Working Party of Senior Budget Officials

FISCAL RISKS:
NEW APPROACHES TO IDENTIFICATION, MANAGEMENT AND MITIGATION

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FISCAL RISKS:
NEW APPROACHES TO IDENTIFICATION, MANAGEMENT AND MITIGATION

George Kopits∗

Abstract

Against the background of the recent financial crisis that in many countries metastasized into significant fiscal stress, this paper reviews new developments in the identification, measurement, management and mitigation of fiscal risks. On the basis of the classification of specific, general and systemic types, fiscal risks have been estimated directly, and more recently, through sensitivity tests on baseline macro-fiscal projections. Although still at an experimental stage, valuable insights have been gained for eventual widespread implementation of various stochastic methods of risk assessment. The paper draws a number of lessons for improved management and mitigation of fiscal risks from the discussion of identification and measurement of fiscal risks, and from a recent OECD survey of country practices. There is indeed scope for improvement in a number of areas: disclosure and estimation of risks; assignment of responsibilities for such tasks within the public sector; adoption of hedging through various insurance schemes; building special-purpose reserves; and enacting well-designed fiscal rules, along with unambiguous no-bailout provisions. At the policy level, it is necessary to adopt a countercyclical policy stance especially during economic booms; to enforce transparent accounting and forecasting practices; and where necessary, to undertake structural reform in key areas. An additional overarching lesson from the financial crisis is the need to assess and prevent systemic fiscal risk, through close coordination with an independent macroprudential supervisory authority.

∗ Senior Scholar, Woodrow Wilson International Center for Scholars, and Member, Portuguese Public Finance Council. A preliminary draft of this paper was presented at the 6th annual meeting of OECD Parliamentary Budget Officials and Independent Fiscal Institutions, in Jerusalem, 1 April 2014. The paper benefitted from comments by Ronald Downes, Klaus Schmidt-Hebbel, Jürgen von Hagen, and Lisa von Trapp. The survey questionnaire was compiled by Irena Valkova. The author alone is responsible for the views expressed.

Over the past couple of decades, policymakers have been operating in an increasingly uncertain environment, to a large extent as a result of widespread financial liberalization and integration. The latter trends, along with policy complacency during the so-called Great Moderation, helped pave the way to the recent financial crisis. An upshot of the crisis has been the complexity of formulating fiscal policy in the face of a marked rise in public indebtedness, financial fragmentation, and prolonged economic stagnation or outright recession. In these circumstances, compounded by erosion of policy credibility in some countries, pressures have been mounting for heightened transparency, including explicit assessment and strengthened management of risks—under the gaze of highly inquisitive media and sensitized financial markets. Partly in response to these developments, in recent years, there have been multiple attempts at pursuing new approaches to cope with fiscal risks in an orderly and effective manner. The purpose of this paper is to examine these attempts and distil useful lessons for the policymaking process and for public institutions.

Broadly speaking, fiscal risk denotes the uncertainty associated with the outlook in public finances. Fiscal risk can be defined as the probability of significant differences between actual and expected fiscal performance, over a short- to long-term time horizon. More critically, a sharp build-up of public indebtedness, coupled with financing difficulties, renders an economy vulnerable to shocks. In the event, the government may face a rollover risk. In an extreme case, fiscal risk encompasses the probability of sovereign default.

The paper is organized as follows. The first section explores the rationale for assessing, managing and mitigating fiscal risks in the shadow of the recent financial crisis. The second section identifies and classifies fiscal risks in an analytically meaningful way, and the third examines evolving approaches for evaluating and estimating fiscal risks at various levels. The fourth section reviews selected country practices in managing fiscal risks, including in the assignment of responsibility to various public entities. The fifth section highlights major steps taken by governments intended to prevent and alleviate fiscal risk. The concluding section summarizes key lessons and implications.

I. Rationale

In recent decades, an increasing number of governments, including those in emerging-market economies, have gained access to financial markets. With the deepening of the markets for sovereign paper, governments have been subject not only to periodic evaluation by major credit rating agencies, but more immediately, to continuous evaluation by investors as reflected in the interest yield on bonds traded in secondary markets. The heightened sensitivity of financial markets in the wake of the recent crisis provides a major rationale for assessing fiscal risk.

From the perspective of bondholders, the spread on a given government’s interest yield relative to a high-grade sovereign bond of the same maturity (issued by another government) is interpreted as the sovereign risk premium paid by the government on its debt. A further manifestation of sovereign risk premium is provided by the spread on credit default swaps (CDS), which are derivative instruments used to hedge against sovereign default. Figures 1 and 2 illustrate respectively the fluctuations in interest spreads on ten-year government bonds since 2007 and CDS spreads on such maturities since 2009 in the hardest-hit member countries of the euro area (Greece, Ireland, Italy, Portugal and Spain) within the European Union (EU).

Interestingly, while the relative position of spreads among countries broadly reflects differences in fundamental fiscal vulnerability to the crisis, their movement seems to be driven primarily by shifts in

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1 Reflecting on his experience in the private and public spheres, former US Treasury Secretary Rubin (2003) expressed succinctly the imponderables faced by decision-makers under uncertainty.
investor sentiment, rather than by significant changes in the underlying fiscal position. From 2008 onward, the sovereign risk of these countries jumped sharply as investors seem to have realized that the no-bailout clause, enshrined in the EU Treaty, is indeed (albeit fitfully) enforced. Conversely, following the declaration by the President of the European Central Bank that it will resort to “whatever it takes to save the euro” signalling an apparent relaxation of the clause, spreads in most of these countries declined to nearly pre-crisis levels.

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2 Herein the term bailout is used to signify a financial transfer without conditionality, as distinct from financial assistance subject to conditions as regards corrective policy action by the recipient national government (typically in the case of an IMF stand-by arrangement) or subnational government (vis-à-vis the central government).
Thus, although the sovereign risk premium, measured by yield spreads, serves as a broad indicator of a government’s vulnerability in financial markets, it conveys limited—and occasionally distorted—information on actual fiscal risk. First, spreads on sovereign bonds reflect not only fiscal risk, but may also embody country risk, currency risk and even systemic risk. Second, spreads are driven to a large extent by the vagaries of market perceptions, not necessarily by fundamentals. Third, as a corollary, spreads are rather volatile in thin secondary bond markets, and volatility of CDS spreads is usually further magnified by highly speculative trading—where the parties to such instruments do not even hold the underlying bond that is meant to be insured. And fourth, movements in spreads cannot be decomposed into the sources underlying fiscal risk. These features underscore the need to approach fiscal risk from an analytical perspective that reaches beyond observed fluctuations in sovereign risk premium.

Besides the heightened sensitivity of financial markets, an even stronger argument for assessing fiscal risk can be made in a democratic society for transparency and accountability in public finances toward the electorate. In this regard, New Zealand’s Public Finance Act of 1989—precursor of the Fiscal Responsibility Act of 1994—that instructs the government to publicly disclose fiscal risks on a regular basis, has become a template for many governments in their quest for transparency.

