



Fiscal Risk Assessment at the CBR: A Conceptual Framework

Ludovít Ódor

Discussion Paper No. 1/2014

© SECRETARIAT OF THE COUNCIL FOR BUDGET RESPONSIBILITY

This study represents the views of the authors and do not necessarily reflect those of the Council for Budget Responsibility (CBR).

Discussion Papers constitute “work in progress”. They are published to stimulate discussion and contribute to the advancement of our knowledge of economic matters.

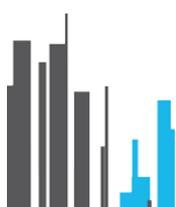
This publication is available on the CBR website (<http://www.rozpocovarada.sk/>).

Copyright ©

The Secretariat of the CBR (Kancelária Rady pre rozpočtovú zodpovednosť) respects all third-party rights, in particular rights relating to works protected by copyright (information or data, wordings and depictions, to the extent that these are of an individual character). CBR Secretariat publications containing a reference to a copyright (© Secretariat of the Council for Budget Responsibility/Secretariat of the CBR, Slovakia/year, or similar) may, under copyright law, only be used (reproduced, used via the internet, etc.) for non-commercial purposes and provided that the source is mentioned. Their use for commercial purposes is only permitted with the prior express consent of the CBR Secretariat. General information and data published without reference to a copyright may be used without mentioning the source. To the extent that the information and data clearly derive from outside sources, the users of such information and data are obliged to respect any existing copyrights and to obtain the right of use from the relevant outside source themselves.

Limitation of liability

The CBR Secretariat accepts no responsibility for any information it provides. Under no circumstances will it accept any liability for losses or damage which may result from the use of such information. This limitation of liability applies, in particular, to the topicality, accuracy, validity and availability of the information.



Fiscal Risk Assessment at the CBR: A Conceptual Framework¹

Ludovít Ódor²

Abstract

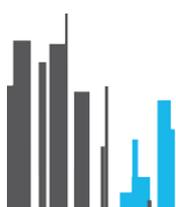
To identify fiscal risk, the CBR uses a pragmatic approach by employing a set of models and indicators, quantitative and qualitative assessments organized in a coherent framework. The inter-temporal net worth serves as an organizing principle. It has the advantage over other frameworks that: i) is directly comparable to budget figures (both ex-ante and ex-post), ii) easier to communicate to policy makers, iii) do not rely on ad-hoc categories but is directly linked to the inter-temporal budget constraint, iv) is embedded in the constitutional Act on Fiscal Responsibility and v) promotes easier detection of fiscal gimmicky. This paper also briefly summarizes the toolkit of the CBR and proposes three „communication devices“, which can in our view help to increase the understanding of fiscal risks among policymakers and the general public.

Keywords: fiscal risk, contingent liabilities, fiscal limit

JEL classification: H1, H6

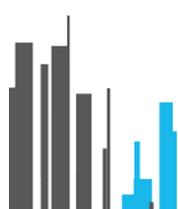
¹ I would like to thank Michal Horváth, Geert Langenus and participants at the 6th Annual Meeting of OECD Parliamentary Budget Officials and Independent Fiscal Institutions for useful comments and suggestions.

² Council for Budget Responsibility, odor@rrz.sk



Content

1	Introduction	5
2	A balance sheet approach	6
3	Taxonomy of fiscal risks	9
3.1.	<i>NPC scenario</i>	9
3.2	<i>Policy impact assessment</i>	9
3.3	<i>Other parts of general government</i>	10
3.4	<i>Interest expenditures</i>	10
3.5	<i>Other assets</i>	11
3.6	<i>Other liabilities</i>	11
3.7	<i>Revaluations</i>	12
4	Communicating the results of risk assessments	13
4.1	<i>“Traffic lights”</i>	13
4.2	<i>“Safe” or “sound” level of debt</i>	14
4.3	<i>Fiscal Space Review</i>	15
	Conclusions	16
	References	17



1 Introduction

Fiscal risk is a multi-faceted concept. Usually is defined as „a source of fiscal stress that could face the government in the future“ (Polackova Brixi and Schick eds., 2002) or as „the possibility of deviations of fiscal outcomes from what was expected at the time of the budget or other forecasts“ (Cebotari et al., 2009). In practice there can be numerous reasons for deviations from targets: different macroeconomic development, windfall revenues, underestimated impact of government policies, bailing out financial institutions, aging problems etc. The time dimension is also important, since different risk factors can materialize in a short-term than on long-term horizons. To capture all these aspects in one framework, different authors used different summarizing schemes. Here we briefly describe just two of them.

