt limits and actual debt levels. In theory, intertemporal budget constraints can be always met by promising sufficient *future* fiscal adjustments. In practice, the problem is that the required future adjustment may be unrealistically high given past policy behavior (track record of adjustments) or political economy constraints (fiscal fatigue). Ghosh et al. proceed in three steps: i) estimate fiscal reaction functions, ii) determine the appropriate interest rate-growth differential and iii) calculate debt limits and fiscal space. D´Erasmo et al. (2016) also recommend estimating fiscal reaction functions (based on the seminal contribution of Bohn, 1998 and 2008) as a useful alternative to traditional fiscal sustainability analyses based on the inter-temporal budget constraint (Blanchard, 1990). However, Leeper and Li (2016) warn that single-equation estimates of fiscal reaction functions are subject to potentially serious simultaneity bias.

[12] The list contains methods and approaches currently used or under development at the CBR. It should be viewed only as a starting point and not an exhaustive list of all the approaches in the literature.

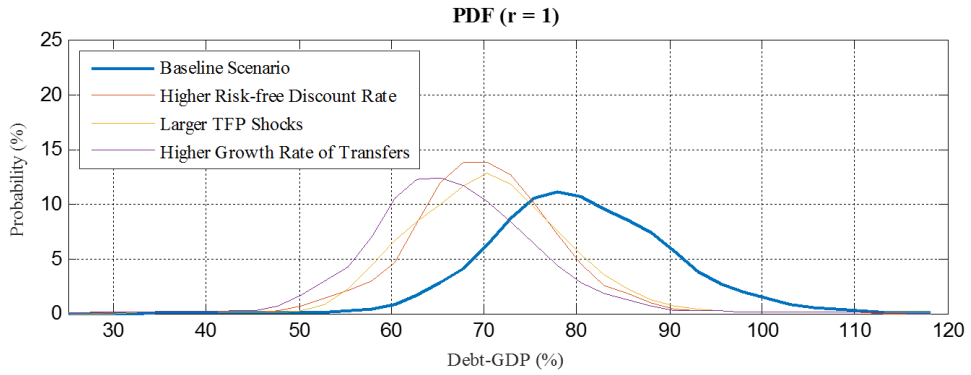
[13] If the primary balance is always a constant proportion of lagged debt, the sufficient condition for stable debt-to-GDP ratio is that the responsiveness of the primary balance be greater than the interest rate-economic growth differential.

3.3.2 Fiscal limit

Very promising area of research is the calculation of fiscal limits developed by Bi (2012). Contrary to the fiscal space concept, fiscal limits are based not on backward looking analysis, but on a forward looking one. Estimating fiscal limits answers the following question (Leeper, 2016): "Given the economic environment, what is the distribution of government debt that can be supported without significant risk premia?" The fiscal limit distribution emerges from the distribution of the expected discounted value of future maximum primary surpluses, where maximum surpluses come from driving tax revenues to the peak of the Laffer curve and driving expenditures to some minimum (politically acceptable) level. Because it depends on realizations of shocks now and in the future, the fiscal limit is a probability distribution. Uncertainty in the economy means that there is no magic threshold for debt that, when crossed, triggers sovereign default or economic collapse. Sovereign default probabilities depend on the current level of debt relative to the position of the fiscal limit distribution. High current debt may be associated with minimal default risk if the fiscal limit distribution implies the economy can easily support still more debt. And low current debt may nonetheless carry with it substantial risk of default when the economy cannot generate sufficiently large future surpluses.

The first attempt to calculate fiscal limit distributions for Slovakia can be found in Múčka (2015). It shows, that in case of bad shocks and bad policy, the 60% European debt limit might be too high for Slovakia. Figure 8 shows the estimated fiscal limit distribution for Slovakia.