Apart from its value as a means of democratic inclusion, a factual and objective assessment of fiscal risks bestows multiple advantages on the quality of policymaking. A government that is aware of the likely risks

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3 For sovereign national governments, or subnational governments, within a common currency area (e.g., states within the United States or euro area members) spreads reflect default risk and are devoid of currency or country risk—subject to the underlying assumption of an effective no-bailout provision. Spreads, of course, collapse to zero absent a no-bailout provision.
ahead—including the risk of inaction—in both quantitative and qualitative terms is in far stronger position to make sound policy decisions than one that ignores or downplays such risks. Informed policymakers can choose among alternative options, conscious of the risks associated with each option. With an understanding of the sources and magnitude of fiscal risks, policymakers should be able to better avert, manage, and mitigate them in various ways. By the same token, the legislature and its constituencies can exercise oversight and conduct an effective debate over budgetary decisions on the basis of reliable estimates of risks. And ultimately, a government that is committed to disclose, manage and mitigate fiscal risks can gain credibility in financial markets and among credit rating agencies, and thus, overcome and dampen the effect of—and thus influence—sovereign spreads on investment decisions.

II. Identification

Fiscal risks can be observed from various perspectives. At a basic level, there are three major types of fiscal risk: economic, technical, and political. The risks under scrutiny herein are primarily of an economic and technical nature. Political risks are far more difficult to identify and assess as they do not lend themselves easily to objective analysis.

Economic type risks for the most part involve macroeconomic variables (especially economic activity, interest rates, terms of trade, exchange rate) that underlie fiscal forecasts. In addition, they include the probable realization of contingent liabilities that may result in claims on budgetary resources. Contingent liabilities cover a wide range of probable events for which the state may be called upon to honour explicit or implicit guarantees and insurance. Such events may be associated with financial default, health-care claims, various legal contracts, natural disasters, and other environmental damages.

Technical risks arise mainly from the data and method for estimating and forecasting government expenditure and revenue. The latter include erroneous elasticity estimates of tax revenue with respect to its corresponding effective base. For example, forecast errors for corporate income tax receipts typically rank among the largest in budgetary forecasts because of leads and lags as well as diversity across industries.

Political risks are the most difficult to capture because they usually involve unanticipated discretionary action (or inaction) by the government, deviating from previous commitments—including those expressed in budget documents—in the course of the fiscal year or over a medium-term program. This is generally a symptom of dynamic inconsistency.

Each type of risk can be either temporary (e.g., risk of expenditure overruns in the run-up to an election) or permanent (e.g., risk of an earthquake or a volcano). More important, while most risks can be treated as exogenous, there are risks that are internally generated by the authorities. In a small open economy, considerable macroeconomic uncertainty is determined externally; specifically, GDP and interest rates may be affected by shocks in the terms of trade, foreign demand, and monetary conditions abroad. By contrast, risks associated with contingent liabilities are largely a function of past and current government decisions, often in an attempt to postpone government expenditures into the future in order to maximize fiscal space at present. Likewise, over-optimism in budgetary forecasts is tantamount to a self-inflicted risk.

Economic or technical type risks can be further classified under three distinct headings: specific, general, and systemic. They are differentiated by certain key characteristics that largely determine the methodological approach to estimating them, as discussed below. Such characteristics encompass in part the relative ease of identifying the source of the risk and the extent of its influence on the budgetary outcome and economic performance.

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4 See the distinction drawn by Kopits (2004).
Specific risks are identified directly with regard to government spending programs, tax measures or other policy decisions that have an uncertain budgetary impact over time. For the most part, they consist of contingent liabilities vis-à-vis the private sector, mainly in the form of government guarantees for depositors, exporters, farmers, or investors in infrastructure under public-private partnership (PPP) contracts. Contingent liabilities may also arise with respect to state-owned enterprises or subnational governments in case they operate under the protection of a bailout provision.\footnote{For a taxonomy and discussion of contingent liabilities, see Polackova Brixi and Schick (2002), and more recently, see OECD (2013a, 2013b).}

The recent OECD Survey on Fiscal Risks highlights the relevance, or incidence, of specific and general types of risk as observed in member countries.\footnote{The survey was conducted by the OECD Secretariat in February and April 2014, with responses to a questionnaire received from 32 out of 34 member countries. Tables 1, 3 and 5 classify responses from finance ministries in 23 member countries (Austria, Canada, Chile, Czech Republic, Estonia, Finland, France, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Netherlands, New Zealand, Norway, Poland, Slovenia, Spain, Switzerland, and Turkey) and from independent fiscal institutions in 9 member countries (Australia, Belgium, Denmark, Greece, Mexico, Portugal, Slovak Republic, Sweden, and the United Kingdom) on the basis of experience and practices over the past decade.} Table 1 summarizes the responses regarding specific risks grouped under major categories. Among the various risks, more than half of the respondents identified those associated with banks and the rest of the financial sector, which reflects the recent experience of the financial crisis and its negative feedback loop on the public sector. Meanwhile, a large majority of respondents assigned low or no relevance to risks from PPP contracts and other risk-sharing arrangements with the private sector, to potential legal claims, to other liabilities and guarantees, and to possible natural disasters and health-care risks.

\begin{table}
\centering
\begin{tabular}{lcccc}
\hline
 & High (In percent of each type) & Medium & Low & None \\
\hline
Pension funds & 6 & 37 & 31 & 25 \\
PPPs and other risk sharing & 6 & 16 & 44 & 34 \\
Financial sector & 31 & 22 & 25 & 22 \\
Legal claims & 3 & 9 & 53 & 34 \\
Other liabilities and guarantees & 9 & 19 & 63 & 9 \\
Natural disasters, health-care risks & 9 & 13 & 53 & 25 \\
\hline
\end{tabular}
\caption{OECD Countries: Relevance of Specific Risks}
\end{table}

From another perspective, Table 2 provides a classification of specific risks by transaction and institution as the source of risk, as experienced in selected advanced and emerging-market economies, on the basis of an earlier survey on a sample of IMF member countries. By transaction, the most frequently cited source of risk involves government expenditure and tax revenue, followed by extra-budgetary and quasi-fiscal operations. At the other end of the spectrum, PPP contracts (none in emerging-market economies), unfunded government pensions, and financial transactions are the less frequently mentioned. Classified by institution, specific risks are generated by the central government and nonfinancial state-owned enterprises in most countries. Social security institutions (concentrated in advanced economies), subnational governments and the financial sector are a source of risk in far fewer countries.

These risks are endogenous, typically incurred by a government to meet a headline deficit ceiling or target, under a fiscal rule, as in the European Union. Examples of risk-generating devices that have been introduced to comply with the EU Stability and Growth Pact include: extra-budgetary outlays, quasi-fiscal activities, PPPs, and more recently, unfunded public pensions (through nationalization of private pension funds). Although conceptually well-designed, implementation of the deficit and debt criteria, under the original Pact, was ridden with loopholes and induced risky government behaviour. Although providing increased headroom in the short run, such practices create a larger public debt burden and increased vulnerability over the medium to long run. Thus the immediate gain in fiscal space imposes a much larger loss in fiscal space in the future.

