



Debt Sustainability Analysis in Market Access Countries

The IMF's New Approach

REZA BAQIR

Division Chief

Debt Policy Division

Strategy, Policy, and Review Department

The old DSA

Public debt (in percent of GDP)

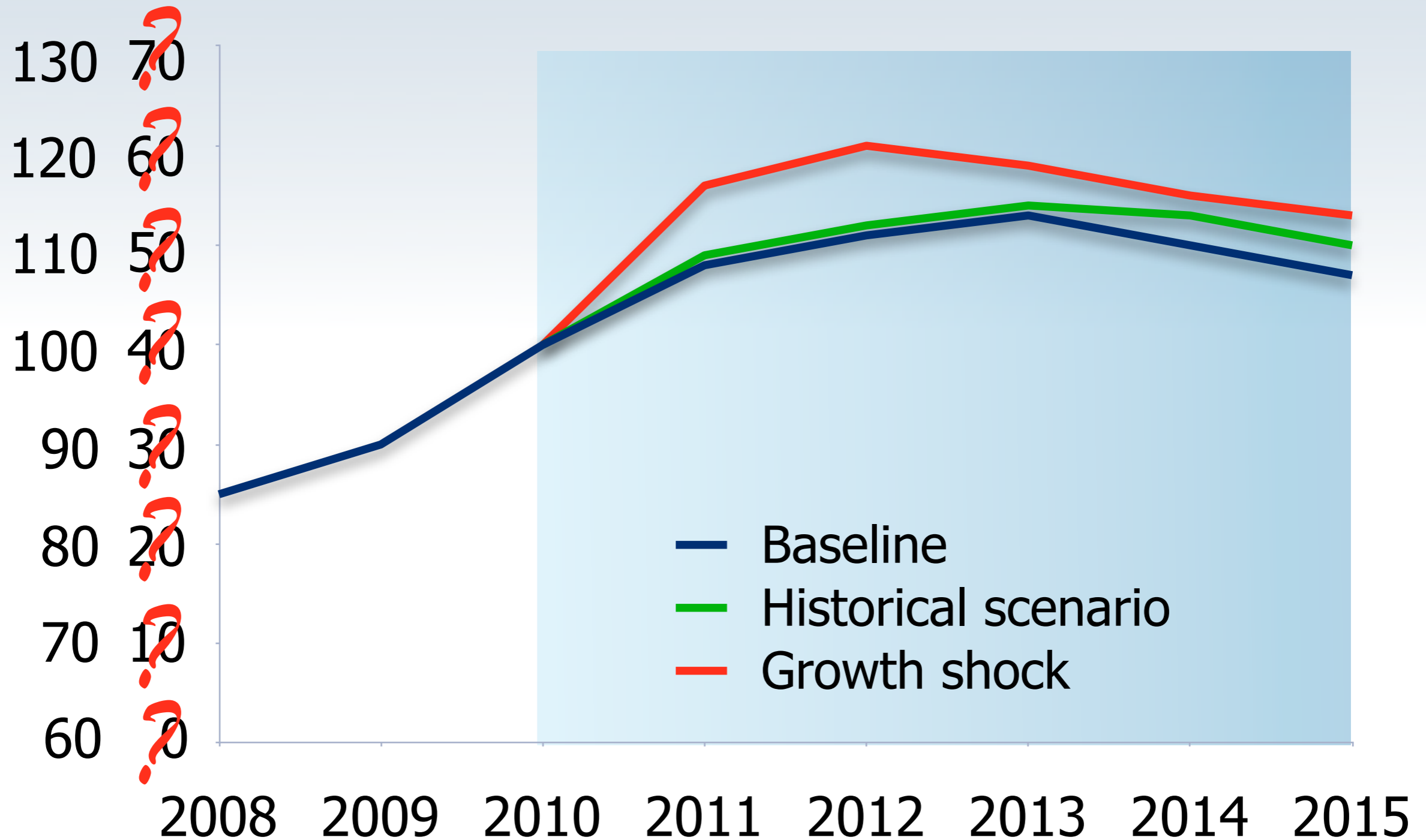


Figure 3. Greece: Public Debt Sustainability: Bound Tests 1/
(Public debt in percent of GDP)