Figure 8 – Fiscal limit distribution for Slovakia



Source: CBR, Múčka (2015)

3.3.3 Sovereign default models

The implicit assumption in the methods discussed so far was that governments are committed to repay debts. A different strand of the literature is focusing on models of strategic sovereign defaults[14]. Based on the seminal paper of Eaton and Gersovitz (1981), defaults are modelled as strategic choices made by governments. Recently Aguiar and Gopinath (2006), Arellano (2008)

[14] Default probabilities depend not only on debt levels, but also on the composition of debt (i.e. foreign vs. domestic lenders, FX vs. local currency debt),

and Hatchondo and Martinez (2009) made significant contributions to our understanding of sovereign defaults.
An interesting research avenue to pursue is the so called "debt dilution problem". It refers to the negative impact of new bond issuances on holders of already existing government debt. In this environment and in case of long-term government bonds, Hatchondo et al. (2015) show that credible fiscal rules might generate welfare gains by committing to lower levels of future debt. If agents know that the size of *future* debt is limited, they are willing to offer higher prices at *current* debt issuances. Múčka and Ódor (forthcoming) calibrate a sovereign default model to Slovak data in order to assess the welfare gain from the introduction of the constitutional debt limit in 2011.

3.3.4 Growth-maximizing debt levels

Growth-maximizing debt levels are usually based on a simple theoretical model with long run optimizing behavior of agents and the assumption that governments implement the so called "golden rule" over the cycle (use debt to finance net investments only). Aschauer (1997) developed this framework, where the optimal level of debt depends on the output elasticity of the public capital stock. For example, Checherita-Westphal et al. (2012) estimate debt levels in OECD countries based on this methodology. Their estimates suggest that the euro area should target debt levels of around 50% of GDP, a threshold comfortably within the limits of the Stability and Growth Pact. One of the major disadvantages of this methodology is the high uncertainty surrounding the estimates of public capital stock and the level of depreciation.

3.3.5 Other models of optimal debt

There is a growing literature describing more complex models of optimal government debt. Here we focus on two important motives to issue public debt: pre-cautionary savings (as a result of incomplete markets) and – as in the case of growth-maximizing debt levels - public investments.

Aiyagari and McGrattan (1997) show in an incomplete markets set up (uninsurable idiosyncratic labor productivity shocks) that there is an optimal level of government debt, which on the one hand enables consumption smoothing, while on the other hand has adverse wealth distribution and incentive effects. They found that the optimal quantity of public debt in the US was about 2/3 of GDP in 1997.

However, subsequent refinements to the framework have found that it might be optimal to accumulate assets instead of having debt. Rohrs and Winter (2015) emphasize that incomplete markets generate non-trivial distribution of assets and consumption. Furthermore, the degree of inequality implied by the model is crucial for the welfare effects of government debt. Rohrs and Winter show that by calibrating the stochastic productivity process in a way that generates realistic degree of wealth and earnings inequality, the resulting optimal government debt for the US is negative.

Chatterjee et al. (2016) introduced public investment into the picture, which is complementary to private capital and labor supply in the production function. They show that this channel is important and alters the conclusions from the previous literature. Inclusion of public investment

significantly lowers the optimal debt level. For the United States they estimate the optimal debt level at -140% of GDP. However, once transitional dynamics are accounted for (the need to consolidate in order to achieve the target level), the optimal share of public debt is positive and close to the current level of public debt in the US.

Fournier (2016) stresses the importance of public investment, as it can increase potential growth. He concludes that by increasing the share of public investment in total government spending yields large growth gains. It is especially true for investment in health and R&D. However positive growth effects can be harvested only in case of high effectiveness of spending. Since debt-financed public investment affects both debt and GDP, the government can choose how long to run higher deficits so that the debt increase is just offset by the GDP growth.

3.3.6 Empirical research on debt and growth

Without emphasizing the exact theoretical channels, lots of research papers focus on the relationship between debt and economic growth. Despite some controversy, it is well established fact that higher debt levels are associated with lower growth (although causality runs probably both ways). Reinhart and Rogoff (2010), Kumar and Woo (2010), Cecchetti et al. (2011) or Égert (2013) use cross-country evidence to calculate real effects of debts. Lukkezen and Suyker (2013) estimate prudent debt levels for the Netherlands based on the empirical evidence between public debt and growth.