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7 See IMF (2012).
8 Contrary to the myopia of some policymakers, fiscal space and fiscal limits are in fact only relevant in the long run; see von Hagen (2013).
Table 2. Transactions and Institutions as a Source of Specific Fiscal Risk

<table>
<thead>
<tr>
<th></th>
<th>All economies</th>
<th>Advanced economies</th>
<th>Emerging economies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>By transaction</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Budgeted taxes and spending</td>
<td>60</td>
<td>63</td>
<td>56</td>
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<tr>
<td>Unfunded government pensions</td>
<td>27</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Extrabudgetary spending</td>
<td>52</td>
<td>38</td>
<td>50</td>
</tr>
<tr>
<td>Quasi-fiscal activities</td>
<td>54</td>
<td>38</td>
<td>63</td>
</tr>
<tr>
<td>Social policy obligations</td>
<td>44</td>
<td>63</td>
<td>56</td>
</tr>
<tr>
<td>Commodity prices</td>
<td>46</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Financial transactions</td>
<td>27</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Government guarantees</td>
<td>46</td>
<td>38</td>
<td>50</td>
</tr>
<tr>
<td>Public private partnerships</td>
<td>15</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>21</td>
<td>25</td>
<td>13</td>
</tr>
<tr>
<td><strong>By institution</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central government</td>
<td>62</td>
<td>63</td>
<td>63</td>
</tr>
<tr>
<td>Extrabudgetary funds</td>
<td>27</td>
<td>13</td>
<td>31</td>
</tr>
<tr>
<td>Social security</td>
<td>38</td>
<td>75</td>
<td>44</td>
</tr>
<tr>
<td>Subnational governments</td>
<td>31</td>
<td>38</td>
<td>31</td>
</tr>
<tr>
<td>Nonfinancial state-owned enterprises</td>
<td>60</td>
<td>50</td>
<td>56</td>
</tr>
<tr>
<td>Financial sector</td>
<td>37</td>
<td>38</td>
<td>44</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td><strong>Number of countries</strong></td>
<td>48</td>
<td>9</td>
<td>15</td>
</tr>
</tbody>
</table>

General risks cover risks that arise from estimates or projections of macroeconomic variables (GDP, interest rates, exchange rate, terms of trade, etc.) and demographic variables (old-age and youth dependency ratios) that provide the basis for government expenditure and revenue forecasts. Such risks can be traced as well to technical and behavioural linkages between fiscal and macroeconomic variables. Table 3 indicates that more than half of OECD governments report that economic forecast errors underlying budget forecast, procyclical fiscal stance, financial asset bubbles, and demographic pressures are the most relevant general risks. Of lesser relevance is the vulnerability to outside shocks and to various external or internal imbalances. Opaque public accounting practices are regarded by governments as least relevant.9

<table>
<thead>
<tr>
<th>Relevance</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiscal forecast errors</td>
<td>16</td>
<td>38</td>
<td>41</td>
<td>6</td>
</tr>
<tr>
<td>Economic forecast errors</td>
<td>13</td>
<td>50</td>
<td>31</td>
<td>6</td>
</tr>
<tr>
<td>Vulnerability to shocks</td>
<td>19</td>
<td>28</td>
<td>41</td>
<td>12</td>
</tr>
<tr>
<td>Opaque accounting practices</td>
<td>3</td>
<td>16</td>
<td>16</td>
<td>66</td>
</tr>
<tr>
<td>Procyclical fiscal policy stance</td>
<td>9</td>
<td>50</td>
<td>28</td>
<td>12</td>
</tr>
<tr>
<td>Financial asset bubbles</td>
<td>13</td>
<td>38</td>
<td>31</td>
<td>19</td>
</tr>
<tr>
<td>Other internal / external imbalances</td>
<td>13</td>
<td>19</td>
<td>50</td>
<td>19</td>
</tr>
<tr>
<td>Demographic pressures</td>
<td>22</td>
<td>31</td>
<td>47</td>
<td>0</td>
</tr>
</tbody>
</table>


General risks are endogenous in the case of a sustained optimistic bias in macro-fiscal forecasts. Similarly, a procyclical expansionary fiscal stance, possibly hidden behind a miscalculated structural budget balance, usually has risky consequences.10 Over time, a prolonged procyclical fiscal expansion that leads to an unchecked accumulation of government liabilities can contribute to an eventual debt crisis.11 In some countries, endogenous general risks (much like some specific risks) are attributable to an attempt to

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9 This may reflect the reluctance of some governments to admit publicly in the survey the prevalence of such practices in their countries.

10 The unsuccessful experience with the Netherlands’ structural balance rule, the first of its kind, calculated with an increasingly overstated measure of potential output in the early 1970s, is documented in Wellink (1996).

11 The Irish fiscal crisis was preceded by an expansionary stance on top of the financial asset boom; see Kopits (2014).
comply with fiscal rules or with an officially declared a fiscal target—an illustration of the well-known Goodhart’s law.12

Systemic risk refers to the probability that the state is both insolvent and illiquid, that is, unable to meet its obligations toward bondholders and creditors. In a broader sense, it is the joint risk of unanticipated bankruptcy facing jointly the public and financial sectors—also known by the journalistic term of a Black Swan event. The likelihood of a financial crisis, such as the ones experienced recent years in Iceland, Ireland, Greece and Cyprus, or the earlier Argentine crisis, can be viewed as manifestation of systemic risk. This type of risk has been the least recognized and anticipated by governments prior to each crisis, including the most recent one. For the most part, fiscal and monetary authorities have only recently begun to identify such risk and to consider building institutions and mechanisms to prevent its occurrence.

II. Measurement

Three different approaches to measuring fiscal risk are examined: direct estimation, sensitivity analysis, and stochastic estimation. This review covers a range of methods, some of which are applied routinely by governments, while others have not advanced beyond an experimental stage.

1. Direct estimation

The best known way of assessing fiscal risk involves the identification and direct quantitative estimation of the potential budgetary cost of specific risks, including those related to contingent liabilities. Estimates can be extended to likely collateral effects on the economy (such as growth, or employment) of the policy measure under scrutiny. Direct estimation has become the most popular approach adopted by governments that follow good practices in transparency standards—especially in the wake of the financial crisis. The trend is reflected in the latest revision of the IMF Code of Fiscal Transparency, which calls for estimates of specific fiscal risks.13

Nevertheless, measurement of specific risks is less than straightforward. In particular, the stock of contingent liabilities (whether in nominal amounts or as a percent of GDP) cannot be simply added to the stock of liabilities in the government’s accounting balance sheet—except shown in the form of a memorandum item. Instead, an estimate of the present value of contingent liabilities, qualified by the probability of realization of the contingency, which cannot be observed, may be incorporated in a comprehensive intertemporal balance sheet of the public sector. Furthermore, such estimates must be presented net of reserves set aside to cover the contingencies.

