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## **The State of Public Finances Cross-Country Fiscal Monitor: November 2009**

Prepared by the Staff of the Fiscal Affairs Department

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Authorized for distribution by Carlo Cottarelli

November 3, 2009

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## WHAT'S NEW IN THIS EDITION OF THE FISCAL MONITOR?

- ***Mixed news on the fiscal front.*** Underlying fiscal trends in advanced economies are weaker than previously projected, but lower expected costs of financial sector support in the United States mean that 2009 headline numbers are better. Among emerging markets, 2009–10 headline deficit forecasts are better than July projections. The fiscal policy stance is projected to remain supportive of economic activity in advanced countries in 2009–10, but a tightening is projected for emerging economies next year.
- ***New evidence on underlying fiscal weakening in advanced countries during the last few years.*** Many advanced economies entered the crisis with relatively weak structural fiscal positions, and these have been eroded further, not only by anticrisis measures but also by underlying spending pressures. This will raise the bar on fiscal adjustment. The outlook for emerging economies is stronger, if fiscal tightening plans materialize in 2010. But these countries remain exposed to considerable risks, which are quantified through new statistical analysis.
- ***New estimates of needed medium-term fiscal adjustment in advanced economies.*** Government debt in advanced G-20 economies is projected to reach 118 percent of GDP in 2014, even assuming some discretionary tightening next year. Getting debt below 60 percent by 2030 will require raising the average structural primary balance by 8 percentage points of GDP relative to 2010 (10½ percentage points for the headline primary balance). Action will be needed on entitlement spending, on other spending, and on revenues. Japan, the United Kingdom, Ireland and Spain are projected to require the largest fiscal adjustment. Only Denmark, Korea, Norway, Australia and Sweden among advanced economies will require little or no medium-term adjustment to keep debt stocks at safe levels.
- ***A fresh look at previous large adjustment episodes.*** Many G-20 economies have achieved big declines in debt ratios in the past. Improvements in the primary balance were at the core of these efforts. Faster growth can also help. Faster inflation is not an effective debt-reducing strategy: raising inflation to 6 percent for five years would erode less than one fourth of the projected trend increase in debt ratios.
- ***New IMF research on government debt, deficits and interest rates.*** Fiscal deficits and government debt levels both affect interest rates. Stabilizing debt at post-crisis levels would imply higher interest rates (perhaps by 2 percentage points). Moreover, there are important nonlinearities: the impact on interest rates of each additional percentage point of debt or deficit increases as the initial debt or deficit level rises, pointing to a risk that government debt could snowball without corrective action. This underscores the need for governments to announce credible exit strategies now, even if it is premature to begin exiting from fiscal support.

## THE STATE OF PUBLIC FINANCES CROSS-COUNTRY FISCAL MONITOR: NOVEMBER 2009

This edition of the *Cross-Country Fiscal Monitor* provides an update of global fiscal developments and policy strategies, based on projections from the November 2009 WEO.<sup>2</sup> These projections reflect the assessment of IMF staff of current country policies and initiatives expected during 2009–14.

### *Near-term fiscal policy*

1. **Fiscal policy will continue to provide substantial support to aggregate demand in most countries this year, but a tightening is projected to commence next year in G-20 emerging markets.** Globally, overall deficits are expected to narrow from 6.7 percent of GDP this year to 5.6 percent in 2010 (Table 1). Across the G-20, the average overall deficit is projected at 7.9 percent of GDP this year—well above its pre-crisis level—and 6.9 percent of GDP next year. Much of the projected fall in the deficit in 2010 reflects declining losses from financial sector support operations in the United States.<sup>3</sup> Net of these—which are unlikely to have a direct impact on aggregate demand—the deficit is projected to widen in advanced G-20 economies in 2010, with reduced discretionary anticrisis measures more than offset by larger automatic stabilizers as the output gap widens further and by increases in other types of spending (especially in the United States, Japan and the United Kingdom). By contrast, fiscal policy is projected to begin tightening in emerging G-20 economies next year, reflecting a combination of reduced anticrisis spending (lower by 0.6 percentage points) and expected consolidation beyond the withdrawal of crisis-related stimulus in Brazil, Mexico, and Turkey, supported by a pick-up of growth. Higher commodity prices will also contribute to lower overall deficits (Russia and Saudi Arabia).

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<sup>2</sup> See <http://www.imf.org/external/pubs/ft/weo/2009/02/index.htm>. The Monitor incorporates updated data for France and Mexico, received by the Fund staff after the October WEO publication. The Monitor complements other IMF staff analysis, including for the surveillance note for the G-20 Deputies Meeting in London and the G-20 Leaders' Summit in Pittsburgh (see <http://www.imf.org/external/np/g20/pdf/090309.pdf>). Unless otherwise indicated data are on a calendar-year basis and for the general government if available (otherwise central government); debt ratios refer to gross debt.

<sup>3</sup> Spending on financial support operations in 2009 is now forecast at 3.2 percent of GDP in 2009 (5 percent in July) and 0.6 percent of GDP in 2010 (1.2 percent in July). The reduced amounts reflect better-than-expected financial market performance. More specifically, a budgetary provision for further losses of \$125 billion in FY 2009 and 2010 was eliminated, while expected outlays for deposit insurance from the Federal Deposit Insurance Corporation and the National Credit Union Administration were reduced, along with estimated costs of the Troubled Assets Relief Program.

**Table 1. Fiscal Balances**  
(In percent of PPP-weighted GDP)

	2007	2009	2010	2014	Change from July Fiscal Monitor		
	(Pre-crisis)				2009	2010	2014
World	-0.5	-6.7	-5.6	-2.8	0.3	0.3	-0.3
Advanced economies	-1.2	-8.9	-8.1	-4.7	0.3	0.1	-0.7
Emerging economies	0.7	-4.0	-2.8	-0.7	0.3	0.6	0.2
Low-income economies	-0.2	-3.8	-2.0	-1.4	0.3	0.1	-0.3
G-20 Countries	-1.0	-7.9	-6.9	-3.7	0.1	0.0	-0.6
Advanced G-20 economies	-1.9	-9.7	-8.7	-5.3	0.4	0.0	-1.0
Emerging G-20 economies	0.3	-5.1	-4.1	-1.3	-0.3	0.1	0.0
Memorandum item: Excluding financial support							
G-20 Countries	-1.0	-7.0	-6.7	-3.7	-0.3	-0.1	-0.6
Advanced G-20 economies	-1.9	-8.2	-8.4	-5.3	-0.4	-0.3	-0.9
Emerging G-20 economies	0.3	-5.1	-4.1	-1.3	-0.3	0.1	0.0

Source: Staff estimates based on the October 2009 WEO and July 2009 WEO Update. See Annex Tables 1 and 2 for country-by-country information for the G-20.

2. **With respect to the July Monitor, projected headline fiscal balances in 2009 and 2010 are improved, but underlying trends are weaker.**<sup>4</sup> Projected headline deficits for 2009 and 2010 are better by about 0.3 percent of GDP globally. Net of financial sector support, however, the outlook for the G-20 is weaker than projected in July. This is particularly true in the United States, where the outturn in 2009 and 2010, net of financial sector support, is projected to be weaker by about 1 percentage point of GDP, due largely to lower-than-expected revenues. The outlook is also worse in Canada and several emerging economies (Argentina, Mexico, Russia, South Africa, and Turkey), reflecting lower projected growth and consequently larger contributions from automatic stabilizers. By contrast, the fiscal outlook is better in countries where growth projections have been revised upwards—China, Germany, Italy and Korea—and in Saudi Arabia. Altogether, deficits net of financial support operations are larger than estimated earlier for the overall G-20, the advanced G-20, and—in 2009—the emerging G-20 (Table 1, last three columns).

3. **Projections assume that all discretionary stimulus envisaged for 2009–10 will be implemented, although a sizable share remains in the pipeline.** A recent IMF–U.K. Treasury survey found that stimulus implementation is proceeding broadly as planned (Table 2). However, information is mostly qualitative, except for France, Korea, and the United States, which report on stimulus regularly, including through dedicated websites. Implementation rates appear to be higher for revenue measures and social transfers, and lower for infrastructure spending, the latter of which accounts for a large share of packages in Argentina, Canada, China, France, Mexico, Saudi Arabia, and South Africa (Figure 1). Country authorities reported that tracking stimulus implementation involves operational

<sup>4</sup> See <http://www.imf.org/external/pubs/ft/spn/2009/spn0921.pdf>.

challenges. However, stepped-up monitoring efforts would be desirable, including to evaluate the impact of measures taken.<sup>5</sup>

**4. Take-up under financial sector support programs is below committed amounts, and some programs have expired or will expire soon:**

- Upfront commitments for financing of pledged support operations are estimated at 5.7 percent of GDP for the advanced G-20, up from 5.5 percent of GDP in July (Table 3 and Annex Table 3). For the emerging G-20, estimates remain at 0.4 percent of GDP.
- However, actual financial sector support provided by governments remains well below announced amounts.<sup>6</sup> Outlays are less than half of pledged amounts for capital injections in financial institutions and about one-quarter of pledges for the purchase of assets and lending by treasuries (Table 4 and Annex Table 4).
- Key recent developments include, in the **United States**, updating the details of the Public-Private Investment Program (PPIP) in July—the PPIP will start with a government investment of up to \$30 billion for the purchase of toxic securities from banks—and expiry of the Guarantee Program for Money Market Funds (a maximum exposure of US\$52 billion or 0.4 percent of GDP) in September, with no losses and \$1.2 billion in participation fees received. In **Japan**, a plan to provide up to ¥50 trillion in guarantees for stock market purchases by a special corporation was withdrawn. Outside the G-20, **Spain** created a Bank Restructuring Fund (FROB) in June, with €9 billion, including direct government financing of €6.75 billion and € 2.25 billion from the deposit insurance funds. The FROB would support possible restructuring of the financial sector. The size of the fund could be increased up to €99 billion through further legislative action and debt issuance. Up to now, the amount of capital injected by Spain into its financial sector has been zero.
- Several liquidity support programs in the United States are expiring, including the Money Market Investor Funding Facility in October and the Term-Security Lending and Primary Dealer Credit Facilities in February 2010. These facilities, which could in principle provide support of up to nearly 4½ percentage points of GDP, have not been active.

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<sup>5</sup> For spending, complications arise if stimulus programs do not represent a separate item in the budget, if budgetary data fail to distinguish among stages of implementation, or if spending is at the subnational level. Monitoring tax cuts is in principle easier, although quantifying their impact is complicated by statutory lags in tax filing schedules and differences in tax bases relative to initial projections.

<sup>6</sup> The reduced amount of expected losses on financial sector support in the United States operations described in ¶1-2 is not reflected in lower commitments, nor in less actual financial support.