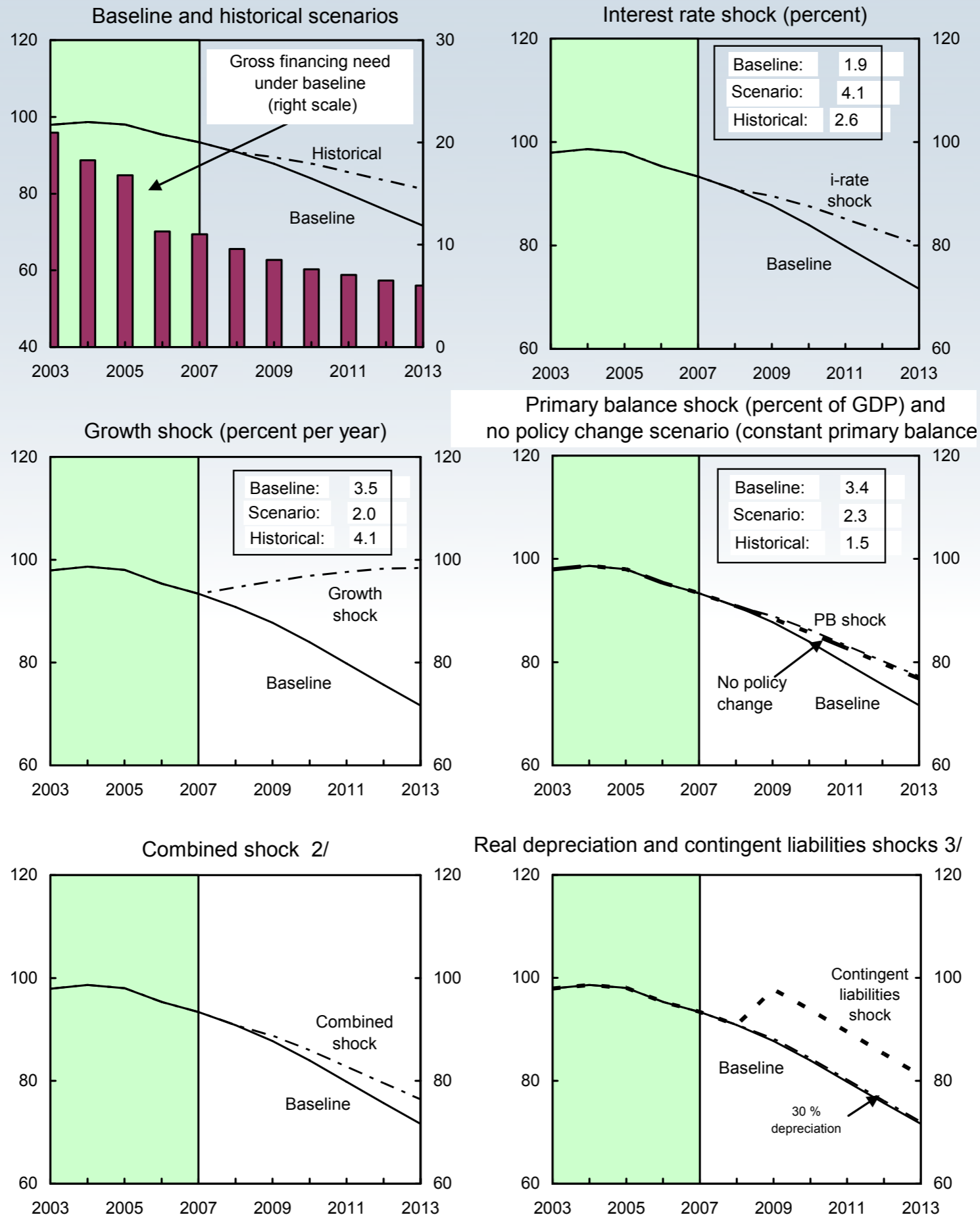