2. Sensitivity analysis

General risks that stem from macroeconomic developments are not amenable to direct estimation. However, they can be assessed by quantifying the sensitivity of a baseline projection of the budget deficit or public sector debt with respect to variations in the growth rate, financial asset bubbles, interest rate fluctuations, exchange rate volatility, terms of trade shocks, demographic pressures, or changes in other domestic or external macroeconomic variables—usually under the restrictive assumption that these

12 Frankel (2011) and Frankel and Schreger (2013) find a marked optimistic bias in official macro-fiscal projections (increasing from one-year ahead to three-year ahead projections) in more than a dozen EU member countries, presumably owing to the incentive to gaming the EU fiscal rules. However, to the extent these projections extend into the period through 2011, they may also reflect the effect of the sharp unanticipated decline in economic activity experienced during the Great Recession.

13 See IMF (2012) on the Code of Transparency, initially based on the report by Kopits and Craig (1998) that was discussed and endorsed by the IMF Executive Board.
changes are exogenous and separable. The resulting deviation from the baseline can be expressed in percentage or nominal terms, given a set percentage change in the selected macroeconomic variable.

A conventional manner of presenting a sensitivity analysis is by illustrating various outcomes with a fan chart—inspired by the fan chart for inflation forecasts published regularly by central banks. Such a technique is used as well to present the results of a stress test in which deviations from a baseline projection is shown in response to a macroeconomic shock of a given magnitude.

Initially, the IMF (2002) designed a sensitivity analysis or stress test as part of an exercise to assess public debt sustainability in member countries. The analysis simulates the impact of selected macroeconomic shocks (through GDP, GDP deflator, primary balance, external financial flow) on the projected path of the debt to GDP ratio over a five-year period. The shocks are set in terms of: historical average of the macroeconomic variables; one and two standard deviations of the variables; 30 percent exchange rate devaluation; and realization of (undefined) contingent liabilities totalling 10 percent of GDP.

In an attempt to improve on the mechanistic nature of the analysis, the IMF (2003) explored various options to estimate the general risks faced by governments. But, cognizant of the difficulty of improving the stress tests for uniform application across countries, it decided to supplement the previous approach with alternative policy scenarios and qualitative assessments specific to each country.

The attractiveness of sensitivity analysis as a gauge of fiscal risk lies in methodological simplicity, minimal data requirements, and ease of communicating the results with the support of illustrative fan charts. On the other hand, the analysis is subject to a number of potentially serious shortcomings: arbitrariness, and exogeneity of the simulated shocks; absence of the probability estimates of their occurrence; lack of impact on contingent liabilities; lack of correlation among shocks; and no policy reaction to compensate the effect of the shocks. To a large extent, these shortcomings paved the way for the stochastic approach.

3. Stochastic approach

During the past decade there have been a number of experiments to identify and estimate fiscal risks to surpass sensitivity analysis. A common thread in these experiments is to compute probability distributions of the impact of well-specified shocks on the fiscal balance and its components, and ultimately, on the public sector balance sheet. In several cases, the overriding objective was to assess public debt sustainability under uncertainty. The stochastic approach recognizes and treats explicitly fiscal risks, incorporates them into a comprehensive indicator of risk, or alternatively, allows calculating the probability of sovereign default.

Stochastic methods correct most limitations inherent in direct estimates and sensitivity analyses. Yet their results are more difficult to communicate and the underlying calculations are more costly in terms of analytical complexity and data requirements. The characteristics and country applications of five basic methods (and variants thereof) are summarized in Table 4 in broad chronological order. The first two sets of methods borrow techniques from financial analysis to the public sector. The third includes structural and dynamic stochastic general equilibrium (DSGE) macroeconomic models, enhanced with a fiscal block. The

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14 The term exogenous or endogenous in measurement refers to the assumed nature of the effect of a simulated change shock in a given variable, as being independent or dependent from other variables. This is to be differentiated from the term as used in the preceding section where it refers to the source of risk, that is, whether it is generated by the government or it stems from outside sources.

15 These costs explain in part the reason why each method has been developed and applied by more than a single author.
Table 4. Summary of Stochastic Methods of Fiscal Risk Analysis

<table>
<thead>
<tr>
<th>Method, authors</th>
<th>Risk indicator</th>
<th>Source of risk</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Net worth</td>
<td>GDP</td>
<td>Brazil, Colombia, Peru, Russia, Turkey, Venezuela</td>
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<td></td>
<td>Contingent assets and liabilities</td>
<td>Contingent assets and liabilities</td>
<td>Brazil</td>
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<td></td>
<td>Gross public debt</td>
<td>Interest rate, foreign exchange rates</td>
<td>Indonesia, 15 EU countries, United States</td>
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<td></td>
<td>Primary balance</td>
<td>Oil price</td>
<td>Turkey</td>
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<td>Interest yield, risk premium</td>
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<td>Synthetic risk indicator</td>
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<td>GDP</td>
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<td>Domestic prices, external prices</td>
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<td>Foreign exchange reserves</td>
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<td>Assets, liabilities</td>
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<td>Contingent assets, liabilities</td>
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<td>Tax revenue</td>
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<td>Selected fiscal variables</td>
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<td>Turkey</td>
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*Last two methods consist of simple ad hoc reduced-form specifications to compute indicators of risk-adjusted debt sustainability and of fiscal stress.*
The first method represents an attempt at estimating the “fair spread” on government bonds, that is, the sovereign risk premium, on the basis of macroeconomic fundamentals and the government’s balance sheet, as compared to the spread observed in financial markets shown in Figures 1 and 2. The fair spread model is focused on calculating sovereign default probabilities which, through the term structure, are used to estimate a given country’s fair spread. In the method, as initially developed by Xu and Ghezzi (2003), default probabilities are driven primarily by the level of treasury foreign exchange reserves, whereby default is approached, rather mechanically, upon exhaustion of the reserves. It was first applied to a handful of emerging-market economies, and then replicated rather successfully for Brazil by de Costa and others (2004). The model has been further extended by Gray and others (2006, 2008, 2012, 2013) and Keller and others (2007) along the lines of a contingent claims analysis (CCA) from the financial analysis of credit risk. A major advantage of the method is that it can be used to simulate systemic shocks across the sovereign, banking and real sectors, drawing on a fuller set of balanced-sheet and macroeconomic variables. But a drawback is that balance-sheet aggregates for the public sector neglect the role of contingent liabilities. Various versions of the CCA approach were applied not only to emerging-market economies, but also to EU member countries and the United States.

Barnhill and Kopits (2004) adapted to the public sector the Value-at-Risk (VaR) method, well known in the private financial sector for assessing the potential losses from an investment portfolio. The method is used to calculate the effect of macroeconomic volatility, within a comprehensive intertemporal balance sheet of the public sector—with all assets and liabilities, including the probability of realization of explicit and implicit contingent liabilities, expressed in present value terms. The worse potential outcome of stochastic shocks on fiscal sustainability is estimated at a given confidence level. Specifically, the shocks are subject to a very large number of Monte Carlo simulations by modelling the variance and covariance of the various sources of risk (output, price level, exchange rate, interest rates, risk premium, and oil price, among others). In the empirical part, the VaR was tested for Ecuador in the year 2000 when the country was hit by fiscal, banking, currency and climatic crises. The baseline simulation of the effect of all shocks is shown in Figure 3 with a probability density function for the net worth of the public sector, exhibiting a fat tail risk at a 5 percent probability. Upon removing sequentially each source of risk, the distribution of outcomes becomes tighter around the mean and the tails become less prominent, as shown in Figure 4. Following the same approach, de Costa and others (2004) conducted VaR simulations in Brazil for 2001, 2002 and 2003, allowing yearly comparisons of risk-adjusted public debt ratios, but without explicitly accounting for contingent liabilities. Budina and van Wijnbergen (2009) specified a highly stylized version of VaR analysis to the public sector in Turkey and calculated the fiscal adjustment required to stabilize the debt ratio following the 2001 crisis.