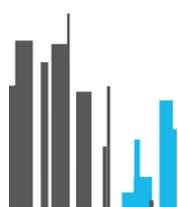
The first is the Government Fiscal Risk Matrix introduced by Polackova (1998) and Polackova Brixi and Mody (2002). It looks at risks from two different angles: the probability of occurrence and the degree of transparency. They call direct liabilities those that will materialize in any event and contingent liabilities the ones that are conditional on the occurrence of a particular event. Explicit liabilities are transparent as they are recognized by law or contract, while implicit liabilities are more hidden and usually represent moral obligations. Figure 1 illustrates the resulting Fiscal Risk Matrix.

Figure 1 – Fiscal Risk Matrix

	Direct liabilities	Contingent liabilities
Explicit liabilities	Sovereign debt Expenditure composition Expenditures legally binding in the long term	State guarantees for non-sovereign borrowing Umbrella state guarantees Trade and exchange rate guarantees State guarantees on private investments State insurance schemes
Implicit liabilities	Future public pensions Social security Future health care financing Future recurrent costs of public investment projects	Default of subnational entity Banking failure Cleanup of liabilities of entities being privatized Failure of pension funds Possible negative net worth and/or default of central bank Other calls for bailouts Environmental recovery, disaster relief, military financing

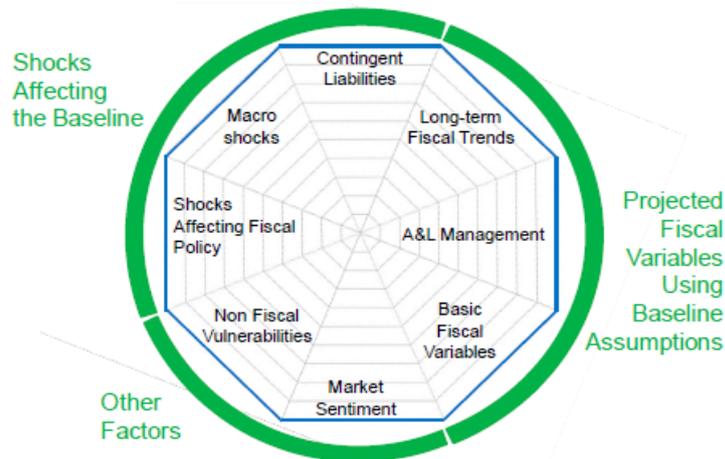
Source: Polackova Brixi and Mody (2002)

It has the advantage that the Matrix is a relatively simple accounting framework, on the other hand it ignores some important risk factors i.e. those stemming from individual policy measures.



The second - more recent – approach for assessing sovereign risks can be found in Cottarelli (2011). It is centered around the “Risk Octagon”, which contains eight different risk categories in 3 broad areas: shocks affecting the baseline, projected fiscal variables using baseline assumptions and other factors.

Figure 2 – The Risk Octagon



Source: Cottarelli (2011)

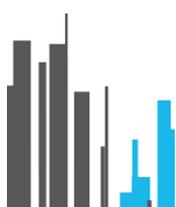
The IMF uses this framework in two ways: as a way of organizing thinking about fiscal policy, but also as a base for quantitative assessment for some of the risk dimensions (Baldacci et al., 2011). Baldacci et al. try to quantitatively assess the risks associated with the right area, namely those related to the projection of fiscal variables using baseline assumptions. They use a set of 13 indicators to construct composite risk scores.

The Octagon represents greater focus on substance than the Fiscal Risk Matrix, on the other hand it has the flavor of ad-hoc inclusion of risk categories. Some of them are overlapping at least conceptually: long-term trends and shocks affecting the baseline. Moreover some are very general: shocks affecting fiscal policy or non-fiscal vulnerabilities.

The conceptual framework proposed in this paper combines the advantages of the above-mentioned two approaches, i.e. it is derived from an accounting identity but not only at an abstract but also at practical level via identification of more explicit risk categories.