3.3.7 Research of international organizations

The IMF and the OECD have a comprehensive research agenda to assess prudent debt levels across countries. For example, OECD (2015) estimates that for euro area countries the debt threshold is from 50% to 70% of GDP. Prudent debt targets should be, in their view, at least 15 percentage points of GDP below the debt threshold (on average) for OECD countries. These numbers are based on a literature survey on three important questions: i) the nexus between growth and debt, ii) the effect of debt-financed public investment on growth and iii) the consequences of debt on the effectiveness of fiscal policy to stabilize the economy. For Slovakia the OECD estimates prudent debt levels around 40% of GDP.

3.3.8 Calculating debt thresholds for Slovakia

The final step is to arrive at a debt threshold for Slovakia, which reflects the above-presented analyses of solvency and optimality. Prudent debt level can be easily calculated by subtracting the sufficient buffer (fiscal space) identified through the fiscal risk assessment and synthesis (steps A and B) from the debt threshold (step C).

3.4 Recommendations

Similarly, as in case of financial stability reports, the last part of the Fiscal Space Review should contain recommendations. These should cover not only policy aspects but also institutional setups or for example fiscal management issues. On the other hand, recommendations regarding

specific growth enhancing policies are usually not consistent with the mandate of fiscal councils.[15]

If actual debt figures are below prudent debt levels identified in the review, recommendations should focus mainly on potential tools to manage and mitigate fiscal risks[16]. For example, if sectoral analysis shows a potential explosion of healthcare costs, it might be useful to recommend a spending review or setting binding expenditure ceilings. In case of unquantifiable contingent liabilities more detailed analysis can be recommended.

The problem is more complicated, if actual debt figures are well above prudent levels. In that case a careful analysis of the cyclical position of the economy and assessment of time profile of identified risks are necessary in order to determine the adequate pace of debt reduction. It is well-known from the literature, that debts should play the role of shock absorbers (Kirsanova and Wren-Lewis, 2012).

Recommendations should cover also the institutional set up (rules, procedures and institutions). If the fiscal framework of the country is not effective in taming the deficit bias, IFIs should recommend changes to fiscal rules or for example transparency requirements. This can be relevant also in a European context. Especially, if one-size-fits-all approaches/recommendations are at odds with optimal policies at the level of individual countries.

For fiscal councils there is also a case to be active, when the problem lies not in the institutional setup, but in the management of public assets, liabilities or fiscal risks. Fiscal councils might recommend implementing international best practices or better procedures in debt management or for instance, in the management of public properties.

4. Other considerations

Although, discussing the content is by far the most crucial question before the publication of FSPRs, one should not forget other important considerations. Here we list three of them:

- frequency and timing of publication,
- communication tools,
- expected reaction of the government.

As we discussed earlier, one of the main theoretical reasons to publish FSPRs is the signaling channel described in Beetsma and Debrun (2016), which implies publication of the review right before elections. On the other hand, there is a risk that entering the political battlefield before elections might lead to a politicization of the fiscal councils. Therefore, publication before the start of the election campaign might be preferred. Fiscal Risk Reports can be published with every budget or once in every two years (like in the case of the OBR), however prudent debt

[15] There are, however, exceptions. For instance, the Swedish Fiscal Policy Council assesses also normative questions, like labour market policies of the government.

[16] There might be also cases (bad times), when fiscal stimulus will be needed to stabilize the economy.

levels do not change too much on a medium-term horizon. Therefore, we recommend publishing FSPRs once every four years. In case of early elections or abrupt changes in the external macroeconomic environment, shortening of this interval can be considered.

The signaling channel will be effective only in case of decent understanding of the main conclusions of the review by the general public. This implies that the language of the FSPR should be simple and all complicated models and analyses should be deferred to the annex or background documents. One might consider using a system of "traffic lights" to indicate the position of the actual debt level compared to prudent debt levels. Another possibility is to have a list of the most significant fiscal risks in the order of importance.

Easy-to-understand communication tools can trigger sufficient media response, however it would be a mistake to exchange views with the government on this important topic solely through this channel. For example, in case of the OBR Fiscal Risk Report, the government is obliged to respond formally within one year of the publication. More generally, the comply-or-explain principle might be used to facilitate discussion at the expert level. We recommend to discuss the main findings of the FSPR also in the parliament (at least in the budget committee).