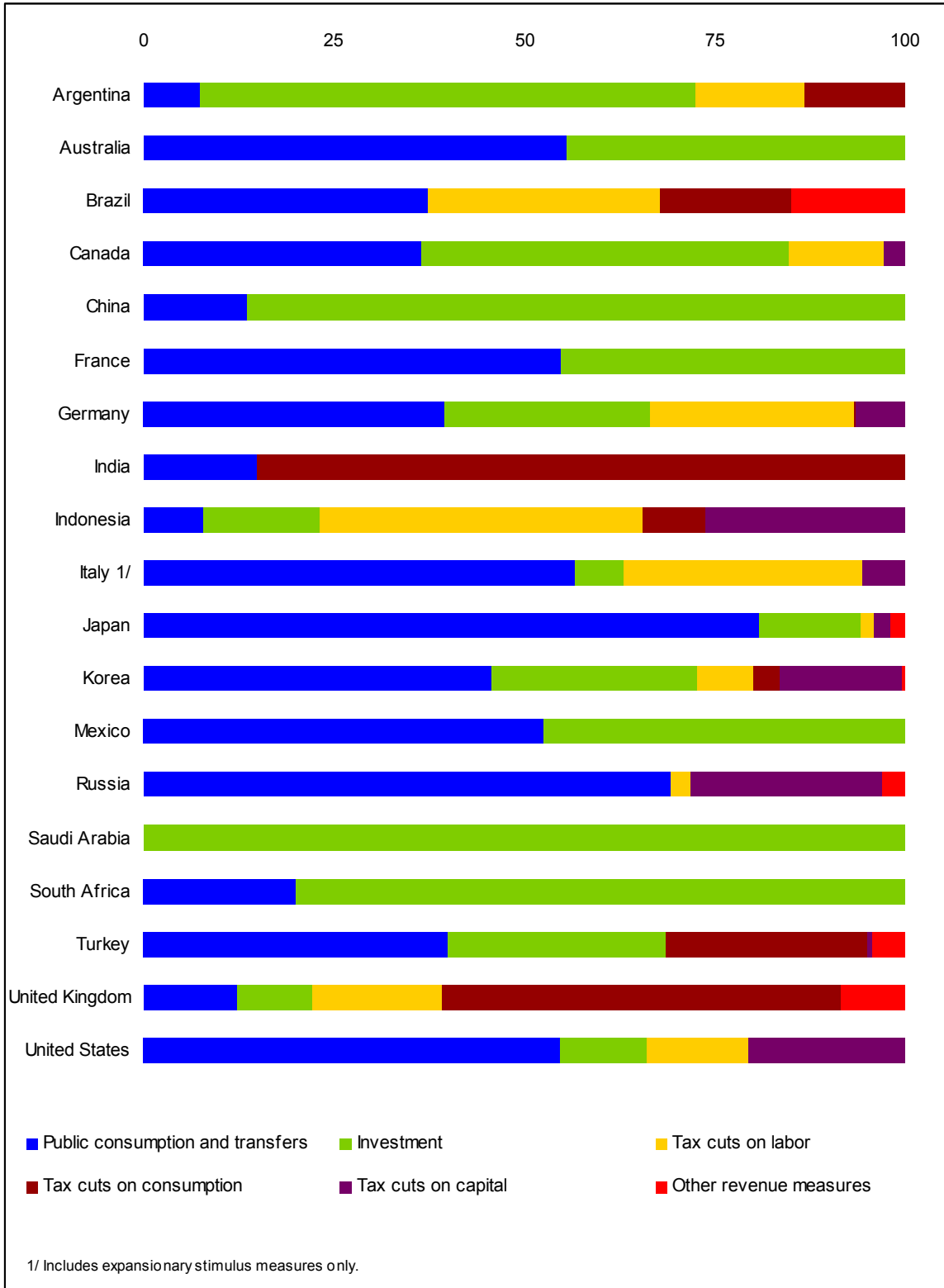


**Table 2. G-20 Countries: Implementation of Stimulus Packages**

	<b>Implementation Status</b>
Argentina	Discretionary stimulus spending is not tracked separately from already-in-force spending lines. Reporting will follow existing public financial management and accountability provisions.
Australia	Nearly all individual tax rebates (one-quarter of the total expected stimulus for 2009) had been paid by early August. Small business tax breaks will be realized with a lag, due to filing schedules. Nearly all jobs-related transfers to households under the main economic stimulus plan have been paid out (one-third of the expected stimulus for 2009). Funding has been approved for investment projects under the plan. However, monitoring is complicated by the need for more detailed information from line agencies and state and territory governments.
Brazil	IMF staff estimate that 40 percent of the planned stimulus for 2009 was likely implemented through end-June. Over 60 percent of tax relief—cuts in personal income taxes and in indirect taxes on vehicles and other goods—is estimated to have been delivered, while half of the expected cash transfers to the poor are likely to have been disbursed. No information is available on implementation of the housing support package.
Canada	Necessary steps for 90 percent of the pledged funds to be flowing by June have been taken. Tax measures are being administered on an ongoing basis, including through lower payroll tax deductions. An updated progress report on implementation was issued in September.
China	As of end-June, about 40 percent of the central government's pledged (and already allocated) stimulus spending for 2009 has been approved by the planning agency (NDRC).
France	53 percent of the approved fiscal stimulus for 2009 had been implemented through end-June. Revenue and current spending measures have been implemented faster than capital spending (61 percent of revenue measures and 55 percent of expenditure measures; among expenditure measures, safety net spending has been fastest at 73 percent versus 35 percent of capital spending).
Germany	Ex post analyses of revenue measures have not yet been undertaken due to lags in the filing of income taxes. On the expenditure side, disbursements are on schedule, although a considerable number of measures fall under the responsibility of the Länder, particularly infrastructure projects. The Länder are expected to produce quarterly updates on their projects.
India	A committee of senior officials was established to ensure that stimulus measures are carried out. The committee and a temporary secretariat have established a detailed monitoring framework that follows the status of each measure and assesses preliminary impacts. The full stimulus amount has been allocated and released to spending units. However, in India's highly federal system, it is not possible to ensure or monitor that amounts allocated have actually been spent.
Indonesia	IMF staff estimate that 36 percent of the 2009 stimulus package was implemented through end-June: 44 percent of tax measures, 35 percent of energy subsidies, and 100 percent of anti-poverty programs. Infrastructure spending, which comprises 15 percent of the package, is moving more slowly.
Italy	Implementation is considered to be in line with plans. The focus of monitoring has been on procedures to implement stimulus—most of these are completed. Information on actual implementation is limited to the provision of guarantees for private sector borrowing by a newly replenished Guarantee Fund.
Japan	It is difficult to track implementation of stimulus measures separately from regular budgets, although cash transfers have been quickly implemented and public works expenditures are intended to be substantially front-loaded. IMF staff estimate that about 60 percent of the total stimulus budgeted for 2009 had been disbursed through September (FY begins in April).
Korea	By mid-year, about 60 percent of the combined annual original and supplementary budgets had been executed. In this context, IMF staff estimate that by mid-year about 37 percent of announced expenditure measures for 2009 had been implemented while about 34 percent of estimated revenue costs had been incurred. In contrast to other countries, the implementation rate on capital investment projects has been higher than on other stimulus measures: 54 percent of the committed investment stimulus for 2009 has been implemented through June.
Mexico	There is no specific mechanism for tracking stimulus implementation. Some aspects, such as energy price relief, were implemented directly. There has reportedly been a high level of approvals for infrastructure spending, and program spending grew strongly in the first semester, although at lower rates than planned in the budget. However, with weakening revenue performance, some spending will be reduced in the second semester, lowering the overall stimulus.
Russia	IMF staff estimate that 53 percent of the pledged annual stimulus had been implemented through end-August. The implementation rate for tax breaks is estimated to be higher, at 67 percent, than for spending, at 47 percent (including 28 percent for support for strategic sectors). Expenditure estimates reflect funds made available to spending agencies rather than funds paid out.
Saudi Arabia	About 45 percent of the US\$37 billion capital budget for 2009 had already been implemented as of end-March.
South Africa	Discretionary stimulus spending is not tracked separately, although the National Treasury is working with agencies to improve the links from additional spending to performance targets.
Turkey	The authorities expect to report on stimulus implementation during the fourth quarter of 2009.
United Kingdom	The bulk of the stimulus is through revenue measures, all of which have been enacted. Tax breaks are expected to be realized equally by quarter. Information on implementation of expenditure measures is not yet available.
United States	Recovery.gov reports that \$86 billion worth of spending had been released by federal agencies through mid-September, while over \$62 billion of tax relief had been granted. This implies that more than half of the total expected stimulus for CY 2009 has been paid out to date. A large share of the stimulus is being implemented at the state level, where tracking is more difficult.

Sources: IMF staff estimates; joint IMF-U.K. Treasury survey; <http://www.recovery.gov>. Unless otherwise indicated, the information refers to the authorities' estimates and views as reported in the survey.

**Figure 1. G-20 Countries: Composition of Fiscal Stimulus Measures**  
 (Share of total stimulus planned in 2009)



**Table 3. Support for Financial and Other Sectors and Upfront Financing Need**  
(As of August 2009; in percent of 2008 GDP unless otherwise noted; PPP GDP weighted)

	Capital Injection	Purchase of Assets and Lending by Treasury	Guarantees	Liquidity Provision and Other Support by Central Bank	Upfront Government Financing
	(A)	(B)	(C)	(D)	(E)
Average					
G-20	2.2	2.7	8.8	9.7	3.7
Advanced Economies	3.4	4.1	13.9	7.6	5.7
In billions of US\$	1,160	1,436	4,638	2,804	1,887
Emerging Economies	0.2	0.3	0.1	13.5	0.4
In billions of US\$	22	38	7	1,581	47

Source: IMF staff estimates based on official announcement by agencies. Columns A, B, C, and E indicate *announced or pledged amounts, and not actual uptake*. Column D indicates the *actual changes in central bank balance sheets from June 2007 to June 2009*. While these changes are mostly related to measures aimed at enhancing market liquidity and providing financial sector support, they may occasionally have other causes, and also may not capture other types of support, including that due to changes in regulatory policies. Transactions will not always have an impact on the overall fiscal position. For example if no corresponding claim resulted from a capital injection, there would be a capital transfer and a corresponding impact on the overall balance. However, if an intervention resulted in the acquisition of a claim, there may be no impact on the overall fiscal balance. Guarantees do not impact the overall balance, except when called, or when governments acquire fees for issuance of guarantees. For country details, see Annex Table 3.

**Table 4. Financial Sector Support Utilized Relative to Announcement**  
(In percent of 2008 GDP, unless otherwise indicated)

Countries	Capital Injection		Purchase of Assets and Lending by Treasury	
	Amount used	In percent of announcement	Amount used	In percent of announcement
<b>Average 1/</b>				
G-20	1.2	43.9	1.0	27.0
Advanced Economies	1.5	43.9	1.2	26.1
In billions of US\$	446	...	366	...
Emerging Economies	0.2	44.6	0.3	50.3
In billions of US\$	11	...	17	...

Source: Staff estimates. PPP GDP weighted averages. For details, see Annex Table 4.

### *Structural balances during the crisis and medium-term prospects*

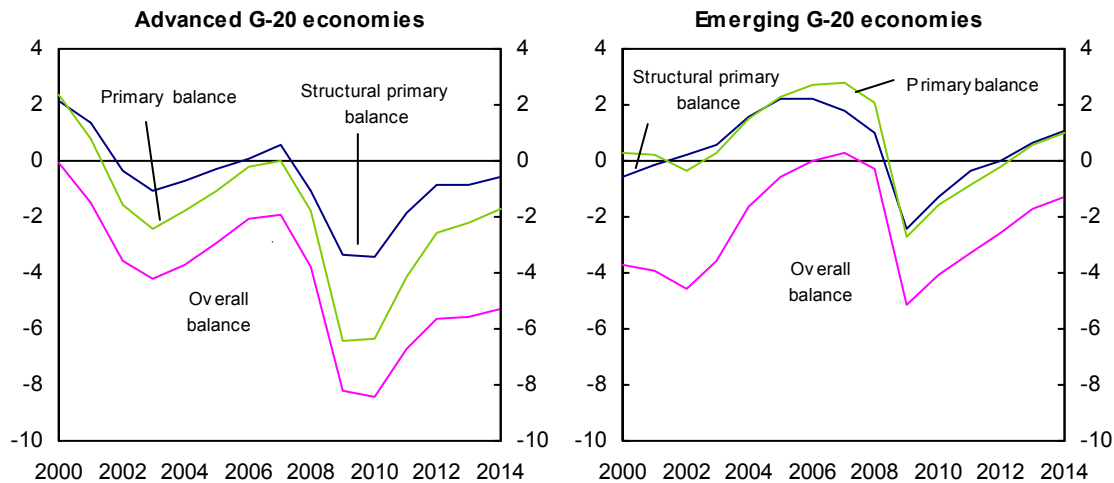
5. **Many advanced economies entered the crisis with relatively weak structural fiscal positions, and these have been further eroded not only by discretionary anticrisis measures, but also by underlying spending pressures.**

- In the **advanced** economies, the structural primary balance (the balance adjusted for cyclical and one-off factors) is projected to deteriorate by 4 percentage points of GDP between 2007 and 2010 (Figure 2 and Table 5), reaching -3.5 percent of GDP. This weakening is due only in part to discretionary stimulus linked to the crisis (1.6 percent of GDP in 2010). Higher spending in other areas explains another 1.7 percentage points,

including higher defense and entitlement outlays in the United States, higher social spending in Japan, and generally higher expenditures in Italy and the United Kingdom, the latter related to programmed spending increases in the 2008–10 multi-year plan. Structural revenue losses explain the rest of the weakening. These are larger in the United Kingdom and the United States, due in particular to losses from the taxation of financial sector and real estate activities, which are expected to be long-lasting.<sup>7</sup>

- For the **emerging** G-20 countries, structural primary balances are also projected to weaken between 2007 and 2010, by 3 percentage points of GDP on average. Once again, this is only partly explained by discretionary fiscal stimulus (1.6 percent of GDP in 2010). The remaining 1½ percentage points is split roughly evenly between revenue losses and expenditure increases (Box 1). Spending pressures affect nearly all emerging G-20 countries and particularly Argentina, China, India, Russia, and Saudi Arabia. Revenue declines, relative to 2007, are larger in commodity producers (Russia, South Africa).

**Figure 2. G-20 Countries: Evolution of Fiscal Balances During 2000–14 1/**  
(In percent of potential GDP)



Source: October 2009 WEO.

1/ Based on WEO projections, which assume some fiscal tightening starting in 2010 in emerging economies and 2011 for advanced economies (see paragraphs 6 and 7).

<sup>7</sup> Yet, the projections assume that some US\$200 billion of revenue losses from the financial sector in the United States are temporary. If this were not the case, the structural deficit in 2010 would be even larger.

**Table 5. G-20 Countries: Changes in Structural Balances and Cyclically Adjusted Revenues and Expenditures, 2007–10**  
(In percent of GDP; 2010, change with respect to 2007)

	Change 2010-2007				Discretionary measures 2010 2/			Changes beyond introduction of discretionary measures in 2010		
	Cyclically-adjusted 1/				Total	Revenue	Expenditure	Total	Revenue	Expenditure
	Structural primary balance 1/	Primary revenue	Primary spending	Temporary factors 1/						
G-20 Countries (GDP PPP weighted)	-3.6	-1.4	2.5	-0.3	1.6	0.5	1.1	-2.3	-0.9	1.4
<i>excluding United States</i>	-2.4	-0.7	1.8	-0.1	1.1	0.3	0.8	-1.4	-0.4	0.9
Advanced G-20 economies	-4.0	-1.7	2.7	-0.3	1.6	0.7	1.0	-2.7	-1.0	1.7
<i>excluding United States</i>	-2.0	-0.5	1.5	0.0	0.8	0.3	0.5	-1.2	-0.2	1.0
Emerging G-20 economies	-3.0	-1.0	2.2	-0.2	1.6	0.3	1.3	-1.6	-0.8	0.9

Source: Staff estimates based on the October 2009 WEO.

1/ The cyclical adjustment to revenues and expenditures corrects for the effect of the economic cycle (see <http://www.imf.org/external/np/pp/eng/2009/030609a.pdf> for details on the cyclical adjustment methodology). Structural balances correct for effects of the economic cycle and for one-off, or temporary, factors not attributable to the cycle, where applicable. All series refer to primary aggregates, i.e. before interest expenditures and revenues.

2/ Positive sign denotes expansionary measure.

6. **Reflecting in part the weak initial structural position, debt dynamics are expected to be unfavorable in advanced countries, in the absence of a sharp discretionary correction** (Figure 3). Removing the fiscal stimulus once a private sector-led recovery develops should be relatively straightforward, as most stimulus measures have been temporary (Box 2). However, merely reversing the stimulus would still leave advanced countries with a structural primary deficit of about 2 percent of GDP on average. In the meantime, spending pressures are expected to continue, particularly in Japan—reflecting increased social security outlays—and in the United States (from higher health and pension spending). Even assuming the cessation of other temporary fiscal measures—in particular the expiration of Bush Administration tax cuts in the United States—structural primary balances would remain negative, and government debt for advanced G-20 countries would reach 118 percent of GDP on average by 2014 (Annex Table 1). Among them, only Australia, Canada, and Korea would have debt ratios well below 90 percent.

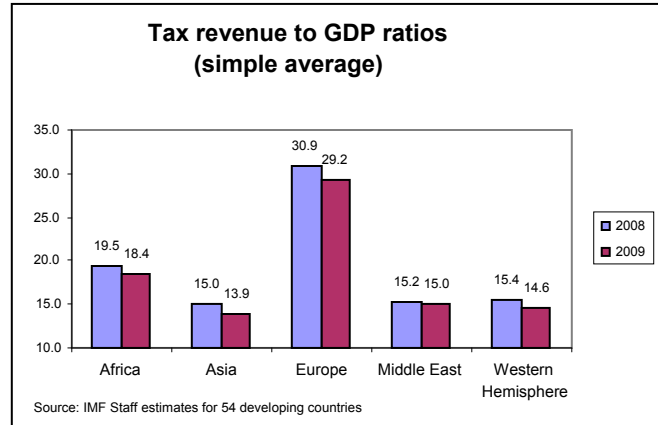
### Box 1. Impacts of the Crisis on Tax Revenues

**Declining tax revenue ratios help explain widening deficits in 2009.** In some regions, the average fall exceeds 1 percent of GDP (text figure). Three factors account for this behavior:

*Discretionary tax cuts.* In responding to the crisis, some countries have reduced tax rates or introduced new exemptions during the past year. While progressive tax rate structures under personal income taxes may be thought to have contributed to declining tax revenues during the crisis, Baunsgaard and Symansky (2009) show that this effect is likely to be small, given tax rate structures and elasticities with respect to output gaps.

*Weakening compliance.* As suggested by Brondolo (2009), compliance is likely to decline in all countries, for example, if taxpayers have lost access to other forms of financing or due to perceptions of a higher expected payoff from tax evasion. This effect may be particularly acute in countries with relatively weak tax administrations.<sup>1</sup>

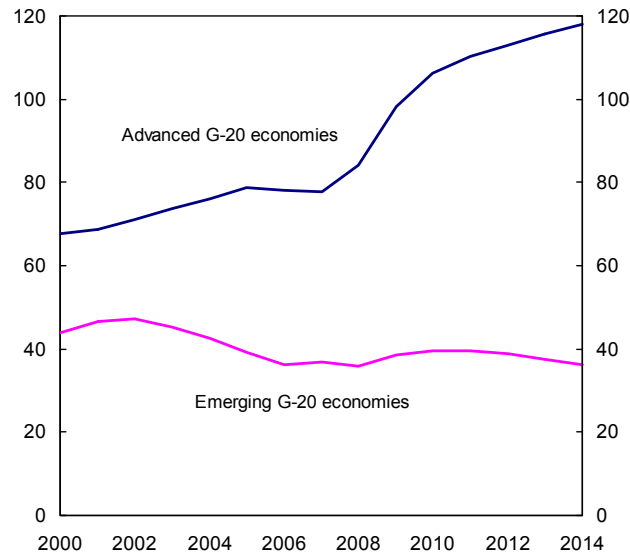
*A shrinking of tax bases relative to GDP.* While real output growth is projected to remain positive in developing countries in 2009, real imports are projected to fall by more than 10 percent. Lower imports reduce tax revenues not only through lower international trade taxes, but also through lower indirect taxes on goods and services (e.g., VAT, excises), which Keen and Simone (2004) find account for a large fraction of tax revenues in developing countries.<sup>2</sup> Countries may also experience a shift in the composition of household spending toward unprocessed foods and other goods that are either exempt or taxed at a lower rate. On the other hand, VAT on imports could benefit from exchange rate changes, which could partly offset the effects of declining import volumes.



<sup>1</sup>A forthcoming IMF Fiscal Affairs Department study examines the relationship between the business cycle and tax efficiency and estimates short- and long-run tax elasticities for the VAT, personal income taxes, and social security contributions for advanced and developing economies over the past two decades. The study finds a significant positive relationship between VAT C-efficiency (the ratio of VAT revenue in consumption per point of the standard VAT rate) and the output gap, with consistent and robust results for quarterly and annual data for both EU countries and a broader group, including developing economies. Changes in VAT efficiency over the cycle are more pronounced for middle-income than high-income countries.

<sup>2</sup>In some countries, the reduction of commodity prices might also imply CIT bases falling faster than GDP.

**Figure 3. G-20 Countries: General Government Debt Ratios, 2000–14**  
(In percent of GDP)



7. **Debt ratio trends are more favorable for emerging economies, but with some important caveats.** The average emerging G-20 debt level is expected to decline moderately after 2010 and remain below 40 percent of GDP, based on WEO projections. However, as noted, this assumes discretionary fiscal tightening in some countries as early as 2010.

### Box 2. Unwinding the Fiscal Stimulus

**From a technical perspective, the fiscal stimulus put in place in response to the crisis should be relatively straightforward to unwind as economic conditions improve, as a large share of packages is temporary.** Stimulus often encompassed time-bound measures (e.g., investment projects or one-off tax rebates) or contained explicit sunset provisions. This is particularly true for expenditure items, where only a small fraction of measures is permanent. By contrast, about half of tax measures introduced are permanent (table). Altogether, one-fifth of the stimulus is permanent and would require discretionary action for reversal. The share of permanent measures is higher in advanced countries—one-quarter—than in emerging G-20 countries—one-tenth. However, the higher share of infrastructure spending in emerging countries’ stimulus packages—half, versus one-fifth for advanced countries—will lead to higher recurrent outlays for operations and maintenance over the medium-term.