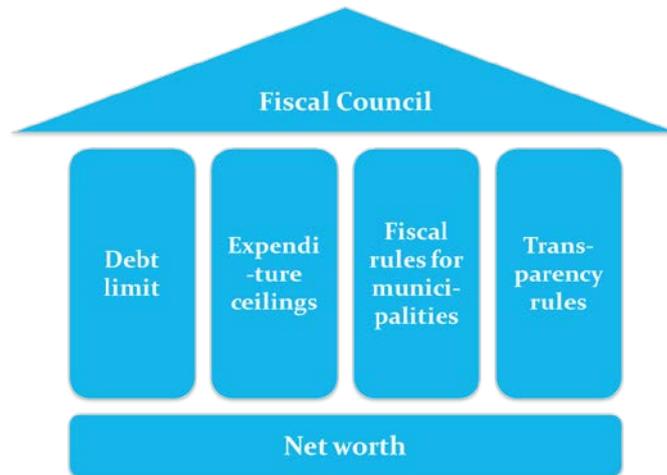
2 A balance sheet approach

The Council for Budget Responsibility uses a somewhat different approach to organize thinking about fiscal risks. Our framework is centered around the concept of inter-temporal net worth (INW), which is one of the basic building blocks of the constitutional Act on Fiscal Responsibility adopted in 2011. It is defined in the law as “the total equity of general government entities, the National Bank of Slovakia, state corporations and municipal



corporations, adjusted for the implicit and contingent liabilities, as well as for other assets and liabilities.”

Figure 3 – Fiscal Framework in Slovakia



Source: Horváth and Ódor (2009)

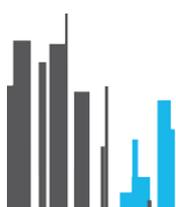
As Ódor (2011) illustrates the inter-temporal net worth can serve as a benchmark for transparency and help to mitigate bad incentives in fiscal policymaking. Increasing the transparency of fiscal accounts is related to risk assessment, since the more we know about the consequences of fiscal policy the more we understand the factors affecting the outcomes. When private sectors analysts assess the prospects of individual firms, they usually analyze three reports: the profit and loss account, the balance sheet and the cash-flow statement. The CBR has decided to use an analogous strategy in analyzing public accounts. Interactions between the budget (flows), inter-temporal net worth (stocks) and debt management strategy (cash-flow) can in our view provide a more complex understanding of fiscal accounts and thus fiscal risks. Figure 4 shows an illustrative balance sheet of the sovereign.

Figure 4 – 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	NET WORTH
A6 Net worth of state enterprises	
A7 Natural resources	
A8 Ecological wealth	
A9 Other assets	

Source: Horváth and Ódor (2009)

The nominal value of the INW is not as important as its *change* on a year-on-year basis. The yearly flows in the budget are just one of the components of the Δ INW. Changes in prices,



implicit liabilities or for example in the net worth of the central bank are other factors influencing the evolution of INW.

$$\Delta INW = PV(flows) + revaluations$$

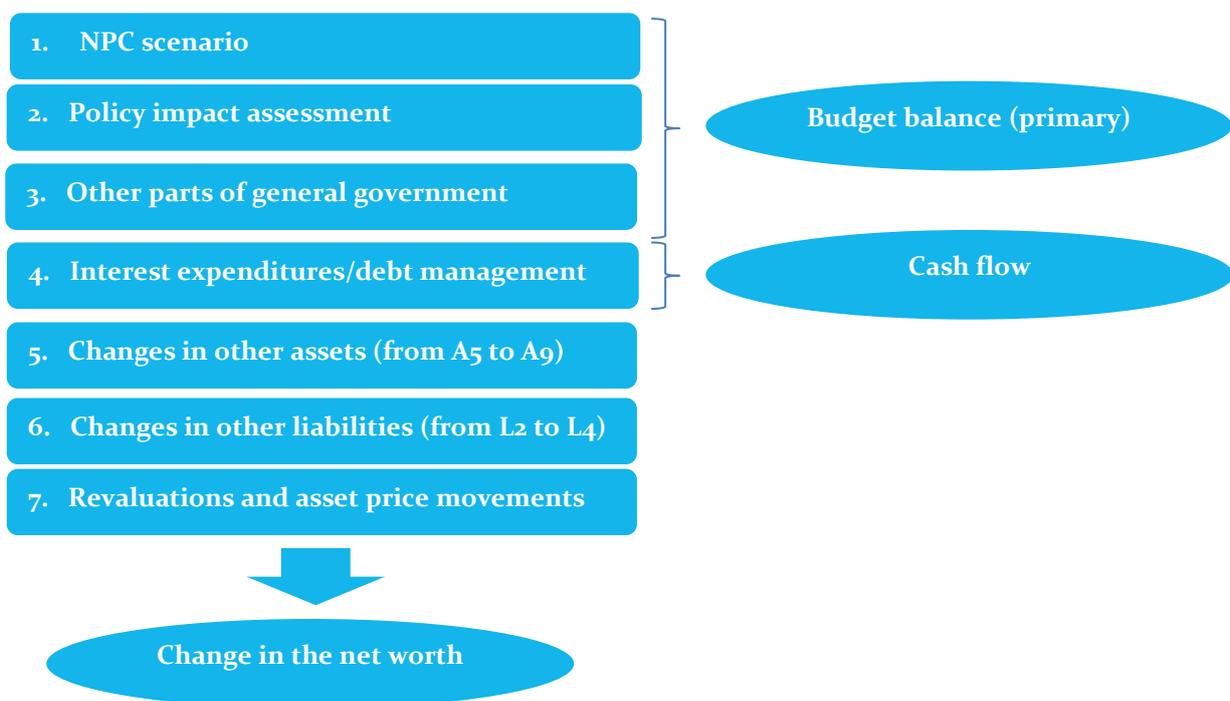
$$flows = general\ government + other\ assets\ and\ liabilities$$