5. Conclusions and further research

As we showed, Fiscal Space Reviews have the potential to strengthen the signaling channel through which independent fiscal institutions can affect fiscal policy behavior. Publishing FSPRs might also contribute to more intense research in the fiscal area.

In order to avoid losing part of their credibility, fiscal councils should base their recommendations in the FSPR on all relevant data available and using state-of-the-art methodologies. Here we list five important areas, we consider as promising avenues for further research[17].

First, better understanding of the effects of public investments (both physical and human) is a critical point in discussing sustainable debt levels. However, one should note that this analysis cannot be separated from the question of the effectiveness of those investments.

Second, there is a current trend to link microsimulation models to macroeconomic models (Horváth et al., 2015). In our view it is a very promising research area, since it can measure the effects of fiscal policy on economic growth, public balances and income distribution both in the short- and long-term. Policymakers can therefore better understand the trade-offs they face when confronted with fiscal problems.

Third, macro-finance models are essential in capturing the links between fiscal policy, financial markets and the economy. More research is needed to better understand fiscal reaction functions, financial markets pricing functions and determinants of sovereign spreads. Moreover,

[17] More complex fiscal research agenda can be find in Leeper (2016).

a complete understanding of those links is not possible without taking into account lender of last resort functions of the central bank.

Fourth, political economy considerations are vital not only case of fiscal frameworks but also in the discussion of fiscal adjustments. For example, both concepts - the fiscal limit and fiscal reaction function - mention explicitly political economy factors.

Fifth, in order to have a more complete understanding of fiscal trends and fiscal risks, balance sheet perspectives will be indispensable. However, more work is needed to construct and publish comprehensive public sector balance sheets in the euro area.

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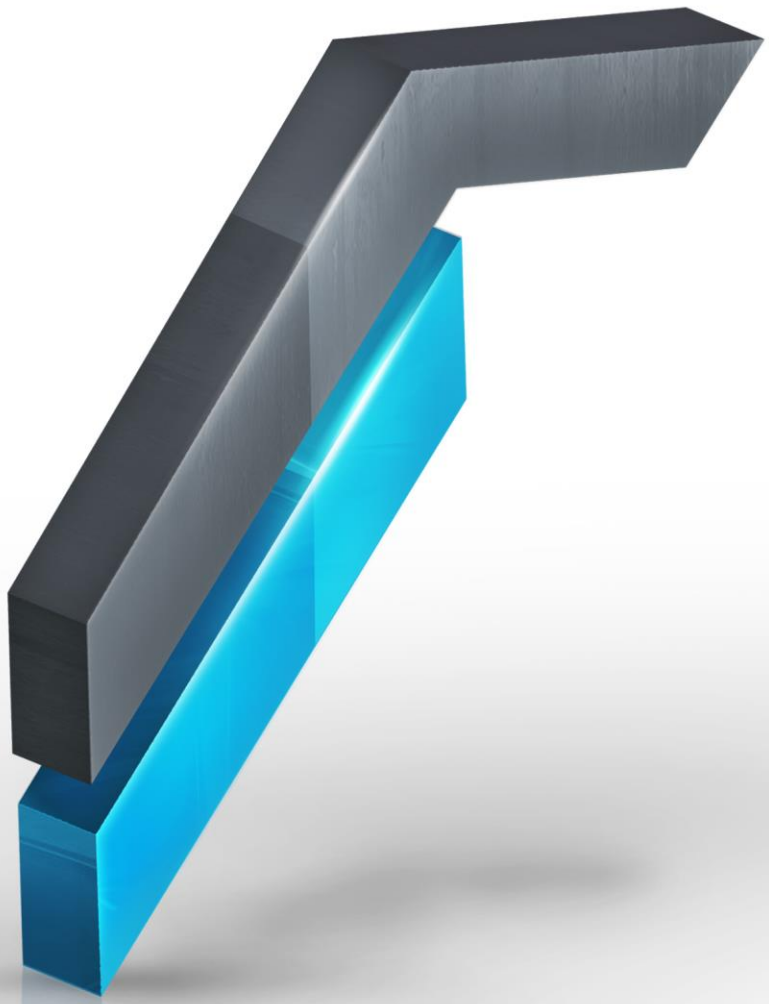

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