#### G-20 Countries: Temporary and Permanent Stimulus Measures (In share of total and of revenue measures, by value)

	Total		of which: Revenues	
	Temporary	Permanent	Temporary	Permanent
G-20 total	80	20	54	46
Advanced G-20 countries	75	25	14	86
Emerging market G-20 countries	91	9	88	12

Source: Staff estimates. Share of total stimulus and revenue measures by the expected cost of specific measures.

Adjustment is projected to continue during 2011–14, going beyond the withdrawal of crisis-related stimulus spending (1.3 percentage points of GDP against an overall improvement in structural primary balances of 2.3 percentage points of GDP, Table 6). Moreover, the projected strong potential growth in emerging markets is a key factor that will drive a reduction in debt ratios despite a primary balance that is projected to remain weaker than before the crisis (1.1 percent of GDP, on average in 2014, compared with 1.8 percent in 2007) (Figure 4). This underscores the risks from a “slow-growth” scenario. Finally, risks stem from possible renewed financial market strains, with implications for debt rollover and exchange rates, and from increased debt issuance in advanced markets, which could add to funding costs.

**Table 6. G-20 Countries: Changes in Structural Balances and Cyclically Adjusted Revenues and Expenditures, 2010–14**  
(In percent of GDP; 2014, change with respect to 2010)

	Change 2014-2010				Discretionary measures 2010 2/			Adjustment beyond reversal of discretionary 2010 measures		
	Cyclically-adjusted 1/				Total	Revenue	Expenditure	Total adjustment	Additional revenue measures	Additional spending cuts
	Structural primary balance 1/	Primary revenue	Primary spending	Temporary factors 1/						
G-20 Countries (GDP PPP weighted)	2.6	1.5	-1.2	0.0	1.6	0.5	1.1	1.0	1.0	0.0
<i>excluding United States</i>	1.6	0.8	-0.8	0.0	1.1	0.3	0.8	0.5	0.5	0.0
Advanced G-20 economies	2.9	1.7	-1.2	0.1	1.6	0.7	1.0	1.3	1.1	-0.2
<i>excluding United States</i>	1.2	0.6	-0.6	0.1	0.8	0.3	0.5	0.4	0.3	-0.1
Emerging G-20 economies	2.3	1.1	-1.1	-0.1	1.6	0.3	1.3	0.6	0.9	0.3

Source: Staff estimates based on the October 2009 WEO.

1/ The cyclical adjustment to revenues and expenditures corrects for the effect of the economic cycle (see <http://www.imf.org/external/np/pp/eng/2009/030609a.pdf> for details on the cyclical adjustment methodology). Structural balances correct for effects of the economic cycle and one-off, or temporary, factors not attributable to the cycle, where applicable. All series refer to primary aggregates, i.e. before interest expenditures and revenues.

2/ Positive sign denotes expansionary measure.

**8. Stochastic simulations of medium-term debt paths confirm the importance of these risk factors.** Figure 5 presents the results for a synthetic economy whose characteristics are set equal to the weighted average for a group of key G-20 emerging markets.<sup>8</sup> The central projection of the distribution of the government debt ratio increases in 2009–10 by about 5 percentage points, and stabilizes at 50 percent of GDP, with the upper band of the charts showing risks of sustained increases in debt ratios.<sup>9</sup> Moreover, the simulations suggest potentially more adverse debt dynamics for countries where debt levels were higher at the onset of the crisis or where fiscal balance have deteriorated sharply during

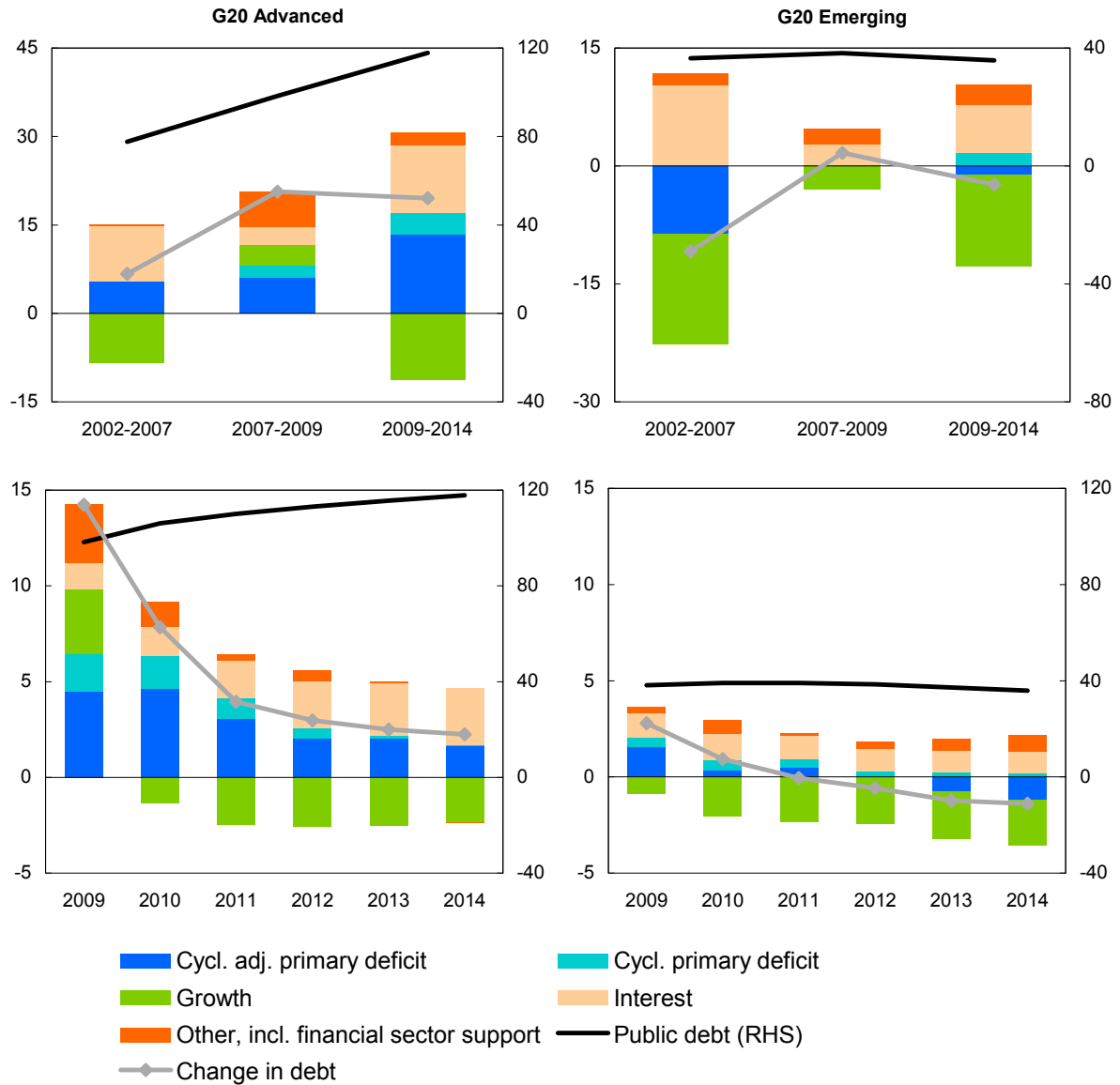
<sup>8</sup> The stochastic simulations are based on information from debt fan charts for individual emerging market countries prepared for the IMF’s Vulnerabilities Exercise for Emerging Markets. The economies in question are Brazil, China, India, Indonesia, Mexico, Russia, South Africa and Turkey.

<sup>9</sup> The figure is based on the approach in Celasun et al. (2006), and involves two empirical exercises: estimation through annual panel data of a fiscal reaction function depicting how primary balances respond to changes in debt levels; and estimation of a VAR model for each country of the non-fiscal determinants of debt dynamics (real domestic and foreign interest rates, real growth rates, and real effective exchange rates). A set of shocks for all variables, including a fiscal shock, is generated at each period and a debt path is calculated. The resulting distribution from a large number of simulated debt paths produces the fan-chart. The distribution shown represents the fan-chart of a synthetic economy, based on the average moments in the group and not the distribution of the average debt to GDP ratio.



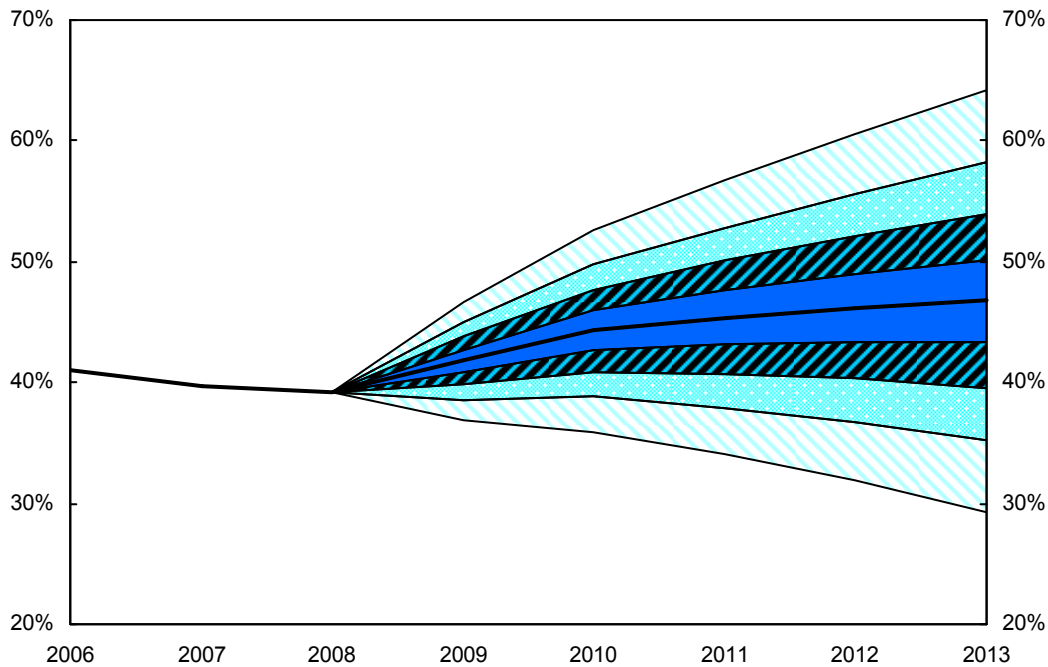
2009. Even in the baseline, debt ratios will remain above 60 percent of GDP for Brazil and India and will increase markedly for Mexico, South Africa, and Turkey. The results underscore the importance for these countries of securing the projected medium-term fiscal adjustment.

**Figure 4. G-20 Countries: Decomposition of Debt Dynamics, 2002–14**



Note: Figure shows the decomposition of the change in the general government gross debt-to-GDP ratio due to contributions from the primary deficit (cyclically adjusted and cyclical), non-fiscal factors (growth and interest payments), as well as other factors. These include financial sector support and valuation changes. The upper charts show the cumulative change over the period indicated; the solid black line represents the end-of-period debt-to-GDP ratio. Based on October 2009 WEO projections, weighted by PPP GDP, excluding Argentina.

**Figure 5. Representative Emerging G-20 Country: Evolution of Public Debt**  
(Gross debt in percent of GDP)



Note: Lines represent the distribution (in deciles) of the simulated debt-to-GDP ratios. Staff estimates based on the October 2009 WEO.

9. **Higher debt stocks, compounded by higher interest rates, will involve a weakening of debt service indicators in advanced G-20 economies.** Net interest payments as a percentage of GDP are projected to nearly double for advanced economies—from 1.9 percent of GDP in 2007 to 3.5 percent in 2014 (Annex Table 5). Increases are particularly large in absolute terms for the United Kingdom and the United States, where debt levels rise sharply, and for Italy and Japan, where higher interest rates are especially costly, given already high debt levels. The interest bill for the United Kingdom nearly doubles in percent of GDP, but stays below levels of the late-1980s and mid-1990s, as interest rates remain relatively low. Net interest payments will also increase as a share of total expenditures, from 5.2 to 8.8 percent, on average, in the advanced G-20. In the United States, interest payments in 2014 are expected to be well above projected defense spending and to eclipse federal spending on health and education. Just the *increase* in interest spending in the United Kingdom is about twice annual outlays for environmental protection and is equivalent to annual spending on public transportation.<sup>10</sup> At higher debt levels, fiscal balances will be correspondingly more sensitive to interest rates. For example, if real interest rates in 2014 are at the 30-year peak for the G-7 countries (5.1 percent in 1985) rather than at 2.5 percent as in

<sup>10</sup> Ratios for debt service to revenues and debt to revenues are also projected to rise during 2009–14 for advanced countries. For emerging G-20 countries, these ratios decline, on average. See Annex Table 5.

the projections, interest payments and budget deficits could be as much as 3½ percentage points of GDP higher than projected.

*Market perception of fiscal risks*

10. **After increasing earlier in the year, advanced-economy government bond yields have recently stabilized, at rates below pre-crisis levels** (Figure 6, left upper panel). The 10-year benchmark bond yield in the United States was almost 3½ percent in late-September 2009 (and subsequently hit a low of 3¼ percent), 1 percentage point below its 2007 average, but above its trough of around 2 percent at end-2008. Following the collapse of Lehman Brothers, bond yields declined sharply in the United States and other countries perceived as safe havens. High demand for government debt as a result of risk aversion was reinforced by liquidity injections, and in some cases by outright purchases by central banks.<sup>11</sup> The flow into sovereign bonds started to ebb as investors' risk appetite returned, as reflected, for example, in rallying stock markets. A similar pattern, although somewhat less pronounced, was observed in bond yields in other advanced economies. Inflation-indexed U.S. government bond yields (TIPS) have remained broadly stable at their pre-Lehman levels since early 2009, implying a substantial rise in break-even inflation expectations (measured as the differential between inflation-indexed and common bond yields) from the very low levels of late 2008 to a still-moderate 2 percent. However, limited trading volumes during periods of market stress call for caution in interpreting TIPS data.

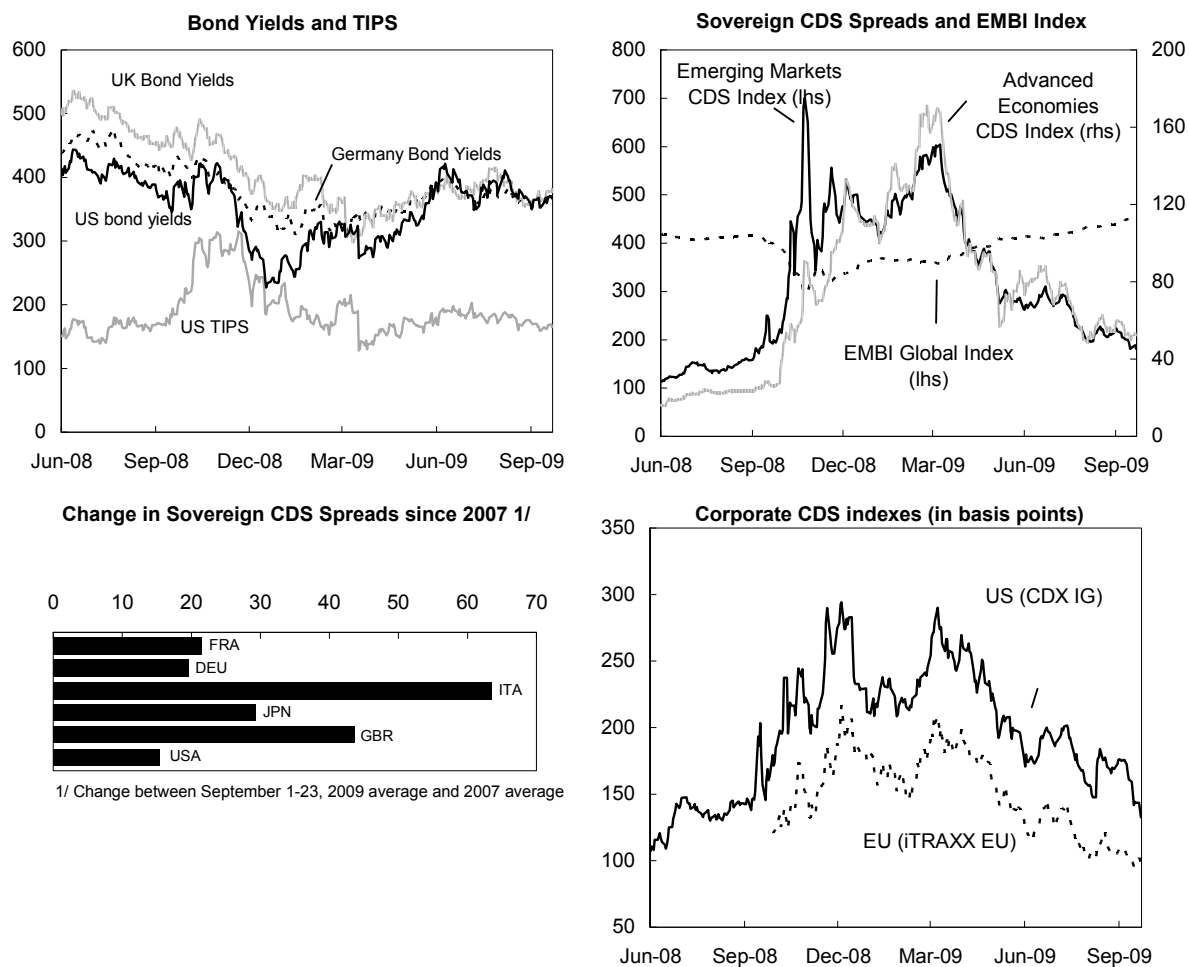
11. **It is difficult to assess the extent to which higher yields in 2009 reflect market concerns about the soundness of public finances.** Most likely, the bulk of the rise in yields early this year was due to regularization of market conditions.