Mendoza and Oviedo (2004, 2006) constructed structural and general equilibrium models, allowing stochastic features, to explain the ability of governments in emerging-market economies to borrow in international financial markets. The capacity to borrow is primarily determined by the high volatility of tax revenue—while implicitly excluding other sources of volatility—when compared to the case of advanced economies. This rather restrictive specification serves to set the natural limit to indebtedness, a constraint that the government is willing to meet with an adjustment in expenditures alone, subject to the political tolerance of the private sector. On the empirics, the cases of Brazil, Colombia, Costa Rica and Mexico provide sufficient diversity as regards revenue volatility, vulnerability to debt crises, and propensity to adopt a fiscal stance to remedy the crisis.

16 Adaptation of VaR to the public sector was originally suggested by Dornbusch (1998) in the context of the Asian financial crisis.
The macroeconomic model developed by Kamenik and others (2013) is the most recent stochastic approach at measuring fiscal risk, focused exclusively on three advanced economies (Austria, Czech Republic and Germany). It essentially consists of a simple and flexible semi-structural model modified with DSGE features, applied to historical data for each economy. The authors compare the actual public debt ratio with the target debt ratio implicit in the fiscal policy derived from the model over a decade, to assess the fiscal outlook facing each economy. In addition, a forward-looking fiscal stress test is conducted.
with projected probability distributions based on the model over two decades, incorporating fiscal reaction functions, to assess the risk of failure to comply with the debt rule. The results of the test are presented in fan charts showing uncertainty bands around baseline projections of key performance variables: government debt, overall budget balance, primary balance, and interest cost, all stated as proportion of GDP.

With the objective of remediying the limitations of the IMF sensitivity analysis for debt sustainability, Celasun, Debrun and Ostry (2006) formulated an algorithm consisting of three blocks. The first, the basis of stochastic simulations, calibrates a joint probability distribution of shocks to historical data for each of five selected countries (Argentina, Brazil, Mexico, South Africa, Turkey) with a vector autoregressive model. This provides the basis for estimates of the effects of the variance and covariance of growth, interest and exchange rates, on public debt. In the second, a fiscal policy reaction function (expressed by the primary balance) is estimated on a cross-country sample—of questionable relevance to the five selected economies. The third block combines the estimates from the other two blocks to generate stochastic simulations around a medium-term baseline projection of the public debt-to-GDP ratio. The results of a simulation exercise of this kind can be illustrated by a three-dimensional fan chart, as shown in Figure 5, indicating that as the time horizon of the projection lengthens, uncertainty increases and the probability density function becomes flatter, with larger fat tails.

Figure 5. Stochastic Approach: Fan Chart Simulations

Borrowing from the methodology of early warning systems (EWS) for currency, banking, and debt crises, Baldacci and others (2011) developed a fiscal stress index. The index rests on threshold values that signal vulnerability to a fiscal crisis, on the basis of a composite of 12 fiscal variables classified into three clusters (basic fiscal variables, long-term fiscal trends, and asset and liability management). The variables are


18 The clusters are drawn partly from a rather rudimentary and arbitrary “risk octagon” chart in Cottarelli (2011).
selected depending of their past contribution to fiscal distress episodes for some 80 countries, estimated with logit regressions over the period 1995-2010. The index proves to be a useful device for discriminating among the selected variables in signalling fiscal stress in advanced economies as compared to emerging-market economies, including during the recent financial crisis. However, as in the case of other EWS techniques, the ultimate test of operational usefulness lies in correctly signalling country-specific fiscal vulnerability beyond the estimation period.

Although admittedly to be regarded as experimental at this stage, the five stochastic methods outlined above offer insights and potentially useful toolkits for an increasingly thorough and realistic evaluation of fiscal risks in their different dimensions. They all face a major challenge in communicating the methodology and the results in clear and nontechnical terms to policymakers, legislators, the general public, and in some cases, even to financial markets. Failure to address this challenge may render any practical application a black box, only accessible to experts.

Nevertheless, each approach has some advantages vis-à-vis the others. Among them, the CCA, VaR, fiscal stress index, and VAR analysis seem to be most amenable to operational application if tailored to the environment of a given country. In this regard, the usefulness of the fiscal stress index and the VAR for actual policy formulation could be enhanced by shifting reliance from cross-country parameter estimates onto country-specific estimation and simulations. Further refinement of the stress index in this direction might improve its reliability as a leading indicator of vulnerability to a sovereign crisis.

By contrast, the macroeconomic models are set in the context of full-fledged theoretical framework, at the cost of being too specialized, restrictive, and least communicable. Yet a distinct advantage of these models is that, by their very nature, they allow for the endogeneity of shocks by tracing the linkages between key macroeconomic variables. Therefore, they can be used to perform more realistic sensitivity analysis than ordinarily done by treating simulated shocks as exogenous. Moreover, DSGE models capture explicitly stochastic behavioural relationships throughout the economy.

As an exception among the methods reviewed, recent extensions of the CCA can capture economy-wide systemic risk through intersectoral linkages in determining sovereign default risk. However, potentially, the VaR method seems the most versatile in its coverage of fiscal risks; within a consistent analytical framework, it can incorporate model-based stochastic simulations of major macroeconomic shocks. Beyond its usefulness in assessing general risks (including those associated with natural disasters, such as El Nino), it can also be employed to estimate the effect of specific risks associated with contingent liabilities, and to help assess systemic risks stemming from the financial sector. Thus the VaR approach, like recent extensions of the CCA, could trace negative feedback loops between the financial and the public sectors—of concern for policymakers, for example, within the euro area.

Inevitably, to a greater or lesser extent, all methods are vulnerable to the Lucas critique. In particular, the normative reaction functions specified in the structural models and the VAR model, relying on historical policy adjustments undertaken to correct past fiscal imbalances, at most have very limited relevance for coping with a future crisis episode in a given country. Any pre-crisis estimates underlying the posited adjustment are likely to be invalidated by a regime shift in the wake of the recent crisis.

**IV. Management**

The most important aspects of managing fiscal risks are analysis, disclosure, and external oversight. Successful tackling of these tasks requires, of course, political will based on a wide consensus which shapes standards of good governance, on the one hand, and a set of technical skills, on the other. These, in turn, eventually become an integral part of political and financial culture of a nation—as evidenced in a
handful of advanced economies. A summary of the use and effectiveness of risk management practices in OECD member countries can be gleaned from the results of the recent survey, summarized in Table 5.