$$general\ gov. = central\ gov. + municipalities + EU\ funds + interest\ exp.$$

$$central\ gov. = NPC\ scenario + policies$$

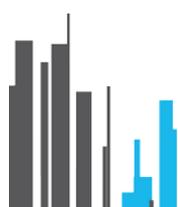
CBR uses this breakdown in a reverse order and employs a 7-step approach to gradually incorporate all important fiscal risks into the analysis.

Figure 5 – CBR’s seven step approach



One can mention several advantages of this approach compared to the ones presented in the previous section:

- 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 policy makers 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 Act on Fiscal Responsibility 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.

In the next section we describe the various fiscal risks inherent in every step of the procedure. Here we just mention that all steps use different models, methods and procedures (qualitative and quantitative) to assess the potential vulnerabilities which make it impossible to calculate just one fan chart around the fiscal target or one default probability. Therefore the change in the inter-temporal net worth should be understood only as an **organizing principle** and **benchmark for transparency**.

3 Taxonomy of fiscal risks

Here we illustrate all seven steps, the methods and approaches we use and the risk factors we try to measure. Currently many of these methods are under construction, so the full toolkit will be available probably at the end of this year.

3.1. *NPC scenario*

Every budget planning should be based on some form of NPC scenario, which calculates fiscal outcomes based on existing government policies. It obviously starts with macroeconomic forecasts and projections of major revenue items and non-discretionary spending. The medium-run NPC scenario should be at the end linked to long-term economic and budgetary projections (this is precisely the approach of the CBR). Obviously, transitory effects including cyclical fluctuations and temporary measures have to be taken into account.

Risks to measure:

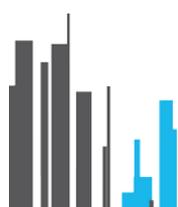
macroeconomic risks, challenges from population ageing, risks related to the tax-benefit system

CBR's toolkit:

ECM forecasting model, DSGE model, principles for one-off and temporary measures, cyclical adjustment methodology, basic tax models, simple models of demographic and labor market trends, Slovak Pension Model (SLOPEM), pension model of armed forces (PESO), Long-Term Healthcare Model (LHTM), EUROMOD and other microsimulation models

3.2 *Policy impact assessment*

The next step is to calculate the effects of proposed policy measures (and feed the results back to the macroeconomic scenario). Governments tend to overestimate the benefits and underestimate the costs of legislative changes (Puviani, 1903). Moreover, the likelihood of policy reversals should be also taken into account. Sometimes there are important differences



between a “current legislation” and a “current policy” scenario. For example, despite the fact that there is a legislation which indexes social benefits by inflation only, it is hard to expect this practice to continue in a longer-term because of important distributional impacts. Here we would like to mention also some political economy aspects of measures, which are hard to quantify and often lay beyond economic considerations.