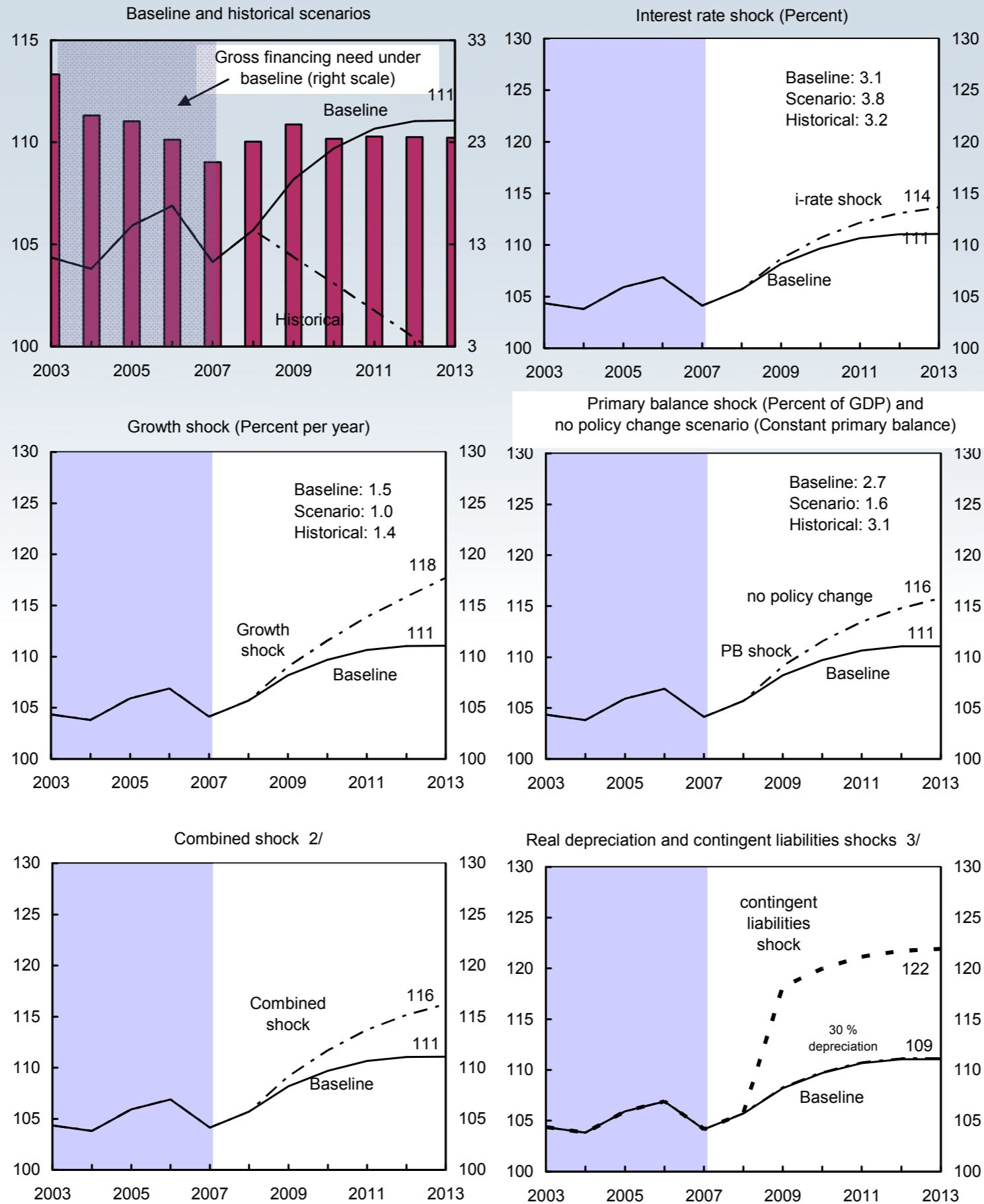