Table 5. OECD Countries: Use and Effectiveness of Fiscal Risk Management and Mitigation Practices

<table>
<thead>
<tr>
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<th>Effectiveness</th>
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<th>Not adopted</th>
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<tr>
<td></td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
<td>None</td>
</tr>
<tr>
<td>Statement of risks</td>
<td>9</td>
<td>19</td>
<td>31</td>
<td>0</td>
</tr>
<tr>
<td>Long-term sustainability report</td>
<td>6</td>
<td>47</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Parliamentary approval of risks</td>
<td>3</td>
<td>16</td>
<td>6</td>
<td>3</td>
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<tr>
<td>Assessment by independent institution</td>
<td>6</td>
<td>31</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td>Countercyclical fiscal stance</td>
<td>16</td>
<td>28</td>
<td>31</td>
<td>12</td>
</tr>
<tr>
<td>Targeting prudent debt level</td>
<td>16</td>
<td>25</td>
<td>19</td>
<td>9</td>
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<tr>
<td>Fiscal rules</td>
<td>25</td>
<td>22</td>
<td>28</td>
<td>13</td>
</tr>
<tr>
<td>Structural reforms</td>
<td>19</td>
<td>41</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Pricing guarantees, mandatory insurance</td>
<td>3</td>
<td>25</td>
<td>34</td>
<td>12</td>
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<tr>
<td>Risk sharing</td>
<td>3</td>
<td>9</td>
<td>44</td>
<td>6</td>
</tr>
<tr>
<td>Credible no-bailout provision</td>
<td>3</td>
<td>0</td>
<td>9</td>
<td>6</td>
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<tr>
<td>Pension or demographic reserve fund</td>
<td>22</td>
<td>12</td>
<td>25</td>
<td>13</td>
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<tr>
<td>Stabilization reserve fund</td>
<td>9</td>
<td>6</td>
<td>19</td>
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1. **Scope for managing fiscal risks**

As a basic step in managing fiscal risks, it is necessary to engage in a minimal level of analysis and estimation of recurrent specific risks of a significant magnitude. In this regard, statements of risks, pioneered in New Zealand (Box 1), are viewed as an elementary standard of good practice in many countries where the government is under a legal obligation to present an annual listing of specific risks and a description within each risk category.\(^{19}\) The practice has spread throughout much of the OECD membership, motivated above all by progress toward increased fiscal transparency. More than one half of the member countries surveyed prescribe a statement of risks, though only in one tenth of the countries is the practice seen as highly effective. Drawing on a more heterogeneous sample, the IMF (2012) confirmed that almost one fourth of governments (50 percent of advanced, 30 percent of emerging-market economies) are required to publish a qualitative statement of fiscal risks, but only one tenth of governments (25 percent of advanced, 13 percent of emerging-market economies) are required to report quantitative estimates of their budgetary cost. As an exception, some governments (Chile and Sweden) apply sophisticated techniques, such as stochastic simulation or option pricing models, to calculate the probability that certain contingent liabilities will be called.

\(^{19}\) For a description of statements of risks in selected countries, as well as a proposed structure, see IMF (2008).
Relatively few governments or independent fiscal institutions attempt an in-depth assessment of general risks. However, according to the 2012 OECD Budgetary Practices and Procedures Survey, fiscal sensitivity analysis is now published in two thirds of member countries as part of the budget documentation.\textsuperscript{20} In a number of countries, the analysis is illustrated with fan charts and is extended to medium- or long-term macro-fiscal projections assuming a marginal change in key macroeconomic variables. Also, such tests are often conducted as part of periodic long-term public debt sustainability reports.

\textsuperscript{20} See OECD (2014).
A large majority of OECD member countries prepare debt sustainability reports, but with low to medium effectiveness (Table 5). In addition to marginal sensitivity tests on baseline long-term scenarios, a few governments run sensitivity analysis on alternative macroeconomic scenarios or well-specified fiscal policy scenarios. Thus far no government is known to have applied a stochastic approach to assess general or systemic fiscal risks.

Beyond disclosure and analysis, managing fiscal risks merits as much attention as managing public debt. This entails a formal framework for monitoring and regulating the terms of public sector liabilities, and ultimately setting limits to exposure to fiscal risk within a strategic context. To this end, it is necessary to clearly allocate responsibilities among various public sector entities.

2. **Role of the government and the legislature**

The primary responsibility for identifying and estimating fiscal risks rests (and should rest) with the government, that is, the finance ministry. Overall coordination in all its technical aspects of risk management can be entrusted to a specialized office, directly under the authority of the ministry of finance. As an alternative, this can be accomplished by assigning this responsibility for managing the issuance and monitoring of contingent liabilities to the debt management office. 21

Each line ministry or department should estimate and monitor the potential budgetary costs for specific risks relating to the category of expenditures corresponding to that ministry, under coordination by the finance ministry (Box 1). Equally, subnational governments and state-owned enterprises should conduct risk assessments regarding their own operations. The reason for this is the presumption that the government and its decentralized agencies are in the best position to manage risk. In any case, accountability by each public sector entity, under the oversight of the finance ministry, should help reduce a possible common-pool problem and the attendant deficit bias.

However, assessment of specific risks associated with contingent liabilities by the finance ministry should not extend beyond explicit contingent liabilities. Recognition of implicit liabilities could lead to moral hazard. In the event, for example, holders of bank deposits or homeowners would expect to be bailed out beyond the limits of their insurance policies. Similarly, facing default or bankruptcy, subnational governments or state-owned enterprises may expect bailouts from the national government notwithstanding a formal no-bailout provision.

The finance ministry should be well equipped to carry out sensitivity analyses or stress tests to assess general risks at the time of preparing the draft budget. General risk estimates and stress tests are a critical input in sound budgetary decisions. An important implication of general risk assessments is that they induce the government to avoid an optimistic bias in formulating macro-fiscal projections.

Apart from the executive branch of the government, the legislature should have an important role in debating and overseeing the budget bill, with unrestricted and timely access to information about the risks underlying legislative proposals. The legislature should be able to benefit from the assistance provided by nonpartisan analysis of fiscal risks by an independent fiscal institution, as outlined in the next subsection. Within the legislative body, the budget or finance committee has a pivotal task of steering the flow of (preferable nonpartisan) analytical material to legislators, to ensure and open and informed debate among them. 22 Legislative approval of the budget bill and of a medium-term budgetary program can be meaningful only if it is exercised upon appropriate consideration of explicit fiscal risks. Yet legislative

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21 For a well-functioning case, see the Swedish experience in Hörngen (2003).

22 From this perspective, the usefulness of the German practice of holding closed hearings for government officials on the assessment of fiscal risks is highly questionable.
approval of explicit fiscal risks is exercised only in one fourth of OECD member countries surveyed, with some effectiveness (Table 5).