Risks to measure:

risks in cost-benefit analysis³, political risk, risk of policy reversals

CBR’s toolkit:

Small-scale multiplier models, behavioral microsimulation model linked to a simple macro model, cohort level-simulations, generational accounting, distributional impacts,

3.3 *Other parts of general government*

The risk assessment of the primary balance is concluded via the analysis of other important sectors inside the general government. It is of course country specific, but some of the themes are common to many countries. In case of Slovakia we pay special attention to:

- Municipalities
- Healthcare sector
- EU funds
- Extra-budgetary funds

Risks to measure:

sectoral risks, administrative capacities

CBR’s toolkit:

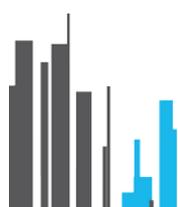
simple sectoral models, detailed database for every municipality, analysis of EU funds, budget traffic lights (more in section 4).

3.4 *Interest expenditures*

Interest expenditures depend on many external as well as internal factors. General risk appetite of international investors, basic fiscal indicators of a country or the debt management strategy are all very important in determining risks related to interest expenditures. One should assess not only the uncertainty around central projections but also liquidity, credit risk or for example refinancing risk.

By completing the first four steps, the vulnerabilities to the budgeted flows (general government) can be identified. It affects the change in the INW mainly via the following entries: A_1 , A_2 , A_3 , A_4 and L_1 .

³ Only reforms with significant impact on the budget will be considered. Changes in the tax system will be discussed jointly with the Tax Forecasting Committee.



Risks to measure:

liquidity risk, credit risk, refinancing risk

CBR's toolkit:

three factor yield curve model linked to macroeconomic variables (URSIM), detailed portfolio of debt and liquidity management (UMOD), stock-flow adjustments, fiscal limit

3.5 *Other assets*

In order to get a complex evaluation of fiscal risks one has to look beyond the general government data. Change in the following assets can be particularly relevant:

- net worth of the central bank, especially after large-scale non-standard operations
- 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
- ecological assets and natural resources
- other assets – human capital in the public sector

Risks to measure:

monetary system, ecological risks, depletion of natural resources, capital stock (fixed and human)

CBR's toolkit:

analyses of large public companies and the central bank

3.6 *Other liabilities*

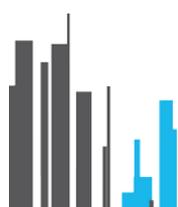
Official net debt is just (smaller) part of the liabilities of the sovereign. Without assessing implicit and contingent liabilities⁴ the picture of fiscal risks cannot be complete. As far as implicit liabilities are concerned, the CBR focuses mainly on three aspects:

- ageing related systems – pension, healthcare, long-term care, education, unemployment benefits
- public-private partnerships (PPPs)
- nuclear decommissioning

The list of contingent liabilities includes the following items (both quantitative and qualitative):

- financial sector bail-outs

⁴ The constitutional Act on Fiscal Responsibility in Slovakia defines implicit and contingent liabilities in a slightly different way than in the literature. Implicit liabilities represent not only payments coming from legal but also moral obligations (pensions, healthcare, etc.). Contingent liabilities refer to events, where the probability of occurrence is lower.



- legal claims
- state guarantees
- natural disasters
- environmental debts

Risks to measure:

Implicit and contingent liabilities

CBR's toolkit:

SLOPEM, PESO, LHTM, database of legal claims and guarantees

3.7 *Revaluations*

Previous steps have dealt mainly with no-policy scenarios and structural measures. The last step is to include changes in INW due to asset price changes. For many countries foreign exchange rate movements or jumps in commodity prices can result in a significant budgetary risk. For those countries, accumulating large pool of assets, changes in security or other asset prices can be more important. In this step we included also an assessment of possible changes in accounting principles, underlying data or other revisions.

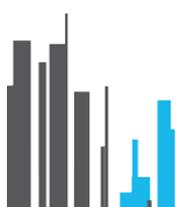
Risks to measure:

exchange rate risk, commodity price risk, other asset price risk, data revision risk

CBR's toolkit:

URSIM, stochastic simulations

After assessing all seven dimensions, the question of communicating the results stands out. In the next section we propose three possible options to inform the policymakers and the general public about fiscal risks.



4 Communicating the results of risk assessments

Since the risk assessment exercise is complex and the analysis contains many indicators, sensitivity tests and analytical judgments, it is impossible to compress all the information into one simple risk measure. We are proposing three communication channels, one more suitable for analysts and the other two tailored at the general public.