Figure 9. Italy: Public Debt Sustainability: Bound Tests 1/
(Public debt in percent of GDP)



Key changes to the DSA framework

Risk-based approach

Realism of baseline assumptions

Risks to level and profile of sovereign debt

Stochastic simulations of debt paths

Risk-based approach



Lower Scrutiny

Basic DSA



Higher Scrutiny

Basic DSA

Text



Realism of baseline assumptions

Risks to level and profile of sovereign debt

Stochastic simulations of debt paths

Risk-based approach

Public debt level

> 50% of GDP for EMs

> 60% of GDP for AEs

Public gross financing needs

> 10% of GDP for EMs

> 15% of GDP for AEs

Exceptional access

None of the
above



Any of the
above

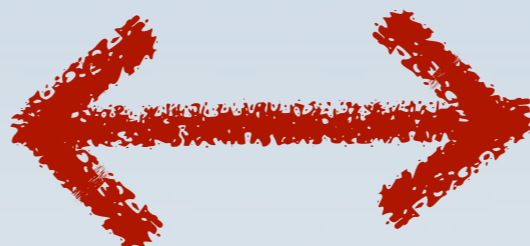


Lower Scrutiny



Higher Scrutiny

Lower Scrutiny



Higher Scrutiny

Indicators	AEs	EMs
3-year cumulative primary balance adjustment (percent of GDP)	2	2