- **Sovereign CDS spreads (the price of insurance against bond issuer default) remain higher than before the crisis** for both emerging and advanced sovereign issuers, including for all G-7 countries (Figure 6, right upper panel). The rise in CDS spreads during the peak of the crisis was likely prompted by a general spike in risk aversion, rather than by market views on the fiscal outlook for each country. CDS spreads have since declined markedly for all sovereigns, although investors do seem to be discriminating among them (Figure 6, left lower panel). Corporate CDS spreads have also declined steadily in recent months (Figure 6, right lower panel).

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<sup>11</sup> In the United Kingdom, the original plan was to purchase up to £100 billion (7 percent of GDP); as of October 22, the Bank of England had purchased £169 billion worth of gilts under the Asset Purchase Facility. In the United States, plans included purchases of T-bills up to \$300 billion, mortgage-backed securities (MBS) of government-sponsored enterprises (GSEs) of up to \$1.25 trillion, and GSE debt up to \$200 billion (in total, 12 percent of GDP). Purchases of GSE MBS and GSE debt have been sizable, while the increase in holdings by the Federal Reserve of Treasury securities since the introduction of the program was \$297 billion. Other advanced G-20 central banks have also made some outright purchases of Treasury securities, including in Japan, Canada, and Australia.

**Figure 6. Financial Market Indicators of Fiscal Risks**  
(In basis points)



Sources: Markit, CMA, Datastream, and IMF staff calculations.

- **Alternative indicators of market risk premia also point in the direction of increasing market discrimination across sovereigns.** Given the thinness of the market for CDS for some sovereigns (e.g., the United States) and other market imperfections exacerbating volatility, it is useful to also look at alternative measures of market risk premia. The relative asset swap (RAS) spread measures the difference between a benchmark government bond yield and the fixed rate arm of an interest rate swap involving the same currency and of the same maturity (usually 10 years) as the bond. This allows yield comparisons across countries and currencies.<sup>12</sup> After the upward shock from Lehman,

<sup>12</sup> Fluctuations in the RAS spread for an individual country can reflect more than changing perceptions of sovereign risk. In particular, while there is no direct counterparty risk in an interest rate swap, there is indirect risk related to the money-center bank deposit that generates the floating rate stream for the swap. Thus, changes in perceived risks related to the bank would also affect the RAS spread. However, as the credit risk related to the bank is independent of the currency of deposit, changes in the ordering of RAS spreads across countries should reflect only changes in the perception of sovereign risk across countries.

RAS spreads have stabilized at levels substantially above their pre-crisis levels, with increasing differences in premia across sovereigns (Figure 7): France, the United States, Japan, and Germany stand in a low-premium group relative to other advanced economies. The indicator for the United Kingdom (among the lowest) presents a somewhat erratic behavior, driven by high and volatile swap rates.

12. **While the reaction of financial markets to the deterioration of the fiscal outlook has so far remained moderate, this should not lead to complacency.** First, interest rates are now cyclically low. Second, markets in the past have reacted late—and abruptly—to changes in fundamentals. Third, the relatively benign response so far is likely to reflect confidence that advanced country governments have a strategy to strengthen their fiscal accounts when the moment comes.<sup>13</sup> This confidence may wane if consolidation strategies are not identified soon.

*Post-Crisis Fiscal Exit Strategies in Advanced Countries*

13. **A “fiscal exit strategy” limited to unwinding discretionary fiscal stimulus and financial sector support would be far from sufficient.** As discussed above, simply letting the stimulus expire would still leave the government debt of many advanced countries on an explosive path. While maximizing the recovery value of assets acquired through financial sector support is important, it will not materially alter the medium-term outlook, as the receipts would be small compared to the overall projected increase in gross debt (Cottarelli and Viñals, 2009).

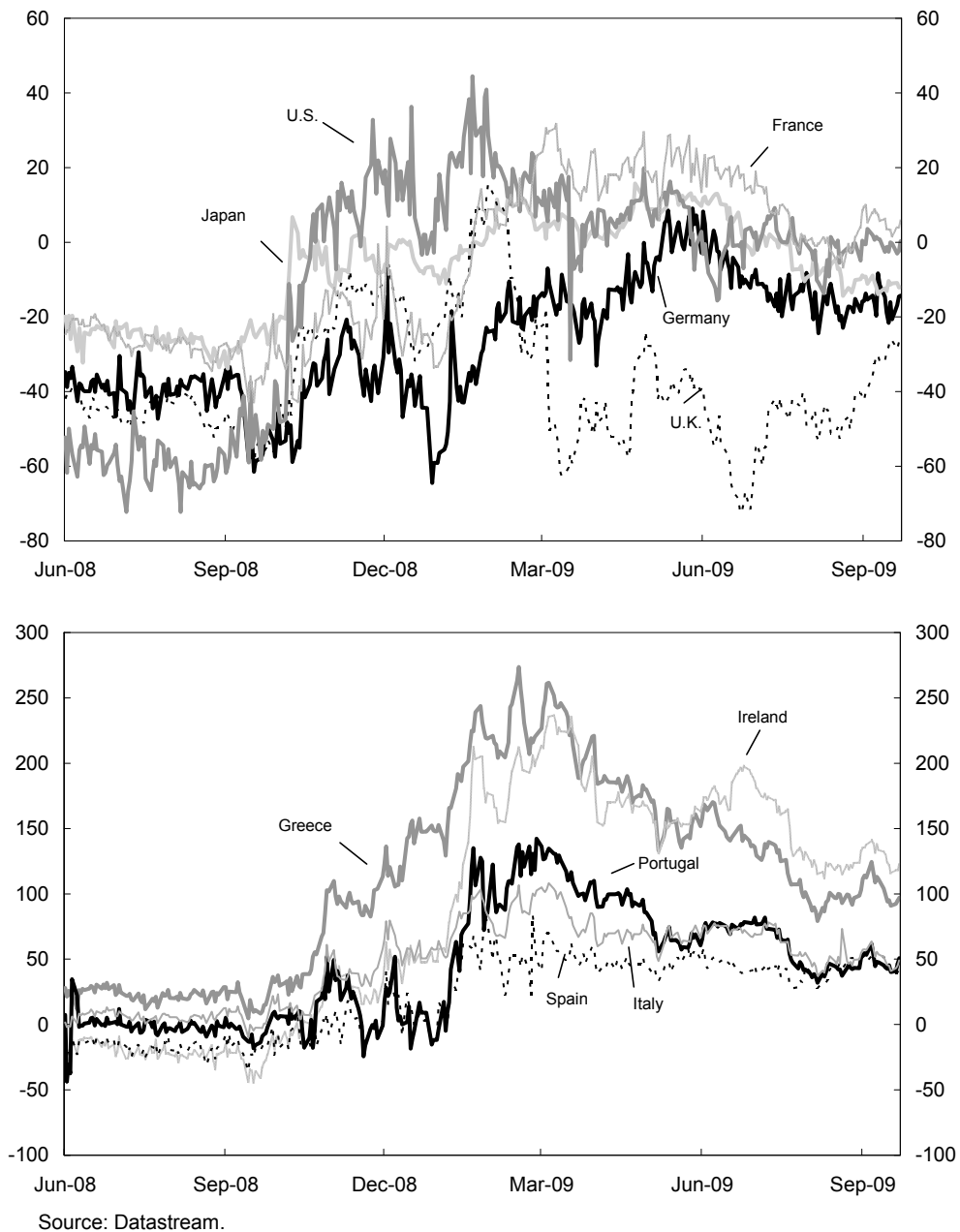
14. **Even stabilizing debt ratios at their post-crisis levels is not enough:**

- Living with high debt would reduce the capacity of fiscal policy to respond to future shocks. Indeed, the fiscal stimulus during 2008–10 was inversely related to the level of public debt, at least in large countries.<sup>14</sup>
- High debt would likely lead to high real interest rates. New evidence on the effect of fiscal variables on interest rates shows that a one percentage point increase in the fiscal deficit raises long-term government interest rates by 10 to 60 basis points (Appendix). The analysis also finds that long-term rates rise by five basis points for each 1 percent of GDP increase in the government debt stock. This implies that the 40 percentage point increase in government debt ratios projected for advanced countries during 2008–14 could raise interest rates by two percentage points. The effects are even larger for countries that start from high debt ratios or deficit levels, or that confront faster

<sup>13</sup> Staff analysis in the Appendix documents that sovereign bond yields are affected by fiscal outlooks.

<sup>14</sup> See <http://www.imf.org/external/np/pp/eng/2009/020109.pdf>, “The Size of the Fiscal Expansion: An Analysis for the Largest Countries.”

**Figure 7. RAS Spreads**  
(In basis points)



population aging. Moreover, the results suggest that the impact of debt and deficits on interest rates is greater during periods when the global supply of sovereign bonds is high. Taken together, these results suggest that living with high debt would be a costly option, all the more so if many countries attempted to do so at the same time.

- High debt may ultimately retard growth. The cases of Japan and Italy—two high-debt countries that have experienced prolonged periods of slow output growth—are noteworthy here.<sup>15</sup>

15. **Instead, an exit strategy should be understood as involving a set of measures that will bring debt ratios down to moderate levels and keep them there on a sustainable basis.** This will require a sharp correction in the structural primary balance of advanced countries. On average, bringing government debt-to-GDP ratios in advanced economies below 60 percent by 2030 would require steadily raising the structural primary balance from a deficit of 3½ percent of GDP in 2010 to a surplus of 4½ percent of GDP in 2020—an 8 percentage point swing in one decade—and keeping it at that level for the following decade (Table 7). The required adjustment of the headline primary balance would be about 10½ percent of GDP. The challenge this will pose is even greater than it might appear, as the adjustment in most countries will need to be undertaken against the tide of a steady increase in aging-related entitlement spending. Some have advocated a moderate increase in inflation as a means of eroding the real value of the debt. This is a risky strategy that would bring limited benefits in the best case and inflict potentially high costs in a worst case. An increase in inflation rates to 6 percent, for example, would erode less than one-quarter of the increase in the debt stock over 2008–14 (Cottarelli and Viñals, 2009), and eventually entail large output costs to restore price stability in the years ahead.

16. **The aggregate adjustment required to restore advanced economy debt ratios to safer levels obscures significant variations at the country level.** While the crisis has been a factor:

- Some countries are experiencing a sizable, simultaneous deterioration of structural balances unrelated to the crisis (e.g., Japan and the United States).
- Others face a significant deterioration with the crisis that may prove to be structural in nature (e.g., Ireland, Spain, the United Kingdom).
- Some countries entered the crisis with relatively high initial structural deficit levels that would have required adjustment even in the absence of the crisis (e.g., Greece, Portugal).
- Finally, for a few countries the adjustment need is almost entirely the result of high pre-crisis debt levels (e.g., Belgium and Italy).

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<sup>15</sup> However, the causality may also run from slow growth to high debt ratios. In addition, factors such as labor and product market rigidities or financial strains may have played an important role in explaining slow growth in Japan and Italy.

**Table 7. Debt and Primary Balances**  
(In percent of GDP)

	Current WEO projections, 2010			Illustrative fiscal adjustment strategy to achieve debt target in 2030	
	Gross Debt	Primary Balance	Structural PB 1/	Structural PB in 2020-30 2/	Required adjustment between 2010 and 2020
<b>Advanced economies</b>					
Australia	22.7	-4.9	-3.4	0.3	3.7
Austria	74.9	-3.1	-2.1	3.1	5.1
Belgium	102.7	-2.3	-0.4	5.3	5.6
Canada	79.3	-3.5	-1.0	2.1	3.1
Denmark	26.9	-2.8	1.9	0.2	-1.7
Finland	48.1	-4.8	-2.3	0.5	2.8
France	85.4	-6.2	-2.1	4.0	6.1
Germany	84.5	-2.3	-0.4	3.0	3.4
Greece	115.0	-2.0	-2.2	6.8	9.0
Iceland	137.3	-2.3	0.4	4.8	4.4
Ireland	75.7	-11.1	-8.2	3.6	11.8
Italy	120.1	-0.7	1.0	5.8	4.8
Japan	227.0	-8.8	-6.9	6.5	13.4
Korea	39.4	-1.0	0.3	0.4	0.1
Netherlands	68.8	-3.6	-2.1	1.4	3.5
New Zealand	30.2	-3.2	-1.9	0.4	2.3
Norway	67.2	8.6	9.2	10.5	1.3
Portugal	81.9	-3.9	-2.9	3.6	6.5
Spain	69.6	-11.0	-5.8	4.9	10.7
Sweden	45.0	-4.5	-1.5	0.5	1.9
United Kingdom	81.7	-10.9	-7.8	5.0	12.8
United States	93.6	-8.1	-3.7	5.1	8.8
<i>Average (PPP-weighted)</i>	102.1	-6.5	-3.3	4.5	7.8
<i>G-20 Advanced economies</i>	106.7	-6.7	-3.4	4.6	8.1
<i>Higher debt</i>	108.2	-6.9	-3.5	4.9	8.4
<i>Lower debt</i>	34.9	-2.9	-0.5	0.4	1.4

Sources: IMF, World Economic Outlook, October 2009 and IMF staff calculations.

1/ Excludes losses from financial system support measures in Japan and the United States. Structural balances are reported in percent of nominal GDP.

2/ Primary balance is assumed to improve gradually during 2011-20; thereafter, it is maintained constant until 2030. The last column shows the primary balance improvement needed to stabilize debt at end-2011 level if the respective debt-to-GDP ratio is less than 60 percent (no shading, "lower debt"); or to bring debt ratio to 60 percent in 2030 (shaded entries, "higher debt"). Illustrative scenarios for Japan are based on its net debt, and assume a target of 80 percent of GDP. For Norway, maintenance of primary surpluses at their projected 2012 level is assumed. The analysis makes simplifying assumptions: in particular, beyond 2011, an interest rate-growth rate differential of 1 percent is assumed, regardless of country-specific circumstances.

17. **While the precise magnitude of primary adjustment that is required over the medium term is sensitive to assumptions, the scale of the fiscal problem is large for any reasonable set of parameter values.** Assumptions about the differential between the rate of output growth and the rate of interest have an impact on estimated adjustment needs (Table 8). However, even if the differential were to fall to zero, the required adjustment for the advanced G-20 to bring debt ratios to 60 percent of GDP or lower would remain sizable—nearly 7 percentage points of GDP between 2010 and 2020. The required degree of adjustment is also sensitive to the medium-term debt objective: stabilizing the debt ratio at its 2014 level would cut the required volume of adjustment by almost half. For the reasons noted earlier, however, this would be a risky strategy.