3. **Role of the independent fiscal institution**

An independent fiscal institution (IFI), through its surveillance function, shares the responsibility for assessing fiscal risk with the government. In this role, the IFI verifies the estimates of specific risks prepared by the government. Lacking government estimates, with sufficient staff resources, the institution should be authorized to prepare and divulge its own estimates as part of the impact analysis of selected measures contained in the budget bill or other fiscal proposals. In the assessment of risks from contingent liabilities, the IFI can play an important complementary role in identifying and disclosing the estimated cost of implicit contingent liabilities—to the extent there is material probability that they may be called—which the government cannot, or refuses to, acknowledge.

The majority of IFIs—especially in the European Union—have been established only in recent years, in the aftermath of the financial crisis. In nearly two thirds of OECD member countries surveyed, IFIs make assessments of fiscal risks, which are deemed quite effective. Whereas only a handful of IFIs have an explicit responsibility to evaluate fiscal risks, this task has been assumed by most IFIs even without a statutory mandate. Indeed, IFIs attempt to at least identify or express a view on specific risks in qualitative terms. As a further step, in a number of countries (for example, Canada, Korea, Netherlands, and the United States) IFIs prepare quantitative estimates of risks associated with specific legislative proposals, as part of their remit to make budgetary and economic impact assessment of each proposed tax or spending measure. In very few countries (Australia and the Netherlands), the IFI prepares a quantitative assessment of the party’s policy proposals during electoral campaigns.

In addition, most IFIs also monitor the government’s aggregate medium-term macro-fiscal projections, or long-term scenario calculations, including sensitivity analyses, for two reasons. One reason is to anticipate the government’s ability to comply with fiscal rules in the future and the other is to determine public debt sustainability. However, in a few cases (Belgium, Canada, Ireland, Slovakia, the United Kingdom, and the United States), IFIs prepare their own macro-fiscal projections and sensitivity analyses or stress tests, for assessing general risks. Presumably to gain credibility, even absent an IFI, governments outsource the preparation of macro-fiscal projections, coupled with sensitivity analysis (Germany), or solicit an outside opinion of an independent panel of experts (New Zealand).

Over time, there is scope for IFIs to develop the capacity to engage in stochastic analysis not only of specific and general risks, but also of systemic risks. For general risks, it can choose among the various methods discussed above, for application to the country’s public finances, within the given institutional.

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23 In the United Kingdom, for example, the Office for Budget Responsibility, as part of its remit in preparing official macro-fiscal projections, conducts sensitivity analysis for general risks from the historical dispersion of key macroeconomic variables around the baseline projections. On this basis, it declares the probability of deviations from forecasts. In addition, the Office estimates deviations of alternative scenarios and events from the central no-policy baseline scenario over the medium to long term. As a separate exercise, it focuses on major quantifiable contingent liabilities. These features are summarized in Chote (2014).

24 See the wide variety of country practices in Kopits (2013).

25 Every four years, an academic institution is under contract with the Federal Ministry of Finance to prepare a baseline long-term macro-fiscal scenario and alternative policy scenarios, published by the Ministry. For the latest English-language version, see Germany (2011).

26 Thus far, Slovakia’s Council for Fiscal Responsibility is the only IFI known to be developing a stochastic approach grounded on an intertemporal public sector balance sheet to assess specific and general fiscal risks; see Odor (2014).
setting and economic conditions. For starters, consideration should be given to methods that are amenable to country-specific practical adaptation. The candidates that may be worth considering from an operational perspective are the vector autoregressive model and the fiscal stress index, to be applied to the public sector as whole, including subnational governments and state-owned enterprises.

Although IFIs are not prevented from conducting an analysis of systemic fiscal risks, at present none of them is known to do so. Management of systemic risks with a broad coverage, possibly including the financial sector is, of course, a very ambitious task. Such a task inevitably must entail close coordination with the central bank or any other authority in charge of macroprudential supervision. The Value-at-Risk approach and the contingent claims analysis, adapted with country-specific features, seem to be most amenable for this task. The scope of the analysis may have to be limited to a realistic context, excluding systemic risks that are entirely exogenous to the country in question, such as the global or regional calamity of a climatic, political or financial character.27

V. Mitigation

In general, fiscal risks are contained through prevention and correction. Prevention calls for high transparency standards, appropriate policy stance, fiscal rules, hedging schemes (pricing, insurance), and effective no-bailout provisions. Corrective approaches include recourse to various types of reserve funds to cushion the adverse impact of shocks and contingencies. The suitability and effectiveness of these approaches depends to a considerable extent on whether the risks are endogenous or exogenous.

Exogenous risks stemming from an adverse shift in the terms of trade or from a sudden stop in financial inflows can be mitigated with a combination of a countercyclical fiscal and monetary expansion, as permitted by the availability of sufficient fiscal space and of an adequate stock of foreign exchange reserves that can be drawn upon rapidly to contain the effects of the shock. For a small open economy that exhibits vulnerability to such shocks, it is particularly important to undertake preventive steps in the form of a build-up of reserves and of a concerted effort at reducing public debt to a prudent level relative to GDP. Demographic pressures stemming from an unanticipated acceleration in aging over time can be mitigated by tapping into accumulated pension reserves.

In principle, endogenous risks are somewhat easier to cope with since they are generated internally by the government—or with the explicit or tacit approval by the government—often with acquiescence from the legislature. Above all, the authorities should follow internationally accepted standards of transparency. This implies avoiding recourse to off-budget operations and public-private partnership infrastructure projects (PPPs) with the sole objective of helping to narrow the headline budget deficit and comply with some fiscal rules in the near term. Instead, PPPs and other government guarantees should be accompanied by clear risk-sharing arrangements.

To contain the proliferation of specific risks, the authorities should require: mandatory insurance especially in areas (such as health-care benefits) where moral hazard might be endemic, as well as pricing of, or limits on, various government guarantees (such as bank deposits). In the same vein, there should be a clear understanding about the enforcement of no-bailout clauses regarding subnational governments, state-owned enterprises, and the financial sector, and unambiguous rejection of implicit contingent liabilities.

A well-designed rules-based fiscal framework is potentially a very useful tool to stave off endogenous risks for it helps create long-run fiscal space, maintain (or restore) policy credibility, and anchor fiscal

27 For instance, the criticism leveled by Cuthbert (2013) at OBR for not assessing, either quantitatively or qualitatively, the repercussions of the hypothetical collapse of the euro area, is entirely unreasonable.
expectations of economic agents and financial markets. For a fiscal rule to be an effective deterrent to fiscal risks, it must be transparent, enforceable, efficient, and technically sound.

This, however, can only be accomplished if, wherever necessary, compliance is underpinned by structural reforms in key areas such as taxation, social entitlement programs, and subnational government finances. By contrast—as evidenced in a number of EU member economies in recent years—if a government attempts to meet fiscal targets with improvised policy measures, opaque public accounts, accumulation of contingent liabilities and other short-run schemes, fiscal rules will exacerbate, instead of alleviating, fiscal risk.