Coefficient of variation of growth	1	1
Bond yield spreads or EMBI global spreads (basis points)	600	600
External financing requirements (percent of GDP)	25	15
Public debt held by non-residents (share of total)	45	45
Public debt in foreign-currency (share of total)	n.a.	60
Annual change in the share of short-term public debt at original maturity	1.5	1.0

Constrained discretion: final determination informed by staff judgment

Requirements for Lower Scrutiny Countries

Basic DSA:

- Baseline scenario**
- Alternative scenarios**

**and where relevant:
contingent liabilities and
customized scenarios**

Requirements for Lower Scrutiny Countries

Basic DSA Indicators and Debt Dynamics

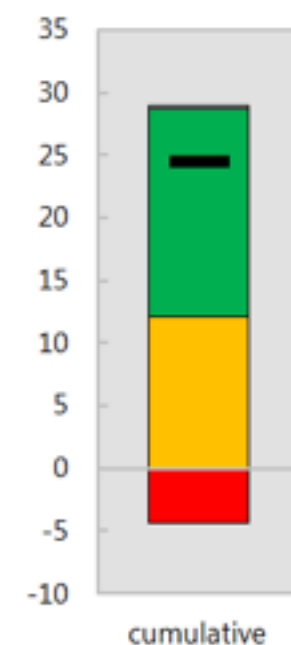
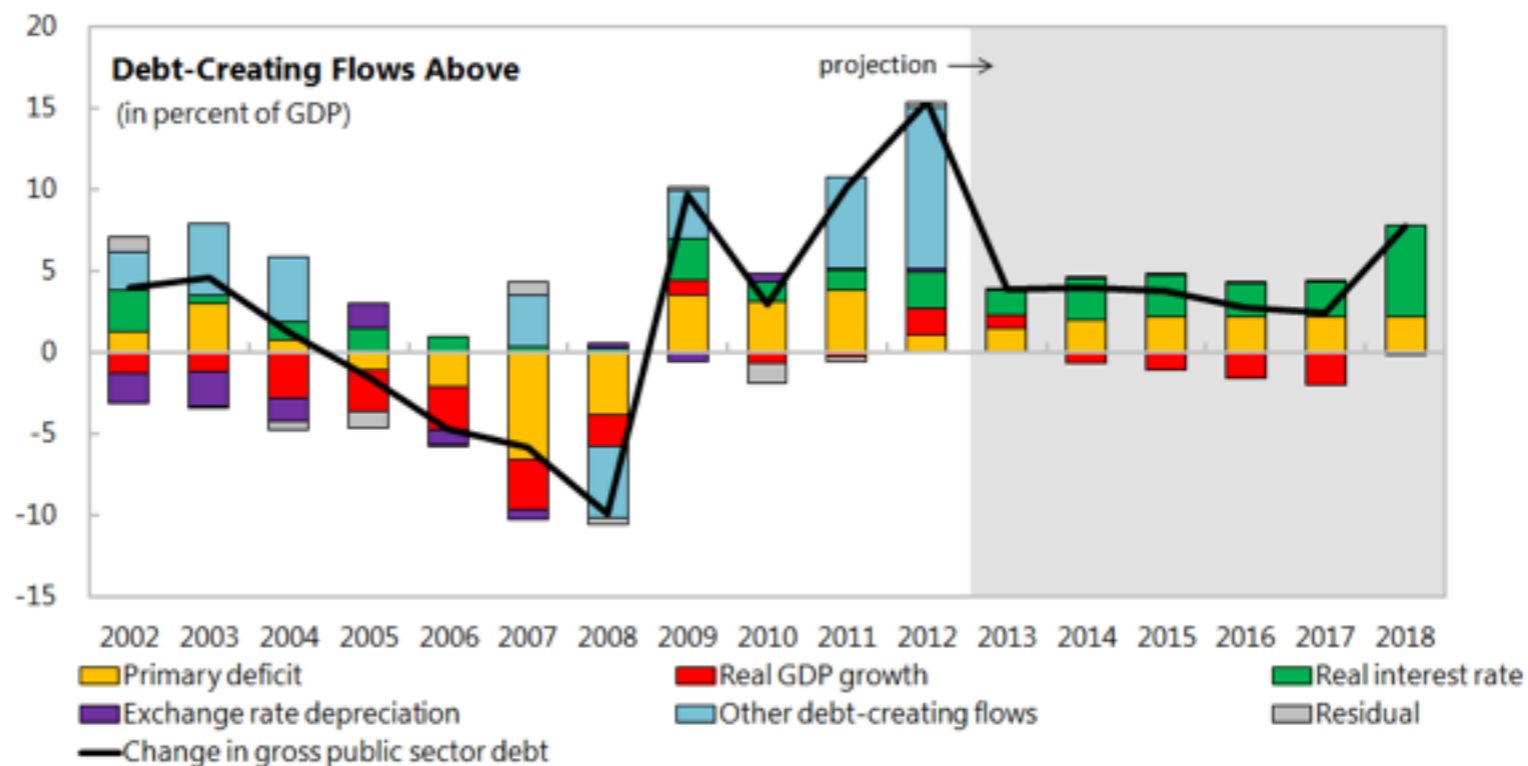
Example Public Sector Debt Sustainability Analysis (DSA) - Baseline Scenario
(in percent of GDP unless otherwise indicated)