4.1 “Traffic lights”

For the purpose of monitoring budgetary trends in the short- to medium-run we developed an indicator of fiscal stress which combines three elements: i) monthly detection of deviations of regular revenue and expenditure items from targets, ii) expert assessment of irregular and one-off items and iii) medium-term fiscal risks. Compared to the standard literature we do not define fiscal stress as a credit event or spread on sovereign bonds, but rather we focus on the magnitude of **deviation of fiscal variables from current and future targets**⁵. Significant deviations can signal to the public that the government will probably need to adopt new measures with possible welfare implications. The results are summarized in a single measure, representing a color on a traffic light. The basic framework is displayed on figure 6.

The **first** element compares the current in-year execution of the budget with profiles from previous years on a monthly basis⁶. It is important to include only revenue and expenditure items with more or less stable profiles (app. 80-85% of the budget). The other substantial change to current practice is that the focus is broader: not only the state budget is under scrutiny but the entire general government sector.

The **second** part is the analysis of all the items left out from the first exercise because of irregular in-year developments. It contains mainly capital expenditures, co-financing of EU funds and one-off items. This can be done only via expert assessment.

From the first two elements one can derive the deviation of expected outcomes in year *t* with respect to fiscal targets (deficit, debt, etc.). At the beginning we set equal weights to deviation from the deficit and debt target.

The **third** component is a risk assessment on a medium-term horizon. We have decided to include two important aspects: deviation of the no-policy-change (NPC) scenario from fiscal targets and a broad measure of macro-fiscal risks calculated by the European Commission (So). While the interpretation of the NPC scenario is straightforward, translating the So indicator into expected deviation is problematic. Therefore we followed a simple approach: adjusting the NPC deviation based on the value of the So fiscal stress index. The So index (Berti et al., 2012) is an early warning indicator incorporating fiscal, financial and competitiveness variables, some of which are common to the scoreboard used in the EU for the surveillance of macroeconomic imbalances.⁷

⁵ We focus mainly on targets which are relevant for harsh sanction mechanisms in the SGP or in the domestic constitutional Act on Fiscal Responsibility (headline deficit and gross debt).

⁶ With the exception of municipalities where only quarterly figures are available through the State Treasury system.

⁷ For example, current account imbalances, private debt, leverage of financial corporations, etc.

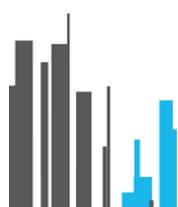
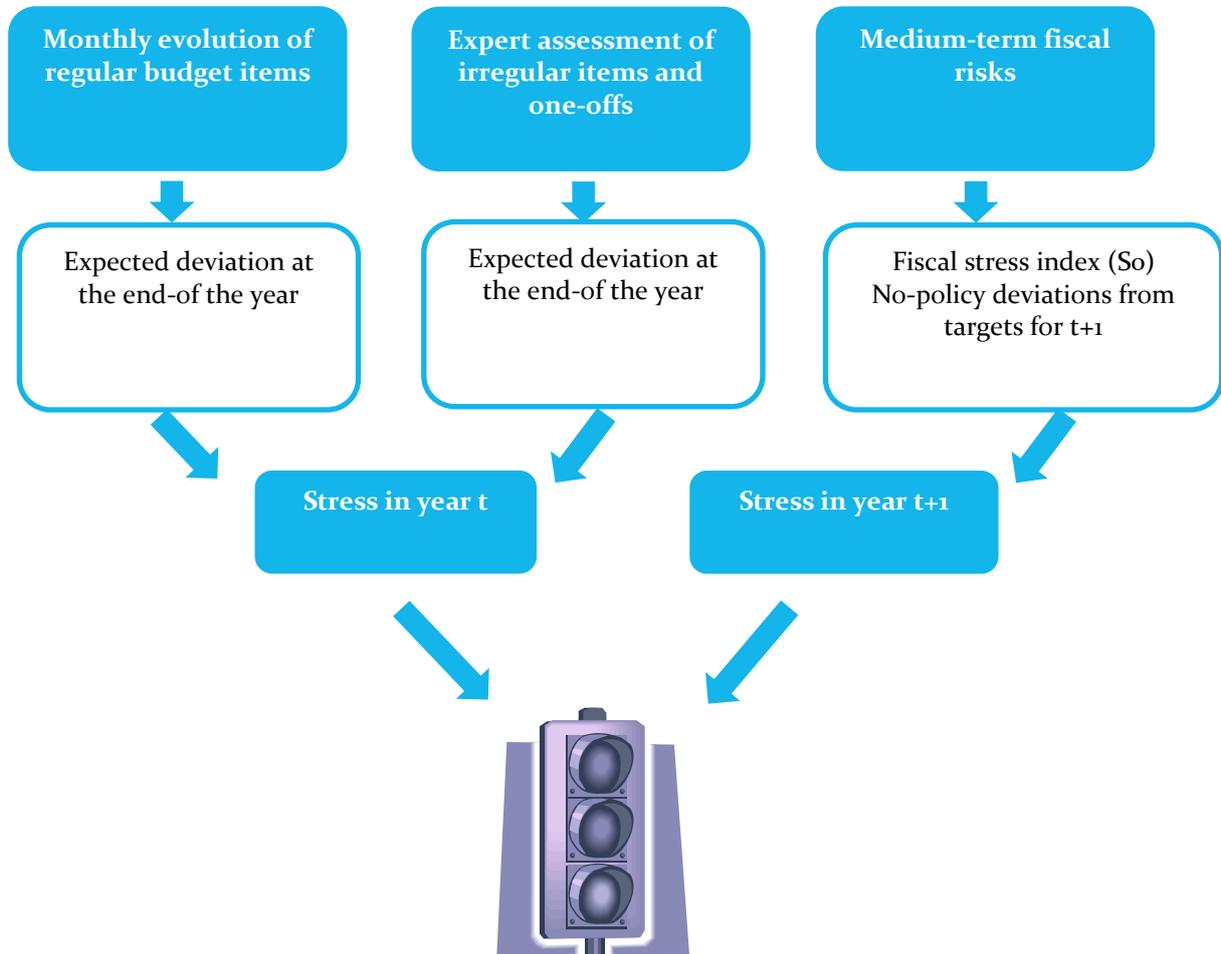