**Table 8. Required Adjustment of Structural Primary Balance: Sensitivity to Variations in Interest and Growth Rates (r-g) and Debt Targets**  
(In percent of GDP)

2030 Debt target	Required adjustment of structural primary balance between 2010 and 2020		
	r-g		
	0	1	2
<b>60 percent of GDP</b>			
All advanced economies	6.6	7.8	9.1
G-20 advanced economies	6.8	8.0	9.4
High debt	7.1	8.4	9.8
Low debt	0.5	0.9	1.3
<b>80 percent of GDP</b>			
All advanced economies	5.2	6.5	7.9
G-20 advanced economies	5.4	6.7	8.1
High debt	5.7	7.0	8.5
Low debt	0.5	0.9	1.3
<b>Pre-crisis levels</b>			
All advanced economies	6.5	7.7	9.0
G-20 advanced economies	6.5	7.8	9.2
High debt	7.0	8.3	9.6
Low debt	1.2	1.5	1.9
<b>Post-crisis levels</b>			
All advanced economies	3.4	4.3	5.2
G-20 advanced economies	3.4	4.4	5.3
High debt	3.6	4.6	5.6
Low debt	0.5	0.9	1.3

Sources: IMF, World Economics Outlook, October 2009 and IMF staff calculations

This table reports the adjustment in the structural primary balance required during 2011-20, in order to reach various objectives (as listed) by 2030. The primary balance would be gradually improved through 2020 and maintained constant thereafter. The objectives "pre-crisis levels" and "post-crisis levels" indicate that each country would reduce its debt-to-GDP ratio to its pre-crisis (2007) or post-crisis (2012) level, respectively, by 2030. On average (PPP-weighted), the pre- (post-) crisis debt target is 61.5 (96.1) percent of GDP. For Japan, all data refer to net debt, and the target level is set to 80 percent of GDP in the first two rows of this table. For Norway, maintenance of primary surpluses at their projected 2012 level is assumed throughout. For the first and second exercises, for economies with a debt/GDP level below 60 percent in the first exercise (or below 80 percent in the second exercise), the illustration is based on a primary balance path needed to stabilize the debt/GDP ratios at their end-2012 levels. "r-g" indicates the assumed difference between the interest rate and the rate of economic growth.

18. **The adjustment needed in many advanced economies will be difficult, but is not unprecedented.** More than twenty advanced economies have achieved improvements in their structural primary balances of at least 5 percent of GDP at least once in the last four decades; ten of them have achieved improvements in excess of 10 percent of GDP in that period (Table 9). Of course, adjustment going forward will be more challenging than in some past episodes, because it will have to be undertaken in an environment of adverse demographics and potentially sluggish potential growth. Some past adjustment episodes in Europe also benefited from nominal exchange rate depreciation and the “carrot” of joining the euro, neither of which will apply in the future. The data also suggest that it has been hard for countries to maintain this adjustment: in most cases, the primary balance deteriorated in the period after consolidation ended. However, this may reflect in part the fact that as the debt ratio declines, smaller primary surpluses are required to stabilize it at its current level.

19. **An illustrative strategy to deliver the 8 percentage points of GDP primary structural adjustment needed in advanced countries could be based on three main elements** (Cottarelli and Viñals, 2009):

- Non-renewal of existing stimulus measures (equal to 1½ percent of GDP).
- A freeze on real per capita spending excluding pension and health (saving 3½ percentage points of GDP, if sustained for ten years), which would require a thorough review and targeted cuts in less effective and low priority outlays. Reforms to contain the growth of pension and health spending in line with GDP would also be critical. Lowering spending ratios in these areas would be very difficult, but without reforms spending would rise by 3–4 percentage points of GDP during 2015–30.
- Revenue measures to deliver the remaining 3 percent of GDP. To the extent possible, those should incorporate base-widening and evasion-reducing measures, although realistically some increases in tax rates may also be needed to achieve the targeted revenue increases. Adjustment efforts should avoid reliance on one-off measures, and revenue overperformance should be saved rather than spent.

The composition of the primary adjustment under this scenario would differ country by country, depending on the level and structure of expenditures, revenues, and tax rates. Reforms to fiscal rules and institutions could also support the adjustment process (Box 3). While it is premature to begin exiting from fiscal support, governments should not hesitate to announce a credible exit strategy now.

**Table 9. Country Experiences with Large Fiscal Adjustment 1/ 2/**

Country (end year)	Size of Adjustment	Length (years)	Cyclically Adjusted Primary Balance	
			At End-Year	Average Over the Five Years After End of Adjustment
<i>Advanced economies</i>				
Ireland (1989)	20.0	11	4.4	3.6
Sweden (2000)	13.3	7	3.8	1.1
Finland (2000)	13.3	7	7.1	3.7
Sweden (1987)	12.5	7	4.8	0.2
Denmark (1986)	12.3	4	6.6	4.3
Greece (1995)	12.1	6	4.8	4.1
Israel (1983)	11.1	3	2.6	7.9
Belgium (1998)	11.1	15	6.7	6.1
Canada (1999)	10.4	14	5.6	3.2
Cyprus (2007)	8.5	4	6.1	...
United Kingdom (2000)	8.3	7	2.9	-0.6
Japan (1990)	8.1	12	2.7	-0.5
Italy (1993)	7.9	8	3.0	4.0
Portugal (1985)	7.5	4	2.6	0.3
Luxembourg (1985)	6.9	4	5.1	3.2
Luxembourg (2001)	6.7	10	6.1	1.0
Iceland (2006)	6.3	4	5.9	...
Netherlands (2000)	6.3	10	4.1	1.0
Denmark (2005)	5.9	11	6.4	...
Australia (1988)	5.8	4	3.7	0.3
Hong Kong SAR (2005) 3/	5.8	4	1.0	...
New Zealand (1995)	5.8	4	7.1	3.9
Austria (2001)	5.8	6	2.2	0.7
Iceland (2000)	5.7	6	3.1	1.6
United States (2000)	5.7	8	3.7	-1.0
Germany (2000)	5.3	9	3.5	-0.7
Germany (1989)	5.3	10	2.7	-0.4
Switzerland (2000)	5.2	7	3.6	1.3
Cyprus (1994)	5.2	3	4.0	0.6
Spain (2006)	5.2	11	3.0	...

Sources: IMF, World Economic Outlook, October 2009 and IMF staff calculations.

1/ Cumulative change in cyclically-adjusted primary balance in percent of GDP. In a given consolidation episode, the cyclically adjusted primary balance should not be reversed by more than 1 percentage point from one year to the next.

2/ Table lists largest adjustments per country, unless episodes for a given country are fully nonoverlapping.

3/ Further adjustment through 2006 to 2007 as a result of asset price effects is not taken into account.

### Box 3: The Role of Fiscal Rules in Large Fiscal Adjustments

**A forthcoming study by the IMF's Fiscal Affairs Department will examine the role of fiscal rules in large adjustments.** Across advanced and emerging market economies there have been 24 episodes since 1980 where large and sustained reductions in government debt were achieved primarily through fiscal consolidation efforts.<sup>1</sup> A review of the experience in these countries yields the following insights:

- While several countries achieved large fiscal adjustments without fiscal rules, adjustments in countries with fiscal rules were on average larger and more front-loaded than those in countries without rules.
- Budget balance and expenditure rules were the most common fiscal rules among large adjusters. Both types of rules, the former anchored in budget targets and consistent with implicit medium-term debt goals, have proved effective in improving budgetary performance and lowering debt levels.<sup>2</sup>
- Most fiscal rules for large adjusters had wide coverage and applied either to the general or central government. In countries with strong decentralized structures, strict targets at the regional or local level contributed to anchoring general government budgetary performance and thereby to the success of large fiscal adjustments.
- Whether a rule is enshrined in law or simply in a political agreement does not seem to affect its likelihood of success.
- Fiscal rules in place during large adjustments were in general stronger than rules in other countries (see also European Commission, 2007). Using criteria (in addition to coverage and statutory base) such as enforcement, monitoring, and visibility, shows that fiscal rules were particularly strong in large adjusters. Moreover, to sustain consolidation efforts over many years, rules were often reformed over time, reflecting the need to address risks of consolidation fatigue and other shortcomings that had emerged.

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<sup>1</sup> We focus the analysis on large public debt reductions spurred by fiscal adjustments. These fiscal consolidations were also supported in part by real GDP growth and were linked to simultaneous structural reform efforts in most countries. A large reduction in government debt is defined as a drop by at least 10 percentage points of GDP over three years or more and by 20 percent of the initial debt stock. Among a set of 45 OECD, G-20, and EU countries, 33 episodes since 1980 fulfilled these criteria. Excluding oil exporters and those episodes in which the reduction in debt was predominantly driven by rapid real GDP growth and inflation (mostly in the new EU member states) reduces the number of cases to 24. This sample of the analysis matches closely those of earlier studies where adjustment was defined in terms of improvements in the cyclically-adjusted primary balance and the impact on debt (see e.g., Kumar, Leigh, and Plekhanov, 2007).

<sup>2</sup> Econometric studies that have analyzed the link between fiscal rules and budgetary performance more generally, find that budget balance and debt rules have contributed to better budgetary outcomes (e.g., Debrun et al. 2008). While this has not necessarily been the case for expenditure rules, Debrun et al. found that expenditure rules have helped to rein in primary spending.

## Box 3: Continued

Types and Coverage of National Fiscal Rules and Large Fiscal Adjustments 1/

	Fiscal Adjustment				Role of Fiscal Rules				Type and coverage of fiscal rules 6/				
	Year when public debt-to-GDP ratio first dropped (t)	First year of sign. improvement in CAPB 2/	Change in public debt-to-GDP ratio (t to i) 3/	Lenth of episode (no. of years) 4/	Year of adoption of fiscal rule 5/	Fiscal rules at start in place?	Fiscal rules adopted/ revised during adjustment period?	Fiscal rules adopted later?					
									ER	RR	BBR	DR	
Australia 7/	1995	1995	-24.2	14	1998	No	Yes	No		CG		CG	CG
Belgium	1994	1993	-53.0	14	1993	Yes	Yes	No	CG, SSS	CG	RG, LG, SSS		
Brazil	2003	2003	-21.0	4	2000	Yes	No	No	GG		GG		GG
Bulgaria	2001	2000	-60.4	8	2003	No	Yes	No	GG				GG
Canada 7/	1997	1995	-19.6	4	1998	No	Yes	No	CG			CG	CG
Denmark	1994	1997	-57.7	15	1992	Yes	Yes	No	GG			GG	
Finland	1995	1996	-15.4	8	1995	Yes	Yes	Yes				LG	CG
Finland	2004	na	-11.0	5	1999	Yes	Yes	No	CG	SSS	CG, LG		
Iceland	1996	1995	-15.4	5	2004	No	No	Yes					
Iceland	2002	2004	-20.5	4	2004	No	Yes	No	CG				
Ireland	1994	1993	-69.6	13	2004	No	Yes	No	CG		LG		
Korea	1983	na	-14.6	12	na	No	No	No					
Mexico	1991	1995	-25.2	3	2006	No	No	Yes					
Netherlands	1996	1996	-25.6	7	1994	Yes	No	No	GG	GG			
New Zealand 7/	1993	1993	-44.2	16	1994	No	Yes	No				GG	GG
South Africa	2004	na	-10.0	5	na	No	No	No					
Spain	1997	1996	-31.3	11	2002	No	Yes	No			GG	RG, LG	
Sweden	1997	1994	-19.7	4	1996	Yes	Yes	Yes	CG, SSS				
Sweden	2002	na	-18.6	7	2000	Yes	Yes	No	CG, SSS		GG, LG		
Switzerland	2004	2005	-13.5	5	2003	Yes	No	No	CG				
Turkey	2002	2001	-38.1	6	na	No	No	No					
United Kingdom	1985	1988	-15.7	7	1997	No	No	Yes					
United Kingdom	1998	1995	-12.0	5	1997	Yes	No	No			GG	GG	
United States	1994	1994	-16.9	7	1990	Yes	No	No	CG			CG	

ER = Expenditure rules; RR = Revenue rule; BBR = Budget balance rule; DR = Debt rule; GG = General government; CG = Central government; RG = Regional government; LG = Local government; SSS = Social security system; na = non-applicable.

1/ Includes episodes in G-20, OECD and European Union member states (except oil exporters) in which the public debt-to-GDP ratio dropped by at least 10 percent of GDP and at least 20 percent of initial public debt stock and this reduction was primarily driven primary surpluses (accounting in principal for more than 25 percent with the other three factors being inflation, real growth, and stock flow adjustments).

2/ Changes in the cyclically-adjusted primary balance (CAPB). Improvement of at least 1 percent of GDP.

3/ t is the year before the public debt-to-GDP ratio drops. i is the last year of the drop.

4/ Number of years when public debt-to-GDP ratio continuously dropped.

5/ Refers to the adoption date of a major fiscal rule applicable to the central or general government.

6/ Includes only those rules in place or adopted during adjustment.

7/ While fiscal rules are not legislated in Australia and New Zealand, the fiscal responsibility laws provide a framework for the formulation and conduct of fiscal policy. In Australia, numerical targets are laid out in the government's annual "Fiscal Strategy Statement" for the coming four years. In New Zealand, the FRA places emphasis on transparency but also requires the government to set specific fiscal targets for the next three years and publish 10-year objectives. Canada has adopted de facto fiscal rules in 1998 when the authorities targeted a balanced budget or better and committed to a debt repayment plan. This was preceded by two-year rolling deficit targets and the legislation of balanced budget rules for a number of provinces and territories.

Sources: IMF Fiscal Affairs Department Database on Fiscal Rules, European Commission Database on Fiscal Rules, Country Reports, and staff calculations based on WEO data.

*Constraints on Fiscal Policy and the Role of Fund Support*

20. **Fund member countries have faced a range of constraints on their fiscal policy response to the crisis.** In addition to declining tax revenues, as described in Box 1, developing and emerging economies have faced concerns with macroeconomic conditions, sustainability, recent fiscal policy behavior, and institutions. These constraints are likely to have been more binding for emerging market countries that subsequently elected to enter into IMF arrangements (Box 4). Notably, fiscal policy during the 2003–07 global upturn in emerging economies that now have IMF arrangements appears to have been procyclical, more so than in the past and likely limiting options to cushion the impact of the slowdown.<sup>16</sup> This stands in contrast to other country groups, including emerging economies that do not now have IMF arrangements or now have Flexible Credit Line (FCL) arrangements (which carry no conditionality), and advanced economies (Figure 8). These other emerging economies implemented countercyclical policies in the run-up to the crisis, in contrast to past upturns during 1980–2002, and therefore may have had more room to expand fiscal policy in response to the crisis. Policies in advanced economies were also countercyclical in the pre-crisis period, albeit to a lesser extent than in past upturns.<sup>17</sup>

21. **IMF arrangements have helped alleviate these constraints.** In emerging market countries with IMF arrangements, fiscal expansion in 2009 and projected for 2010 is on a par with that of other emerging market countries without arrangements and countries with FCLs (Table 10).<sup>18</sup> The IMF has also provided technical assistance for structural fiscal reforms to support the crisis response and strengthen fiscal institutions in countries with IMF arrangements (Box 5).

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<sup>16</sup> Notably, procyclical behavior is explained largely by spending increases, which were particularly large in 2003–07 for countries that now have IMF arrangements. The estimation followed the approach outlined in Section V of *The State of Public Finances* (see <http://www.imf.org/external/np/pp/eng/2009/030609a.pdf>). The results suggest important structural revenue gains during 2003–07, particularly in emerging market countries with and without arrangements. However, it is likely that some of these revenue gains were of a cyclical or a one-off nature, either because elasticities with respect to output gaps were greater than those employed or output gap estimates do not capture fully the gap relevant for a particular tax base. If so, procyclicality of fiscal policy in countries with arrangements would have been even greater in the pre-crisis period, while the behavior for advanced countries and countries without arrangements may have been less counter-cyclical or even procyclical.

<sup>17</sup> Upturns are defined as periods of increases of the output gap in at least 3 out of 4 years (with only a small decline in the fourth year of less than half of the standard deviation of the change in the output gap for the country). The sample covered 55 countries, of which 12 now have IMF arrangements.

<sup>18</sup> See *Review of Recent Crisis Programs* (<http://www.imf.org/external/np/pp/eng/2009/091409.pdf>) for a comprehensive review, including the adaptability of Fund programs to unanticipated deteriorating conditions, constraints on the full operation of automatic stabilizers, and protection of social safety nets.

**Table 10. Change in Overall Fiscal Balances in Selected Countries**  
(Change in percentage points of GDP, relative to 2007)

	2009	2010
With Fund Arrangement	-2.8	-1.6
Without Fund Arrangement (or with FCL)	-2.6	-1.5

Source: Staff estimates based on the October 2009 WEO.

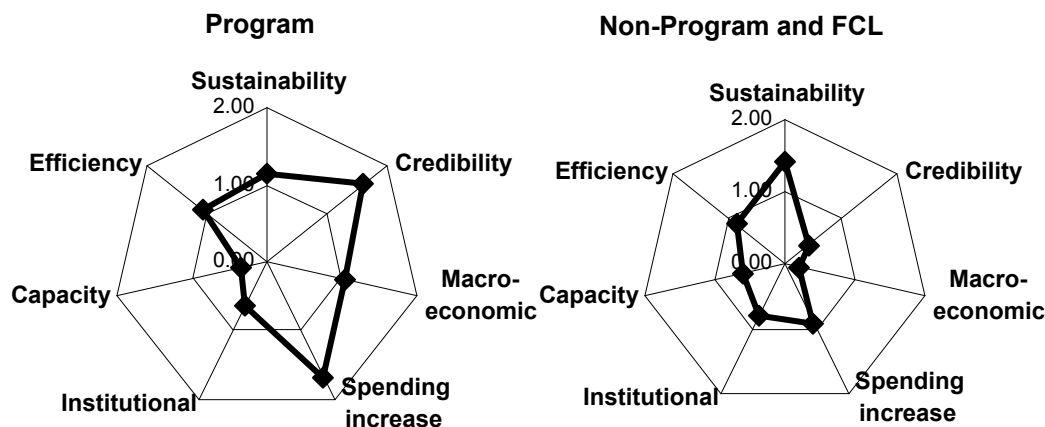
### Box 4. Constraints on Fiscal Policy Response in Emerging Market Countries

Policymakers have faced various constraints in responding to the global crisis. These are likely to have been more binding in emerging and developing countries. This box analyzes constraints, focusing on thirty emerging market countries, fifteen with IMF arrangements.