Debt, Economic and Market Indicators

	Actual			Projections					
	2002-2010	2011	2012	2013	2014	2015	2016	2017	2018
Nominal gross public debt	63.1	71.6	87.0	90.9	94.9	98.6	101.3	103.8	111.5
Public gross financing needs	11.7	13.2	10.5	17.6	17.2	19.8	20.4	15.3	16.1
Real GDP growth (in percent)	2.7	0.5	-2.3	-1.0	0.7	1.2	1.7	2.0	0.0
Inflation (GDP deflator, in percent)	2.9	2.0	2.1	1.3	0.8	1.7	2.9	2.9	0.0
Nominal GDP growth (in percent)	5.7	2.5	-0.2	0.3	1.5	2.9	4.6	5.0	0.0
Effective interest rate (in percent)	5.2	4.1	5.2	3.1	3.7	4.5	5.1	5.2	5.4

As of March 08, 2013

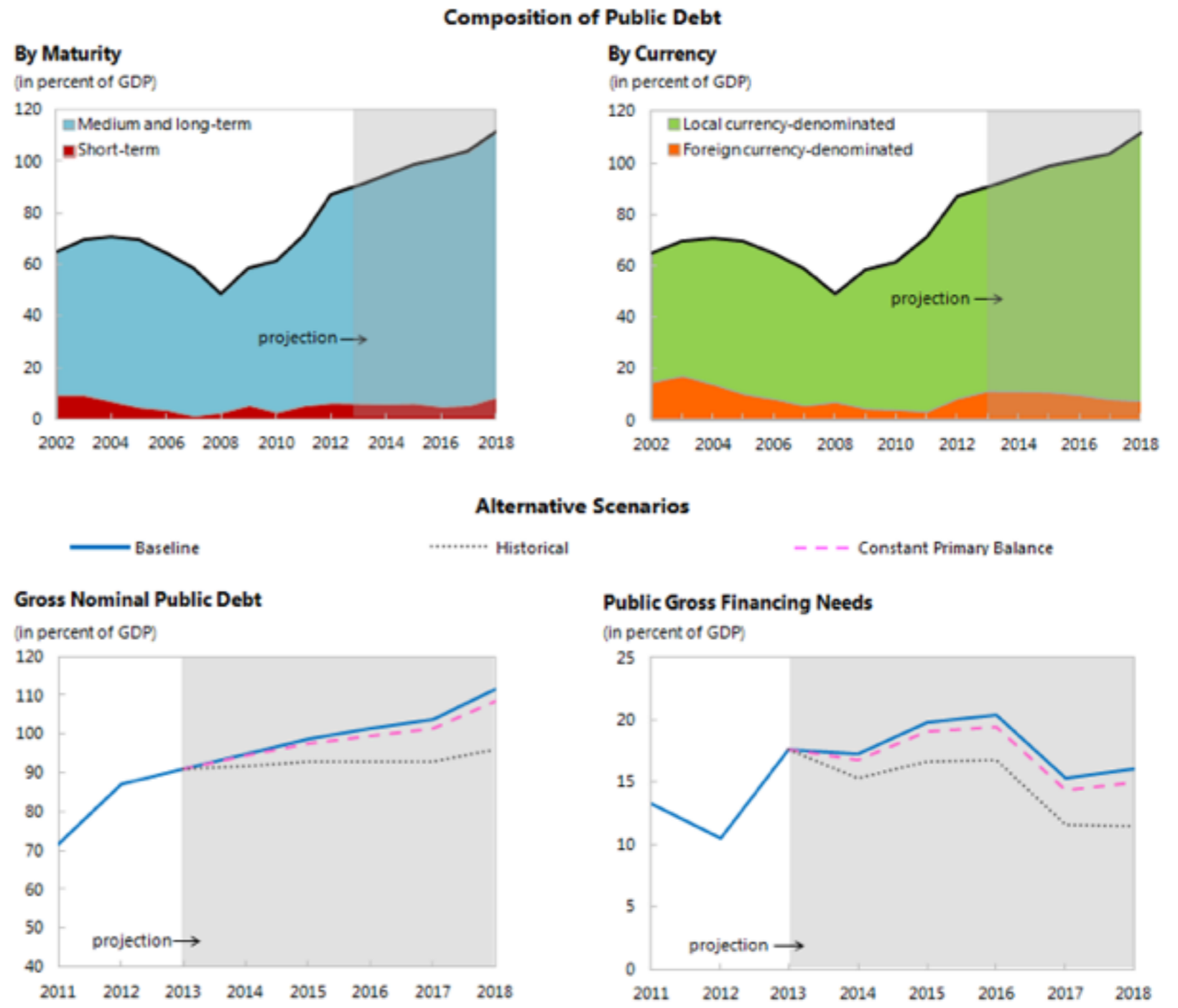
Sovereign Spreads		
Spread (bp)	450	
CDS (bp)	475	
Ratings	Foreign	Local
Moody's	Baa1	Baa1
S&Ps	A-	A
Fitch	A-	A



Requirements for Lower Scrutiny Countries

Basic DSA Scenarios and Debt Structure

Example Public DSA - Composition of Public Debt and Alternative Scenarios



Requirements for Higher Scrutiny Countries

Basic DSA

**Realism of baseline
assumptions**

**Risks to level and profile of
sovereign debt**

**Stochastic simulations of
debt paths**

Cross-country tools to assess...