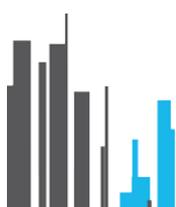
Figure 6 – Budgetary traffic lights at the CBR



Once we have calculated the potential deviations from targets for t and $t+1$ it is straightforward to combine into one single measure of expected deviation. The last step is to attach “colors” to different magnitudes of deviations.

4.2 “Safe” or “sound” level of debt

The fully-fledged analysis of the change in the inter-temporal net worth is definitely not the right channel of communication with the general public. But the underlying analysis can be used to construct an empirical indicator referring to “safe” level of debt. In the literature there is no clear theory to calculate such an indicator (Calmfors and Wren-Lewis, 2010); however a simple empirical framework can help to distill much of the above-mentioned risk assessment into one number understandable to the public.



Analysis of the refinancing risk and fiscal limit (see for example Bi and Leeper, 2013) in step 3.4 together with case studies of credit events of similar countries can help to define a gross⁸ debt level at which market access is highly unlikely. As a second step, it is necessary to calculate the value of “reserve” or “room for maneuver” needed to cover the most important risks. For example this reserve can be calculated based on the following considerations:

- “prefunding” of part of the ageing costs based on current policies⁹
- room for counter-cyclical policy in case of financial crises (together with optimistic potential growth estimates)
- contingent liabilities including potential bail-out costs
- international risk-sharing mechanisms
- potential central bank losses
- realization of state guarantees

It is important to note that analytical judgment is necessary to carry-out these calculations. The “safe” or “sound” level of debt is simply the fiscal limit minus the necessary room for maneuver (reserve)¹⁰.

One of the most important parts of the constitutional Act of Fiscal Responsibility in Slovakia is the debt limit. It is the main reason why we have decided to focus on sound debt levels instead of sound budgetary position (expressed as a structural budget balance¹¹) which would be an equally viable alternative. The communication with the public is also more straightforward when referring to debt and not to cyclically-adjusted budget balances.

4.3 Fiscal Space Review

The work of independent fiscal institutions (IFIs) is generally about risk assessment. Publishing fragmented information throughout the year (via different reports on different topics) may be not enough to educate the public about the “big picture”. Therefore it might be useful to publish a complex evaluation of fiscal risks from time to time to send a clear and more *complete* message towards the general public and the media.

It can be done in a form of Fiscal Space Review – a document similar to the well-known Financial Stability Reviews. Actually, financial stability is one aspect of fiscal risks. The CBR is now considering the possibility to publish such a document based on the above-mentioned 7-step procedure every three years¹² or every four years before parliamentary elections. The latter option might also help voters to distinguish between bad luck and bad policies of the incumbent government.