Finally—learning the main lessons from the financial crisis—systemic risks must be identified and monitored early on, as financial asset bubbles emerge, requiring joint oversight by an independent fiscal institution and the central bank (or a dedicated financial supervisory agency). While the latter is responsible for macroprudential regulation and supervision of the financial sector, the former is in charge of monitoring the conduct of fiscal policy, with the twin goals of maintaining financial stability and fiscal sustainability, respectively. The need for effective coordination between these institutions is underscored by the recent experience of several European countries where illiquid (in some cases insolvent as well) financial entities and highly indebted governments have been operating in a mutually dependent lethal embrace. In all, only a few countries have undertaken initial steps toward establishing a suitable mechanism to prevent systemic risks in the future.

Table 5 lists actual practices in OECD member countries to mitigate fiscal risks. Between 40 and 60 per cent of governments claim to apply with medium to high degree of effectiveness countercyclical fiscal policies, target prudent levels of public debt, fiscal rules to contain expansionary policies, and structural reforms. The overwhelming majority of governments report the lack, or low effectiveness or ineffectiveness, of pricing of government guarantees and mandatory insurance and of sound risk-sharing arrangements with the private sector. Of even greater concern is that only one fifth of the respondent governments have credible repudiation, that is, a credible no-bailout provision, as regards perceived or implicit liabilities. Nevertheless, more than one half of member governments have accumulated more or less effective pension reserve funds to compensate for deteriorating demographic trends. By contrast, merely only third of the countries have accumulated stabilization (“rainy day”) reserve funds, which are viewed as rather ineffective, to counteract the effects of various macroeconomic shocks, presumably under the assumption that they can be cushioned with an appropriate countercyclical fiscal stance.

**VI. Summary and implications**

As a result of the recent financial crisis, which in many countries metastasized directly or indirectly into significant fiscal stress, governments have become increasingly aware of the need to explicitly cope with uncertainty in public finances. Motivated by such developments, this paper seeks to provide an overview of new approaches—that emerged for the most part over the past decade—to coping with fiscal risk, ranging from analytical issues to institutional arrangements as well as practices in the management and alleviation of risks.

The evolution of a globalized secondary market for sovereign paper provides a high-frequency gauge of the risk premium faced by governments around the world. However, the limitations of this indicator makes

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29. This finding is broadly in line with the results on potential risks associated with entitlement spending from the 2012 OECD survey. In the latter, most governments reported that they specifically evaluate such risks, one third take risk into account in all entitlement spending, while another third consider it in some manner (through risk adjustment, budgeting margin, or simply on an ad hoc basis). See OECD (2014).
a strong case for assessing, more fundamentally, specific, general, and systemic types risk, and their underlying sources. According to the recent OECD Survey on Fiscal Risks—with responses from 32 out of 34 member countries—not surprisingly, specific risks associated with the financial sector are deemed as most relevant; in comparison, various risk-sharing arrangements and legal claims are considered as less relevant. Among general risks, economic forecast errors, procyclical fiscal stance, financial asset bubbles, and demographic pressures are viewed as very relevant, whereas fiscal gimmickry as being least relevant.

Major progress has been made toward identifying and estimating cost of specific risks—particularly those consisting of contingent liabilities, whose proliferation is attributable in part to poorly-designed fiscal rules, especially in the European Union. Also noteworthy are the sensitivity tests conducted to ascertain general risks associated with medium-term macro-fiscal forecasts, as well as long-term public debt sustainability scenarios.

Although still at an experimental stage, several stochastic methods have been developed and applied over the past decade, which provide useful insights for estimating mostly general type risks. Among these methods, the contingent claims analysis (CCA), rooted in the earlier fair spreads model, the Value-at-Risk (VaR) approach, the vector autoregressive (VAR) model, and the fiscal stress index seem to be most promising for practical application. Perhaps the most versatile, the VaR approach is capable of encompassing specific, general, and systemic risks within a consistent computational framework.

The OECD survey reveals a mix of practices and views on their effectiveness involving management and mitigation of fiscal risks. The majority of member governments prepare (or outsource) debt sustainability reports, but identify these as having medium level of effectiveness. A relatively lower though increasing number of governments are required to publish statements of risks, which are seen as relatively less effective. While independent fiscal institutions (IFIs) have acquired an increasing role in assessing fiscal risks, to over one half of the countries, parliamentary approval of explicit risks is reported for only about one fourth of the countries surveyed. In most countries, governments have adopted a prudent target for public indebtedness, a countercyclical fiscal stance, fiscal rules, and structural reforms, which are viewed as being quite effective. On the other hand, adequate pricing of government guarantees and mandatory insurance, and sound risk-sharing arrangements are less prevalent and viewed as less effective in member countries. While pension reserve funds are widespread and deemed effective, there are relatively few countries with stabilization reserve funds. The proportion of member countries without credible no-bailout provisions in member countries can be regarded with some concern, especially against the background of the recent crisis.

A number of broad lessons can be drawn for consideration from the discussion of identification and measurement of fiscal risks, and the survey of country practices. Beyond analysis and disclosure, managing fiscal risks merits as much attention as managing public debt. This entails a formal framework for monitoring and regulating the terms of public sector liabilities, and ultimately setting limits to exposure to fiscal risk within a strategic context. To this end, it is necessary to clearly allocate responsibilities among various public sector entities. In general, the central government should have primary responsibility for the management and mitigation of tasks, to be undertaken at every level of government and the rest of the public sector under the tutelage of the ministry of finance. Further, technical elaboration and coordination may be centralized in a dedicated government agency or the debt management office, also under the authority of the ministry. And ultimately, as an integral part of the budgetary process the legislature should has a key role in debating and approving specific risks, particularly those contracted by the government.

As part of their external surveillance function, IFIs should be called upon to monitor the government’s qualitative and quantitative evaluation of specific and general risks. To the extent the government does not engage in fiscal risk assessment, it behoves the IFI to perform this function by default. In any event, the IFI has a unique role in estimating the probable budgetary cost of implicit contingent liabilities, which the
government cannot be expected to estimate lest it creates moral hazard. In the future, with the support of an adequate technical staff, IFIs should be able to develop and apply stochastic methods appropriate for assessing specific, general, as well as systemic risks.

To mitigate fiscal risks, governments need to take steps to counteract exogenous risks (slowdown of real or financial activity abroad, deterioration in the terms of trade, natural disasters, etc.), by hedging through various insurance schemes, by building special-purpose reserves, and by enacting well-designed fiscal rules, along with unambiguous no-bailout provisions or limits thereon. Overall, governments learned that they must contain endogenous risks through prudent fiscal policymaking, and in particular, restrain the proliferation of explicit or implicit contingent public sector liabilities. At the policy level, this involves stepped-up compliance with well-designed fiscal rules, adoption of a countercyclical policy stance especially during economic booms, enforcement of transparent accounting and forecasting practices, and where necessary, implementation of structural reform in key areas. An additional overarching lesson from the financial crisis is the need to focus more intensely on the likelihood of systemic risk. Management of such risk requires close coordination between the IFI and the independent macroprudential supervisory authority, with the latter having primary responsibility for the prevention and mitigation of systemic risk in the financial sector.30

30 IMF (2013) provides a useful review of the key components of a macroprudential policy framework.
References