**Constraints.** Factors that may limit the scope for fiscal expansion during downturns include concerns with sustainability, macroeconomic conditions, institutional arrangements, and absorption capacity. Fiscal space defined this way covers both short-term considerations, as well as long-term sustainability and institutional concerns. To provide a basis for cross-country comparison, a weighted index of seven constraints was devised, based on thresholds and a 3-point scale, with 0 indicating no constraints, 1 indicating some constraints, and 2 indicating severe constraints. Weights and thresholds were assigned according to staff judgment, based on experience from past crises and the empirical literature.

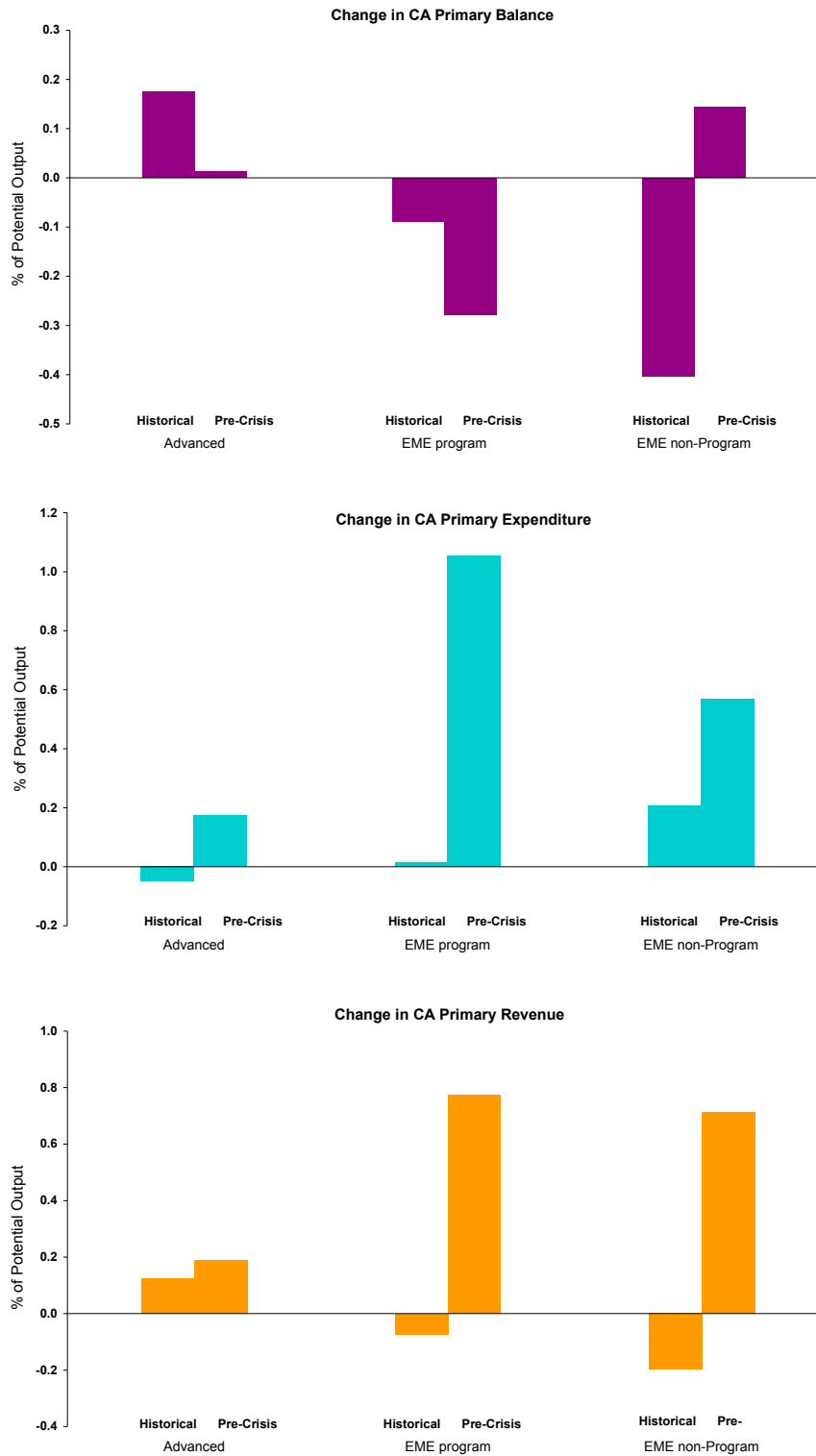
Constraint	Weight	Indicator (s)	Threshold
Sustainability	25 (split 50/50)	Average pre-crisis projected debt ratio, 2009-14 Difference from debt-sustaining primary balance (in percentage points)	0-25; 25-45; > 45 percent of GDP < -1; -1 to 1; > 1; unless projected debt > 80 percent of GDP
Credibility	20	Pre-crisis projected overall fiscal deficit in 2009-10 (percent of GDP)	< 3.6; 3.6 to 6; > 6 percent of GDP
Macroeconomic	20 (split equally)	Pre-crisis projected inflation in 2009-10 Pre-crisis projected current account deficit (2009-10) Pre-crisis projected reserve coverage of imports Pre-crisis projected coverage of short-term liabilities	< 5; 5 to 10; > 10 percent < 2.7; 2.7 to 5; > 5 percent of GDP > 3 months; 2 to 3; < 2 > 150 percent; 101 to 150; < 100
Spending absorption	10	Annual real spending growth, 2005-08	0-1; 1-3; > 3 percent
Institutional	10	Fiscal rules, FRLs, earmarking, revenue sharing arrangements	Desk judgment on binding nature
Capacity	10	Capability of quickly increasing capital spending or coverage of social safety nets	Desk judgment
Efficiency	5	Perception of the efficiency of spending and the coverage and structure of tax bases	Desk judgment
Total	100		

**Results.** Countries that have IMF arrangements have faced, on average, more binding constraints than countries without arrangements or countries with Flexible Credit Line arrangements, particularly concerning credibility, macroeconomic, and recent spending constraints (Figure). The overall index for countries with arrangements was 1.15, compared with 0.76 for non-arrangement and FCL countries. Both countries with and without arrangements are somewhat constrained along efficiency and sustainability dimensions, although notably, sustainability issues are more pronounced in non-arrangement countries.





**Figure 8. Change in Cyclically-Adjusted Fiscal Indicators During Upturn Periods**  
(In percent of potential output, simple averages)



Source: Staff estimates based on the October 2009 WEO. Pre-crisis period 2003–07, compared with previous upturn periods during 1980–2002. Positive amounts for the primary balance and revenues and negative amounts for expenditures imply counter-cyclical behavior.

**Box 5. IMF Technical Support for Structural Fiscal Reforms in Crisis Countries**

Countries affected by the crisis have received stepped-up advisory support from the IMF's Fiscal Affairs Department (FAD) to strengthen fiscal institutions and enhance the policy response. Support has been focused particularly on revenue administration and public financial management (PFM) efforts in Europe and Asia.

**Revenue administration.** With the crisis, revenue agencies have encountered growing compliance risks, including escalating tax debts, growth of the cash economy and tax evasion, dubious refund claims, and incorrect reporting of losses. To address these, FAD has helped design and implement strategies to contain noncompliance through targeted enforcement, while helping taxpayers in genuine distress. With FAD support, countries in central and eastern Europe have developed integrated strategies, focusing on consolidated compliance management across key taxpayer segments, and on identifying emerging revenue risks. Compliance improvement plans have aimed at addressing weaknesses in large taxpayer administration, VAT management, arrears collection, audit, and cross-border activity, while avoiding tax amnesties.

**PFM.** In crisis countries, efforts have focused on immediate efforts—tightening controls over budget execution and cash management functions—while helping improve medium-term budgeting and consolidation plans through multi-year spending ceilings, improved budget preparation and approval processes, strengthening external scrutiny of fiscal performance, and establishing frameworks to manage risks from contingent liabilities. FAD has assisted with the design of fiscal responsibility legislation to improve medium-term policy setting.

**Tax policy.** Assistance to crisis countries has aimed to address shortcoming in policy design and thereby mitigate tax avoidance and evasion. This has included simplifying specific tax policies, strengthening tax regimes for financial institutions, and reforming special VAT regimes (e.g., for agriculture).

**Expenditure policy.** In central and eastern Europe, FAD has provided advice on short-term expenditure rationalization, aimed at identifying sustainable ways of raising the efficiency of public spending. FAD has also provided advice on the design of social safety nets and the reform of subsidies to better target public spending on poor and vulnerable groups.

**Annex Table 1. G-20 Countries: Fiscal Balances and General Government Debt 1/ 2/**  
(In percent of GDP)

Overall Fiscal Balance							
Country	2007				Change from July Fiscal Monitor		
	(Pre-crisis)	2009	2010	2014	2009	2010	2014
Argentina	-2.1	-3.9	-2.4	-1.7	-0.6	-0.9	-1.3
Australia	1.5	-4.3	-5.3	-1.1	0.0	0.0	0.2
Brazil	-2.8	-3.8	-1.2	-1.0	-0.6	0.1	0.4
Canada	1.6	-4.9	-4.1	0.0	-0.8	-0.4	-0.4
China	0.9	-3.9	-3.9	-0.8	0.4	0.4	0.2
France	-2.7	-8.3	-8.6	-5.2	-0.9	-1.1	0.0
Germany	-0.5	-4.2	-4.6	0.0	0.4	0.8	0.5
India	-4.4	-10.4	-10.0	-5.7	-0.5	-1.5	-1.1
Indonesia	-1.2	-2.6	-2.1	-1.3	0.0	0.0	0.4
Italy	-1.5	-5.6	-5.6	-5.3	0.3	0.7	-0.5
Japan 3/	-2.5	-10.5	-10.2	-8.0	-0.2	0.0	-0.4
Korea	3.5	-2.8	-2.7	2.6	0.4	1.6	0.4
Mexico	-1.4	-4.9	-3.7	-3.1	-1.0	0.3	-0.2
Russia	6.8	-6.6	-3.2	2.2	-1.2	1.8	0.2
Saudi Arabia	15.7	5.0	10.0	14.5	0.8	1.3	1.2
South Africa	1.2	-4.4	-4.7	-2.5	-1.6	-1.6	-0.2
Turkey 4/	-2.1	-7.0	-5.3	-4.8	-1.2	0.1	0.3
United Kingdom	-2.6	-11.6	-13.2	-6.8	0.0	0.1	0.1
United States 5/	-2.8	-12.5	-10.0	-6.7	1.1	-0.2	-2.0
G-20 Countries (GDP PPP weighted)	-1.0	-7.9	-6.9	-3.7	0.1	0.0	-0.6
Advanced G-20 economies	-1.9	-9.7	-8.7	-5.3	0.4	0.0	-1.0
Emerging G-20 economies	0.3	-5.1	-4.1	-1.3	-0.3	0.1	0.0
Memorandum item: Excluding financial support							
G-20 Countries (GDP PPP weighted)	-1.0	-7.0	-6.7	-3.7	-0.3	-0.1	-0.6
Advanced G-20 economies	-1.9	-8.2	-8.4	-5.3	-0.4	-0.3	-0.9
Emerging G-20 economies	0.3	-5.1	-4.1	-1.3	-0.3	0.1	0.0

General Government Debt (Gross)							
Country	2007				Change from July Fiscal Monitor		
	(Pre-Crisis)	2009	2010	2014	2009	2010	2014
Argentina	67.9	60.5	58.1	46.4	10.1	7.5	-2.0
Australia	9.8	16.9	22.7	27.8	3.2	3.7	1.8
Brazil	66.8	68.5	65.9	58.8	-1.6	-2.7	-3.4
Canada	64.2	78.2	79.3	68.9	2.6	2.7	3.5
China	20.2	20.2	22.2	20.0	-0.6	-1.2	-1.3
France	63.8	78.0	85.4	96.3	0.6	1.6	0.9
Germany	63.4	78.7	84.5	89.3	-1.1	-2.3	-2.0
India	80.5	84.7	85.9	78.6	1.0	0.9	5.3
Indonesia	35.1	31.5	31.2	27.1	0.4	0.2	-1.3
Italy	103.5	115.8	120.1	128.5	-1.5	-3.1	-3.8
Japan	187.7	218.6	227.0	245.6	1.3	0.9	6.4
Korea	29.6	34.9	39.4	35.4	-0.9	-2.6	-4.0
Mexico	38.2	47.8	47.9	44.3	-1.4	-2.5	-0.2
Russia	7.4	7.2	7.7	7.2	-0.1	-0.1	-0.1
Saudi Arabia	18.5	14.5	12.5	9.3	-0.1	-0.1	-0.1
South Africa	28.5	30.8	33.5	34.8	1.9	3.0	5.4
Turkey 4/	39.4	48.1	49.6	52.8	1.1	-1.1	-5.3
United Kingdom	44.1	68.7	81.7	98.3	0.1	-0.5	-1.3
United States	61.9	84.8	93.6	108.2	-4.0	-6.2	-3.7
G-20 Countries (GDP PPP weighted)	62.0	75.1	80.2	85.9	-0.9	-1.9	-0.8
Advanced G-20 economies	78.2	98.9	106.7	118.4	-1.7	-3.0	-1.3
Emerging G-20 economies	37.4	38.9	39.6	36.2	0.0	-0.5	-0.2

Source: IMF, World Economic Outlook, October 2009 Update. More recent data for France and Mexico.

1/ Data are on calendar-year basis for the general government if available (otherwise central government). Debt is on gross basis for general government, except for Argentina and Korea (central government).

2/ Averages are based on 2008 PPP GDP weights.

3/ Includes financial sector-related measures of 0.5 percent of GDP in 2009, and 0.2 percent of GDP in 2010. These measures cover both subsidies to and capital injections in public financial institutions.

4/ Fiscal projections reflect staff's assessment of the policy measures underpinning the authorities' Medium-term Program.

5/ Includes financial sector support (3.2 percent of GDP in 2009 and 0.6 percent of GDP in 2010)

**Annex Table 2. G-20 Countries: Fiscal Expansion**  
(In percent of GDP, change with respect to pre-crisis year 2007)

	2009			2010			Fiscal Expansion	
	of which:			of which:			Change from July WEO	
	Overall Balance	Crisis-Related Discretionary Measures 1/	Other Factors 2/	Overall Balance	Crisis-Related Discretionary Measures 1/	Other Factors 2/	2009	2010
Argentina 3/	-1.8	-1.5	-0.3	-0.4	0.0	-0.4	-0.7	-1.0
Australia	-5.8	-2.9	-2.9	-6.8	-2.0	-4.8	0.0	0.0
Brazil	-1.0	-0.6	-0.4	1.6	-0.6	2.1	-0.4	0.3
Canada	-6.5	-1.9	-4.6	-5.7	-1.7	-4.0	-0.8	-0.4
China	-4.8	-3.1	-1.7	-4.8	-2.7	-2.1	0.4	0.4
France	-5.6	-0.7	-5.0	-5.9	-0.8	-5.0	-0.9	-1.1
Germany	-3.7	-1.6	-2.1	-4.2	-2.0	-2.2	0.4	0.8
India 4/	-6.0	-0.6	-5.4	-5.6	-0.6	-5.0	-1.3	-2.3
Indonesia	-1.4	-1.4	0.0	-0.9	-0.6	-0.2	0.0	0.0
Italy	-4.1	-0.2	-3.9	-4.1	-0.1	-4.0	0.3	0.7
Japan 5/	-7.4	-2.4	-5.0	-7.5	-1.8	-5.7	-0.2	0.0
Korea	-6.2	-3.6	-2.6	-6.2	-4.7	-1.5	0.4	1.6
Mexico	-3.5	-1.5	-2.0	-2.3	-1.0	-1.3	-1.0	0.3
Russia	-13.4	-4.1	-9.3	-10.0	-1.3	-8.6	-1.2	1.8
Saudi Arabia	-10.8	-3.3	-7.5	-5.7	-3.5	-2.2	0.8	1.3
South Africa 6/	-5.6	-3.0	-2.6	-5.9	-2.1	-3.8	-1.6	-1.6
Turkey 7/	-4.9	-1.2	-3.7	-3.2	-0.5	-2.7	-1.2	0.1
United Kingdom	-8.9	-1.6	-7.4	-10.6	0.0	-10.6	0.0	0.1
United States 8/	-6.4	-2.0	-4.4	-6.5	-1.8	-4.7	-0.8	-0.9
G-20 Countries (GDP PPP weighted)	-5.9	-2.0	-3.9	-5.7	-1.6	-4.0	-0.4	-0.2
Advanced G-20 economies	-6.3	-1.9	-4.4	-6.5	-1.6	-4.8	-0.4	-0.3
Emerging G-20 economies	-5.4	-2.2	-3.2	-4.4	-1.6	-2.8	-0.4	0.0
United States 9/	-9.6	-2.0	-7.6	-7.1	-1.8	-5.3	1.0	-0.3
Japan 9/	-7.9	-2.4	-5.5	-7.7	-1.8	-5.9	-0.2	0.0
G-20 weighted average including financial se	-6.9	-2.0	-4.9	-5.8	-1.6	-4.2	0.1	0.0

Source: Staff estimates based on the October 2009 WEO. More recent data for France and Mexico.