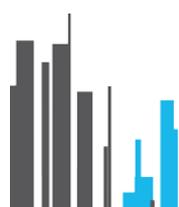
⁸ The level of financial assets can be taken into account.

⁹ To avoid the complicated issue of intergenerational equity, projections based on current policies are used.

¹⁰ Taking into account also the potential correlations between various types of risks.

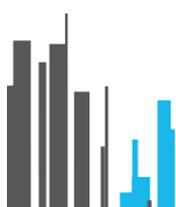
¹¹ Possibly including a safety margin for estimation errors.

¹² To have the same frequency as the ageing report of the European Commission.



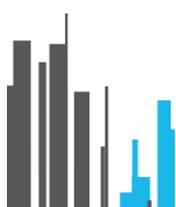
Conclusions

Independent fiscal institutions were set up to assess and communicate fiscal risks. Since budgetary outcomes are affected by many external and internal shocks, it is a challenging task to analyze and evaluate all possible sources of fiscal stress and to communicate clear and complete messages towards the general public. The CBR has decided to use the inter-temporal net worth as an organizing principle for this exercise. The communication of results is planned mainly via three channels: medium-term budgetary “traffic lights”, calculation of a “sound” level of debt and a fully-fledged Fiscal Space Review conducted in every three or four years.



References

- Baldacci, E., McHugh, J. and I. Petrova, (2011): "Measuring Fiscal Vulnerability and Fiscal Stress: A Proposed Set of Indicators," IMF Working Paper 11/94 (Washington: International Monetary Fund).
- Berti, K., Matteo, S. and M. Lequien (2012): An early-detection index of fiscal stress for EU countries, *European Economy, Economic Papers* No. 475
- Bi, H. and E. Leeper (2013): Analyzing Fiscal Sustainability, Bank of Canada Working Paper, 2013-27
- Calmfors, L. and S. Wren-Lewis (2011), "What Should Fiscal Councils Do?," CESifo Working Paper Series No. 3382
- Cebotari, A., Davis, J., Lusinyan, L., Mati, A., Mauro, P., Petrie, M. and R. Velloso (2009): Fiscal Risks: Sources, Disclosure, and Management; Departmental paper 09/01;; IMF Fiscal Affairs Department; 2009.
- Cottarelli, Carlo, (2011): "The Risk Octagon: A Comprehensive Framework for Assessing Sovereign Risks" presented in University of Rome "La Sapienza," January.
- Horvath, M. and L. Ódor (2009), "Making Fiscal Commitments Credible", National Bank of Slovakia, Research Department, Working and Discussion Paper, No. 1006
- Koen, V. and van den Noord, P. (2005): Fiscal Gimmickry in Europe: One-Off Measures and Creative Accounting, *OECD Economics Department Working Papers* No. 417
- Kopits, G. (2014): Fiscal risks. New Approaches to Identification, Management and Mitigation, unpublished manuscript
- Ódor, L.(2011): Is It Worth Considering Net Worth? — Fiscal Policy Frameworks for Central Europe, Public Finance Workshop, 31 March 2011–April 2, Perugia
- Polackova, H., (1998): "Contingent government liabilities: a hidden risk for fiscal stability," Policy Research Working Paper Series 1989, The World Bank.
- Polackova Brixi, H. and A. Schick, eds. (2002): "Government at Risk: Contingent Liabilities and Fiscal Risk," World Bank Publications, The World Bank, number 15233, March.
- Polackova Brixi, H. and A. Mody, (2002): "Dealing with government fiscal risk: An overview" in "Government at Risk: Contingent Liabilities and Fiscal Risk," World Bank Publications, The World Bank, number 15233, March.
- Puviani, Amilcare (1897): "Teoria della illusione nelle entrate pubbliche". Perugia.
- Schaechter, A. et al. (2012): A Toolkit to Assessing Fiscal Vulnerabilities and Risks in Advanced Economies; by a staff team led by Andrea Schaechter with C. Emre Alper, Elif Arbatli, Carlos Caceres, Giovanni Callegari, Marc Gerard, Jiri Jonas, Tidiane Kinda, Anna Shabunina, and Anke Weber; IMF Working Paper 12/11; January 1, 2012





**Council for Budget
Responsibility**

Imricha Karvaša 1
Bratislava 1
813 25
Slovakia