1/ Figures reflect the budgetary cost of crisis-related discretionary measures in each year compared to 2007 (baseline), based on measures announced through mid-October. They do not include (i) acquisition of assets (including financial sector support) or (ii) measures that were planned before the crisis.

2/ Includes estimates of the impact of automatic stabilizers, plus noncrisis discretionary spending or revenue measures and the impact of nondiscretionary effects on revenues beyond the normal cycle (e.g., the revenue impact of the extraordinary decline in commodity and real estate prices and financial sector profits). A positive amount reflects factors limiting the size of permissible deficits (e.g., assumed compliance with fiscal rules).

3/ Based on staff's analysis.

4/ Discretionary measures on fiscal-year basis. Includes only on-budget measures. Additional off-budget measures amount to 0.8 percent of GDP in 2008/09 and 1.6 percent of GDP in 2009/10 (including 0.4 percent of GDP for bank recapitalization).

5/ Based on staff preliminary analysis, financial sector-related measures of 0.5 percent of GDP in 2009, and 0.2 percent of GDP in 2010 are excluded, so as to focus on the fiscal measures with direct effect on demand. These measures cover both subsidies to and capital injections in public financial institutions.

6/ Fiscal-year basis. Based on staff estimates of the cyclically-adjusted general government balance. Additional stimulus in the form of infrastructure investment is being provided by the broader public sector, so that the total fiscal stimulus (as measured by the public sector borrowing requirement) is 4.2 percent of GDP in 2008, 6.2 percent in 2009, and 4.9 percent in 2010.

7/ Fiscal projections reflect staff's assessment of the policy measures underpinning the authorities' Medium-term Program. Includes only discretionary measures that could be quantified.

8/ Excludes losses from financial system support measures (estimated at 3.2 percent of GDP in 2009 and 0.6 percent of GDP in 2010), so as to focus on the fiscal measures with direct effect on demand.

9/ Includes cost of financial system support measures.

**Annex Table 3. Support for Financial and Other Sectors and Upfront Financing Need**  
(As of August 2009; in percent of 2008 GDP; average using PPP GDP weights) 1/

	Capital Injection	Purchase of Assets and Lending by Treasury 2/	Guarantees 3/	Liquidity Provision and Other Support by Central Bank	Upfront Government Financing 4/
	(A)	(B)	(C)	(D)	(E)
Advanced North America					
Canada	0.0	10.9	13.5	1.5	10.9
United States 5/	5.2	1.5	10.6	8.1	6.9
Advanced Europe					
Austria	5.3	0.0	30.1	...	8.9
Belgium	4.8	0.0	26.4	...	4.8
France 6/	1.4	1.3	16.4	...	1.6
Germany	3.8	0.4	18.0	...	3.7
Greece	2.1	3.3	6.2	...	5.4
Ireland	5.9	0.0	198.1	...	5.9
Italy 7/	0.6	0.0	0.0	...	0.6
Netherlands	3.4	11.2	33.6	...	14.6
Norway 8/	2.0	15.8	0.0	21.0	15.8
Portugal 9/	2.4	0.0	12.0	...	2.4
Spain 10/	0.8	3.9	15.8	...	4.6
Sweden 11/	1.6	4.8	47.5	13.9	5.2
Switzerland	1.1	0.0	0.0	24.9	1.1
United Kingdom 12/	3.9	13.8	53.2	19.0	20.0
European Central Bank	...	...	...	8.5	...
Advanced Asia and Pacific					
Australia	0.0	0.7	8.8	...	0.7
Japan 13/	2.4	11.4	7.3	1.9	0.8
Korea 14/	2.3	5.5	14.5	6.5	0.8
Emerging Economies					
Argentina 15/	0.0	0.9	0.0	5.4	0.9
Brazil 16/	0.0	0.8	0.0	10.8	0.0
China	0.0	0.0	0.0	22.5	0.0
India	0.4	0.0	0.0	8.3	0.4
Indonesia 17/	0.0	0.0	0.1	1.2	0.1
Hungary 18/	1.1	2.4	1.1	13.6	3.5
Poland	0.0	0.0	3.2	5.4	0.0
Russia	1.2	1.2	0.5	11.6	2.3
Saudi Arabia 19/	0.0	1.2	N/A	30.6	1.2
Turkey 20/	0.0	0.3	0.0	3.7	0.0
Average					
G-20	2.2	2.7	8.8	9.7	3.7
Advanced Economies	3.4	4.1	13.9	7.6	5.7
In billions of US\$	1,160	1,436	4,638	2,804	1,887
Emerging Economies	0.2	0.3	0.1	13.5	0.4
In billions of US\$	22	38	7	1,581	47

Sources: FAD-MCM database; IMF staff estimates based on announcements by official agencies. Among G-20 countries, Mexico and South Africa have not provided any direct support to the financial sector.

1/ Columns A, B, C, and E indicate *announced or pledged amounts, and not actual uptake*. Column D indicates the *actual changes in central bank balance sheets from June 2007 to June 2009*. While these changes are mostly related to measures aimed at enhancing market liquidity and providing financial sector support, they may occasionally have other causes, and also may not capture other types of support, including that due to changes in regulatory policies. For the Euro zone countries, see the ECB row. Averages for column D include the Euro zone as a whole.

2/ Column B does not include treasury funds provided in support of central bank operations. These amount to 0.5 percent of GDP in the United States, and 12.8 percent in the United Kingdom.

3/ Excludes deposit insurance provided by deposit insurance agencies.

4/ Includes gross support measures that require upfront government outlays. Excludes recovery from the sale of acquired assets.

5/ Estimated upfront financing need for 2009–10 is US\$990 bn (6.9 percent of GDP), consisting of the allocated amount under TARP (US\$510 bn); Treasury purchases of GSE preferred stocks (US\$400 bn); and treasury support for Commercial Paper Funding Facility (US\$50 bn).

## Notes to Annex Table 3 (continued):

- 6/ Support to the country's strategic companies is recorded under (B); of which €20 bn will be financed by a state-owned bank, *Caisse des Dépôts et Consignations*, not requiring upfront treasury financing.
- 7/ Does not include the temporary swap of government securities for assets held by Italian banks undertaken by the Bank of Italy.
- 8/ Excluding asset accumulation in Sovereign Wealth Funds, the balance sheet expansion during the period was only 4.5 percent of GDP (Column D).
- 9/ A maximum amount of €20 bn (12% of GDP) is allocated to both guarantees and capital injection, with the latter not exceeding €4 bn.
- 10/ Spain created a Bank Restructuring Fund (FROB) in June, with the current legislative framework providing for €9 billion (direct government financing of €6.75 billion, complemented by €2.25 billion from the deposit insurance funds), to support the possible eventual restructuring of the financial sector. The size of the FROB could potentially be increased up to €99 billion (9 percent of GDP) through debt issuance. Column C includes approved bank debt guarantees up to €100 bn, and another €100 bn that would be extended, if needed.
- 11/ Some capital injection (SEK50 billion) will be undertaken by the Stabilization Fund.
- 12/ Estimated upfront financing need is £289 bn (20 percent of GDP), consisting of Bank Recapitalization Fund (£56 bn), Special Liquidity Scheme (£185 bn) and financing for the nationalization of Northern Rock and Bradford & Bingley (£48 bn).
- 13/ Budget provides JPY 3,900 bn (0.8 percent of GDP) to support capital injection by a special corporation and lending and purchase of commercial paper by policy-based financing institutions.
- 14/ In 2009, KRW 8 trillion will be provided from the budget to support for SMEs.
- 15/ Staff estimates.
- 16/ Liquidity support and loan purchases are provided through public banks and deposit insurance fund, entailing no upfront financing.
- 17/ Small interventions have been recently implemented through the deposit insurance agency that are not yet quantified.
- 18/ The expansion of the central bank balance sheet reflects mostly the increase in Net Foreign Assets as a result of IMF and EU disbursements in the context of the SBA-supported program. During this period, the increase in central bank domestic assets was limited to 2.3 percent of GDP.
- 19/ A significant part of the central bank balance sheet expansion is due to a large accumulation of foreign assets during 2008.
- 20/ Column B shows loans by the SME Industry Development Organization, not requiring direct treasury financing.

**Annex Table 4. Financial Sector Support Utilized Relative to Announcement**  
(In percent of 2008 GDP, unless otherwise indicated)

Countries	Capital Injection		Purchase of Assets and Lending by Treasury	
	Amount used	In percent of announcement	Amount used	In percent of announcement
<b>Advanced North America</b>				
Canada	...	...	5.8	53.5
United States	2.4	46.1	0.7	48.0
<b>Advanced Europe</b>				
Austria	1.7	32.7	...	...
Belgium	4.7	97.6	...	...
France	0.8	58.1	0.4	26.5
Greece	1.7	82.0	1.8	55.0
Ireland	5.4	90.9	...	...
Italy	0.1	14.5	...	...
Netherlands	2.4	72.8	5.5	49.1
Norway	0.0	0.0	7.2	45.5
Portugal	...	...	...	...
Spain	0.0	0.0	1.8	44.6
Sweden	0.2	11.2	...	...
Switzerland	1.1	100.0	...	...
United Kingdom	3.3	85.2	3.4	24.4
<b>Advanced Asia and Pacific</b>				
Australia	...	...	0.5	77.5
Japan	0.0	1.0	1.2	10.9
Korea	0.8	33.0	0.3	4.8
<b>Emerging Economies</b>				
Brazil	...	...	0.3	43.5
India	0.0	9.5	0.0	...
Indonesia	...	...	...	...
Hungary	0.1	9.3	2.0	82.3
Russia	0.7	60.4	0.6	54.0
Saudi Arabia	...	...	0.6	51.4
<b>Average 1/</b>				
G-20	1.2	43.9	1.0	27.0
Advanced Economies	1.5	43.9	1.2	26.1
In billions of US\$	446	...	366	...
Emerging Economies	0.2	44.6	0.3	50.3
In billions of US\$	11	...	17	...

Source: Staff estimates.

1/ PPP weighted averages for the countries listed above.

**Annex Table 5. G-20 Countries: Selected Fiscal Risk Indicators**

	Ratio:		Ratio:		Ratio:		Ratio:	
	Net interest payments to GDP		Net interest payments to expenditure		Net interest payments to fiscal revenues		General government gross debt to fiscal revenues	
	2007	2014	2007	2014	2007	2014	2007	2014
Argentina	4.5	2.6	13.5	7.0	14.4	7.3	215.1	131.9
Australia	-0.4	0.9	-1.2	2.4	-1.1	2.5	26.4	77.1
Brazil	6.3	4.3	16.8	11.5	18.1	11.8	190.2	162.4
Canada	0.6	0.2	1.5	0.5	1.5	0.5	158.4	166.8
China	0.4	0.6	2.0	2.5	1.9	2.6	98.9	90.2
France	2.3	3.2	4.5	5.9	4.7	6.5	128.7	197.2
Germany	2.4	2.1	5.4	4.8	5.5	4.8	144.5	203.4
India	5.5	5.6	20.3	19.1	24.2	23.8	353.2	336.5
Indonesia	2.0	1.8	10.2	10.2	10.9	11.0	189.3	168.2
Italy	4.8	6.2	9.9	11.8	10.3	13.1	220.7	272.9
Japan (net debt)	0.5	2.6	1.5	6.5	1.6	8.1	604.5	446.2
Korea	1.4	1.5	6.4	6.4	5.5	5.8	118.7	136.6
Mexico	2.7	2.8	11.7	11.2	12.4	12.8	178.4	204.2
Russia	0.6	0.6	1.7	2.1	1.4	1.9	18.5	21.4
Saudi Arabia	1.5	0.6	4.3	1.8	2.9	1.3	36.9	19.2
South Africa	1.1	1.4	2.9	3.3	2.7	4.0	88.1	276.8
Turkey	5.9	5.4	17.4	14.8	18.6	17.0	124.5	165.1
United Kingdom	1.6	3.1	3.9	7.0	4.2	8.3	116.8	267.4
United States	2.2	4.5	6.6	12.4	7.2	15.2	206.9	364.4
G-20 Countries (GDP PPP weighted)	2.1	3.0	6.6	8.7	6.8	10.0	197.9	246.0
Advanced G-20 economies	1.9	3.5	5.2	8.8	5.5	10.7	225.5	300.5
Emerging G-20 economies	2.5	2.3	9.6	8.3	9.5	8.9	142.3	137.1

Source: Staff estimates based on the October 2009 WEO. Projections for Turkey reflect staff's assessment of the policy measures underpinning the authorities' Medium-term Program.



## Appendix: Deficits, Debt, and Interest Rates

1. **This Appendix presents new IMF Fiscal Affairs Department empirical work on the factors affecting long-term interest rates on government debt.** Although high deficits and rising debt appear to have had little impact on interest rates thus far in the crisis, this likely reflects weak private demand and expansionary monetary policies. The impact of general government debt and deficits on interest rates may become more evident as private demand recovers and monetary policy is eventually tightened, with potentially significant implications for financial markets and the conduct of fiscal policy.

2. **Fiscal deficits and debts can raise long-term government bond yields through various channels.** Fiscal imbalances are likely to reduce national savings and—for a given demand for savings—will lead to higher interest rates; risk premia may rise with investors’ perceptions of threats to debt sustainability; roll-over risk of government debt may be exacerbated by an increase in sovereign global bond supply in the absence of a commensurate rise in demand; and nominal yields on sovereign securities may also rise due to higher inflation expectations and as a result of investors’ portfolio decisions.<sup>19</sup>

3. **Empirical results of IMF staff analysis confirm that increasing fiscal deficits raise bond yields in both advanced and emerging markets.**<sup>20</sup> Long-term nominal bond yields increase significantly when the overall fiscal balance or primary balance deteriorates. An increase in the overall fiscal deficit of 1 percent of GDP pushes up bond yields by about 20 basis points over the medium term. A 1 percent of GDP deterioration in the primary fiscal balance increases bond yields by a similar amount.<sup>21</sup> The effect on yields is higher in emerging economies than in advanced economies: rates rise by about 30 basis points for a percentage point increase in the ratio of deficits to GDP. The larger impact possibly reflects

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<sup>19</sup> If the quality of new debt issuance is perceived to be lower, given the stock of debt, investors will shift their holdings of financial assets away from sovereign debt. As a result, sovereign bond yields rise as debt increases.

<sup>20</sup> Results draw from ongoing IMF FAD work for a forthcoming working paper. The following reduced-form specification of the nominal yield on 10-year government bonds ( $r^{10Y}$ ) is used for a panel of 31 advanced and emerging market economies (indexed by  $i$ ) during 1980–2008 ( $t$ ):

$$r^{10Y}_{it} = \alpha_i + \beta_1 r^M_{it} + \beta_2 \pi_{it} + \delta_1 d_{it} + \delta_2 D_{it-1} + \rho_1 z_{it} + \varepsilon_{it}$$

where  $r^M$  is the short-term interest rate (to control for the effects of monetary policy on the bond yield term structure),  $\pi$  is inflation (expected to have a positive impact on nominal rates),  $d$  is the fiscal deficit in percent of GDP,  $D$  is the initial level of general government debt in percent of GDP, and  $z$  is lagged output growth (to control for the country’s cyclical position);  $\varepsilon$  is the error term. Results are based on fixed effects estimates. Results are found to be robust to potential endogeneity of fiscal variables, the impact of global risk perception in financial markets (as measured by the VIX index), and residuals’ heterogeneity and serial correlation. All findings reported in the text are based on statistically significant coefficients.

<sup>21</sup> Rolling recursive estimates show that both the significance and the size of the estimated effect of fiscal deficits on yields increase with time after 2003. The effect of the 2008 crisis year on these estimates is, however, negligible.

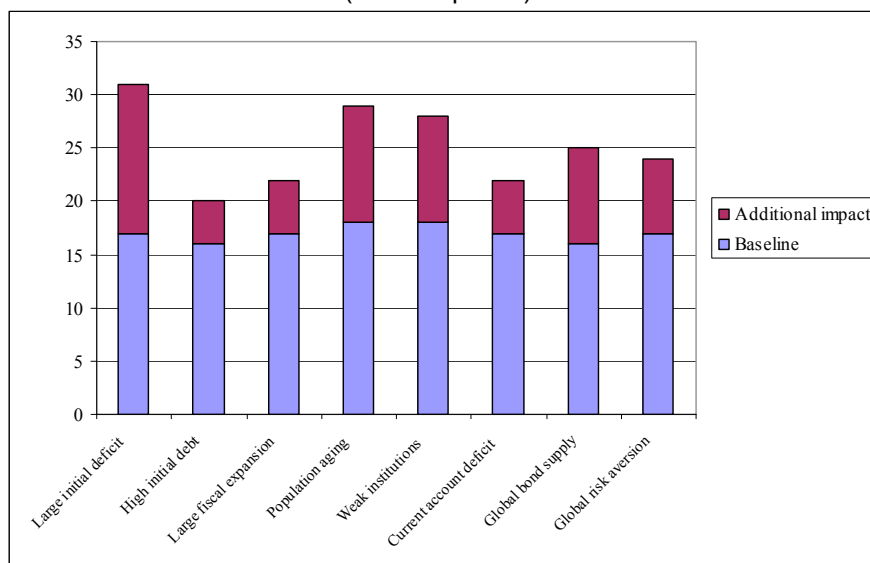
lower tolerance for debt, higher exposure to currency risks, and vulnerability to capital flow reversals in emerging economies.

4. **Several factors can magnify the impact of fiscal imbalances on sovereign bond yields.** In particular, the results suggest that the overall impact of higher deficits on interest rates is greater (up to 30 basis points) in countries with certain characteristics (Figure 1):<sup>22</sup>

- poor initial fiscal conditions;
- weak institutions;
- low domestic savings;
- less than full access to global capital inflows.

These effects are compounded in periods of global risk aversion and uncertainty.

**Appendix Figure 1. Impact of Fiscal Expansions in Countries with Selected Characteristics 1/**  
(In basis points)



1/ Estimated impact on 10-year bond yields of a one percent of GDP increase in fiscal deficits. Each bar measures the impact of budgetary deterioration for economies or years with the selected characteristics. The impact is estimated separately for each bar and is not additive across the different characteristics

5. **Expectations about long-term fiscal vulnerability also affect the impact of deficits on bond yields.** In countries with faster population aging, bond yields rise by more than an additional 10 basis points for each one percent of GDP increase in the fiscal deficit. This likely reflects expected stronger spending pressures over the medium term, constraining

<sup>22</sup> These results are based on augmenting the baseline regression model with an interaction between the fiscal deficit and a dummy capturing selected features (e.g., initial fiscal conditions, quality of institutions). See Appendix Table 1 for a definition of the variables used.

the space for fiscal adjustment. Inflation expectations also matter. If the increase in sustainability risks raises inflationary expectations, nominal interest rate could be higher, with a one percent increase in current inflation raising bond yields by up to an additional 80 basis points.

6. **High levels of general government debt may limit the ability of countries to respond to adverse shocks.** While the impact on bond yields of a given increase in debt is considerably smaller than that of an increase in deficits (about 5 basis points for an increase in the debt-to-GDP ratio of one percentage point), countries with initial high debts experience sharper increases in interest rates for a given fiscal balance deterioration (Box 1). This could reflect heightened market concerns about solvency risks, as actual debt levels move close to market-perceived sustainability thresholds. Countries with higher initial deficits are also likely to experience larger increases in yields, perhaps because pre-existing fiscal problems would make the return to fiscal stability associated with any further deterioration more difficult. Staff analysis suggests that a deficit above 2 percent of GDP prior to the fiscal expansion raises the impact on bond yields by an additional 15 basis points for each percentage point of GDP larger current period deficit. Initial debt levels above 80 percent of GDP add about 5 basis points to the baseline effect of an increase in fiscal deficits.

7. **A large fiscal deterioration can modify market perceptions about fiscal solvency.** A sharp increase in the deficit may signal a structural change in policy and be viewed by markets as the start of a permanent phase of higher deficits and credit risk. When deficits are large enough to be perceived to trigger a shift in the conduct of fiscal policy, effects on bond yields can rise significantly. Episodes of large fiscal deficit increases lead to substantially higher nominal and real long-term interest rates on government bonds. Estimates suggest that the additional impact on bond yields of a large fiscal balance deterioration<sup>23</sup> adds around 5 basis points to the baseline effect for each one percent of GDP increase in the fiscal deficit.

8. **Differences in institutional features and domestic saving rates also play a role in determining the impact of deficits on interest rates.** The quality of governance is important, as better institutions signal the credibility of economic policies, thereby reducing risks about policy implementation. For countries with *weaker institutions* and higher political risks (measured by the ICRG political risk index) the impact of a fiscal deterioration is about 10 basis points higher than in other countries. Economies with structurally high domestic private savings and systems that rely on bank financing more than capital markets for funding investment have also been seen to be more able to absorb an increase in the public bond supply.<sup>24</sup> In countries with low saving ratios, bond yields rise significantly more than in

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<sup>23</sup> Expansions in the primary fiscal deficit above 1½ percent of GDP.

<sup>24</sup> Home bias in investment can also be beneficial as it channels domestic savings to the government securities market. In Japan, the higher share of domestic purchases of government securities may be linked to lower spread volatility.

other countries. This may come at the cost of lower financing for investment and crowding out of private sector credit.

### Appendix Box 1. Previous Empirical Findings

**Empirical studies on the impact of fiscal variables on interest rates have yielded results consistent with those reported here.** Studies focusing on flow fiscal variables have typically found larger estimated effects on long-term government bond yields than those considering stock variables (Haugh, Olivaud, and Turner, 2009). Generally, estimated impacts range from a minimum of 10 basis points up to 60 basis points for a percentage point of GDP increase in fiscal deficit. The bulk of the empirical analyses, however, relates to only advanced economies. A positive impact of deficits on sovereign bond yields is found more frequently when expected deficits and long-horizon forward interest rates are used (Laubach, 2009).

**Several results highlight the nonlinear effects of public debt on interest rates.** Ardagna, Caselli, and Lane (2007) look at 16 OECD countries and find that the impact of debt on long-term bond yields depends on initial debt levels. Higher initial debt raises the perception that governments will be less able to service their liabilities and therefore increases credit risk. Also, countries with large debt accumulation tend to be more at risk of inflationary pressures. These factors affect the long end of the term structure curve and raise borrowing cost for long-term government securities nonlinearly.

**Cross-section studies like that conducted here typically find smaller effects than analyses of individual countries.** This may be because in the pooling of data, country-specific coefficients tend to be heterogeneously affected by institutional and structural factors not adequately controlled for in the analysis. Reinhart and Sack (2000) find that the impact of a deterioration in the fiscal balance by one percent of GDP in the current and the following year raises government bond yields by 9 basis points in a sample of OECD countries, but by 12 basis points in a more limited, but less heterogeneous, sample of G-7 countries.

9. **Global factors increasingly have a pronounced effect on government securities markets.** In the last decade, capital inflows have been found to increase sovereign bond market liquidity and lower yields (Hauner and Kumar, 2006). The increase in global financial integration, particularly for sovereign bond markets, has been striking and capital inflows have helped reduce excess demand pressures for these securities (Box 2). Empirically, higher foreign investment flows (above 10 percent of GDP) limit the increase in bond yields due to fiscal expansions (reducing the impact of a 1 percentage point of GDP deficit increase by about 5 basis points relative to the baseline), as countries with capital inflows are more able to roll over maturing debt and finance new borrowing more readily. However, in economies with current account deficits, bond yields rise 5 basis points more for each percentage point of GDP increase in fiscal deficits.

10. **Global sovereign bond supply has risen sharply and will continue to be high over the next years, raising borrowing costs in countries with higher credit risks.** An increase in global supply is likely to affect the price at which countries with lower credit risk can tap financial markets, thereby raising long-term interest rates. Issuance of new sovereign securities has increased on a global basis as a result of the crisis, fiscal deficit financing requirements, and debt-creating financing support measures. Higher global bond supply (as measured by gross financing needs in the sample) could raise the impact on bond yields of a one percent of GDP deficit increase by an additional 10 basis points, with the effect likely to be larger for countries with higher credit risks.

## Appendix Box 2. Global Market Integration and Bond Yields

**In advanced economies, long-term yields have become increasingly dependent on global conditions.** The availability of global funds has made the demand for sovereign securities more dependent on global investors' preferences, while country-specific risk factors may play a smaller role in G-7 countries (Kumar and Okimoto, 2009). Pricing of longer debt maturities tends to be increasingly correlated with global risk appetite, global savings, and investment, and less affected by country-specific considerations. As a result, cross-country correlation of long-term government bond yields has increased markedly.

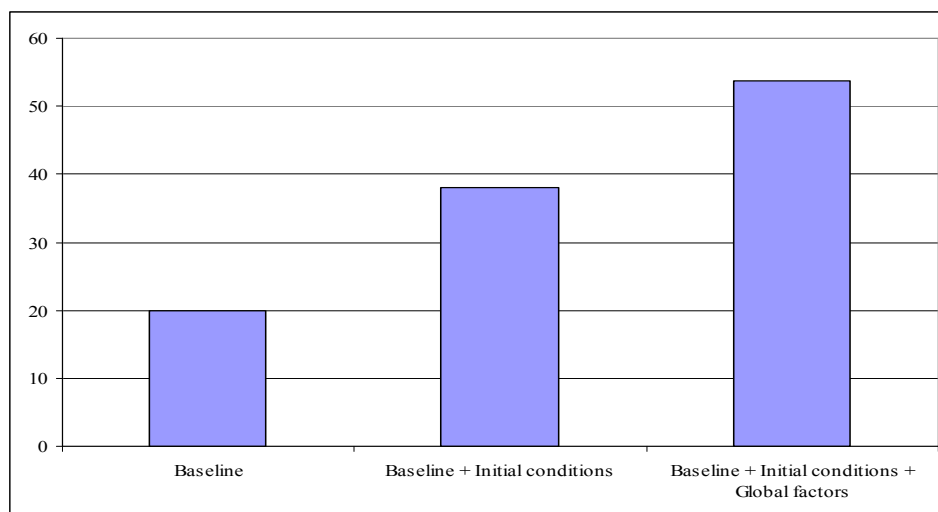
**The term structure of the government yield curve has also changed.** With higher correlation across advanced economies of the returns at the long than at the short end of the government bond yield curve, differences in the steepness of the curve largely reflect differences in inflationary pressures. In fact, short-term rates continue to be dominated by monetary policy that has diverged across countries (e.g., in the United States and the European Union) despite the increase in bond market integration.

**Results for a broader sample of countries show that this trend is not limited to advanced economies.** Staff analysis for a sample of 31 advanced and emerging economies during 1980–2008, shows that the estimated correlation between the three-month and 10-year government bond yields declined from 0.7 in 1980–1999 to 0.4 in the 2000–08 period. This trend is more marked in the case of advanced economies.

**Sovereign bond yields may, however, again begin to reflect country-specific factors as a result of the crisis.** With considerable differences in the deficits and debt profiles of G-20 countries, specific credit risk and concerns about country solvency are likely to return to the fore. This could be accentuated by a return to the home bias and a reduction in global capital flows to sovereign bond markets.

11. **A renewed decline in global risk appetite could also raise sovereign risk premia.** General risk aversion can raise the risk premia demanded by investors on higher-debt sovereigns, as portfolio reallocation triggers the sale of high return assets and a flight to quality. While this effect may not raise interest rates on sovereign debt for all countries, marked concerns about economic instability feeding into higher solvency risks can generate a rapid drop in demand for sovereign assets, even those of borrowers with high credit ratings. In periods of *financial distress* as measured by wider CDS spreads and large stock market volatility (based on high levels of the VIX index) markets react less favorably to debt build up. In such periods, the additional impact on bond yields of a one percent of GDP deficit expansion is about 10 basis points.
12. **Given the extent of the fiscal deterioration experienced in some countries, the impact of the crisis on bond yields may be sizable, especially in countries that entered the period with weak fundamentals.** For a country experiencing an increase in the fiscal deficit of 5 percent of GDP, long-term interest rates could rise by 100 basis points. This effect could be compounded by a combination of adverse factors (e.g., weak initial fiscal conditions, poor governance, and elevated global risk aversion) leading to an impact of up to 270 basis points (Figure 2).

**Appendix Figure 2. Impact of Fiscal Deficits and Country Features 1/**  
(In basis points)

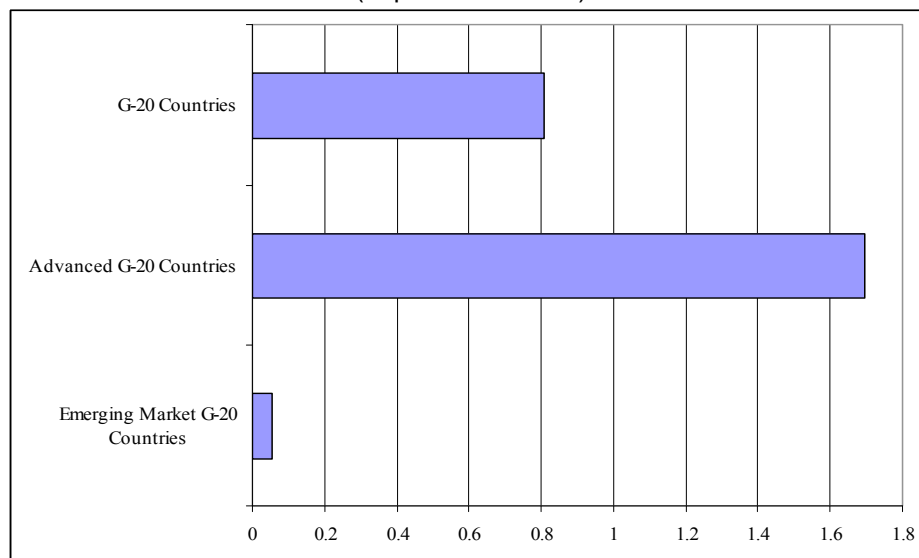


1/ Estimated impact on 10-year bond yields for each one percent of GDP increase in fiscal deficits taking into account the simultaneous effect of selected factors: initial conditions include fiscal (e.g., initial debt levels) and other structural characteristics (i.e., quality of institutions). Global factors include global risk aversion and global bond supply. Source: Staff estimates

**13. Simulation analysis suggests a pronounced increase in debt service costs for G-20 countries.** Based on the above findings, advanced economies with sizeable accumulations of debt are more likely to experience substantial increases in debt service costs over the medium term. The results of a simulation<sup>25</sup> highlight that a persistent increase in debt of about 20 percent of GDP would raise debt service costs by more than 1½ percent of GDP in G-20 countries (Figure 3). The impact of the crisis is likely to be markedly lower in emerging markets, given the significantly smaller increase in their debts, despite the finding of higher elasticities of bond yields to fiscal deficits in this group of economies (assuming no pronounced spillover effects from advanced economies).

<sup>25</sup> The results are based on econometric estimates of the elasticity of bond yields to debt expansions, separately for advanced and emerging markets. The increase in bond yields is based on the expected fiscal debt in 2010 compared to 2007.

**Appendix Figure 3. Impact of Fiscal Expansions on Debt Service 1/**  
(In percent of GDP)



1/ Results measure the impact of the increase in debt on interest spending as a share of GDP. The estimated impact is based on the projected increase in debt between the pre-crisis year and 2010 and the estimated elasticity for the impact of debt on bond yields. Source: Staff estimates

**Appendix Table 1. Definition of Dummy Variables**

Variable	Definition
Large initial fiscal deficit	Fiscal deficit above 2 percent of GDP in the year before
High initial debt	General government debt above 80 percent of GDP in the year before
Large fiscal expansion	Reduction in the primary fiscal balance above 1.5 percent of GDP in the year before
High old-age ratio	Positive growth in the share of the population aged 65 or more
Weak institutions	ICRG political risk index above sample average
Current account deficit	Negative current account balance in percent of GDP
Global bond supply	Average gross financing needs above 20 percent of GDP
Global risk average	VIX index above 30

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