Forecast track record

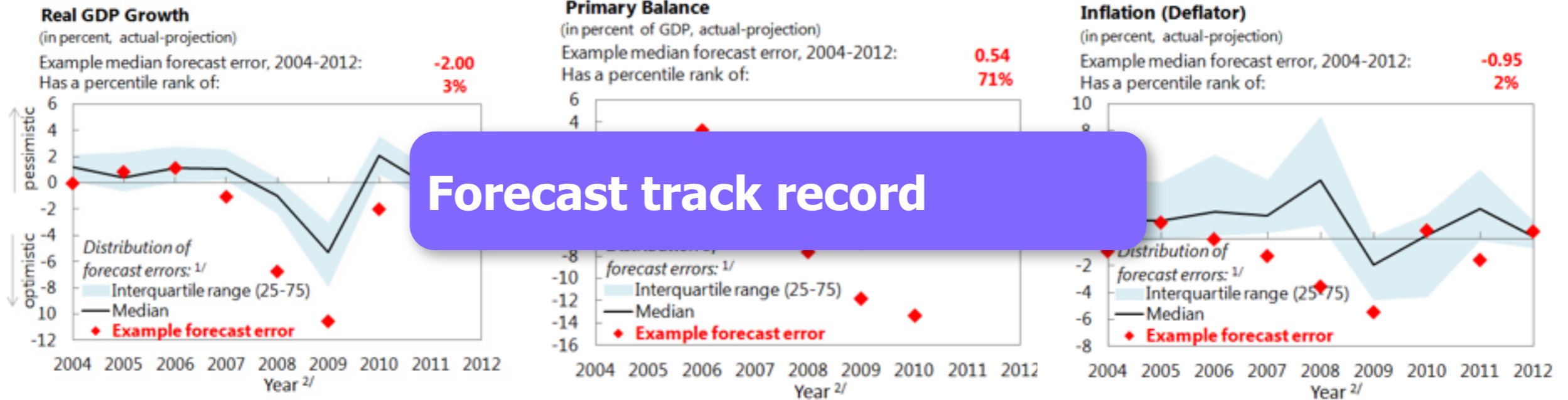
Projected fiscal adjustment

Boom-bust analysis

**...to help identify
potential optimism**

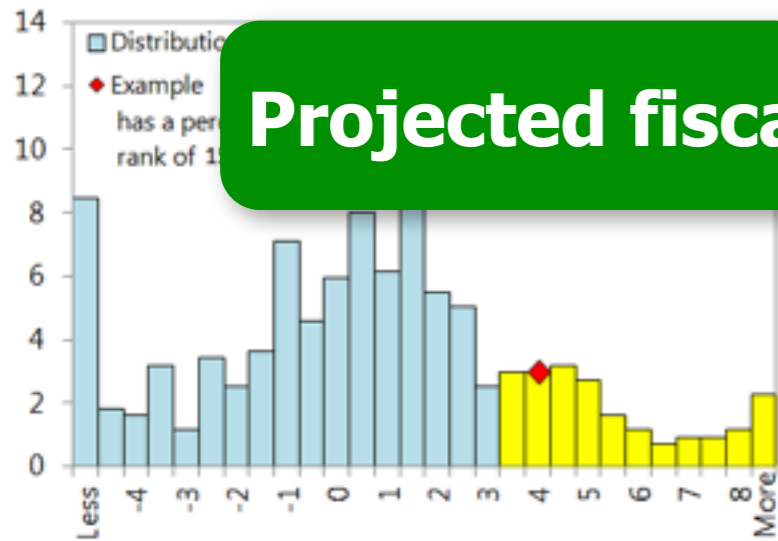
Example Public DSA - Realism of Baseline Assumptions

Forecast Track Record, versus all countries



Assessing the Realism of Projected Fiscal Adjustment

3-Year Adjustment in Cyclically-Adjusted Primary Balance (CAPB) (Percent of GDP)

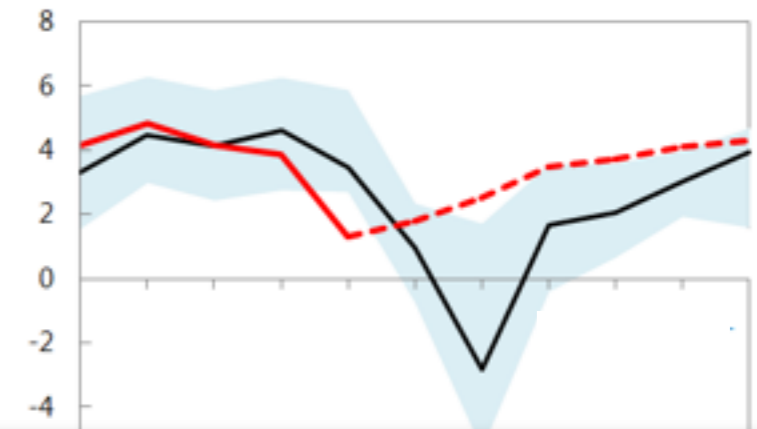


3-Year Average Level of Cyclically-Adjusted Primary Balance (CAPB) (Percent of GDP)



Boom-Bust Analysis^{3/}

Real GDP growth (in percent)



Source: IMF Staff

^{1/} Plotted distribution includes all countries, percentile rank refers to all countries.

^{2/} Projections made in the spring WEO vintage of the preceding year

^{3/} Example has had a cumulative increase in private sector credit of 44 percent of GDP, 2009-2012. For Example, t corresponds to 2013; for the distribution, t corresponds to the first year of the crisis.

^{4/} Data cover annual observations from 1990 to 2011 for advanced and emerging economies with debt greater than 60 percent of GDP. Percent of sample on vertical axis.

Forecast track record

Real GDP Growth

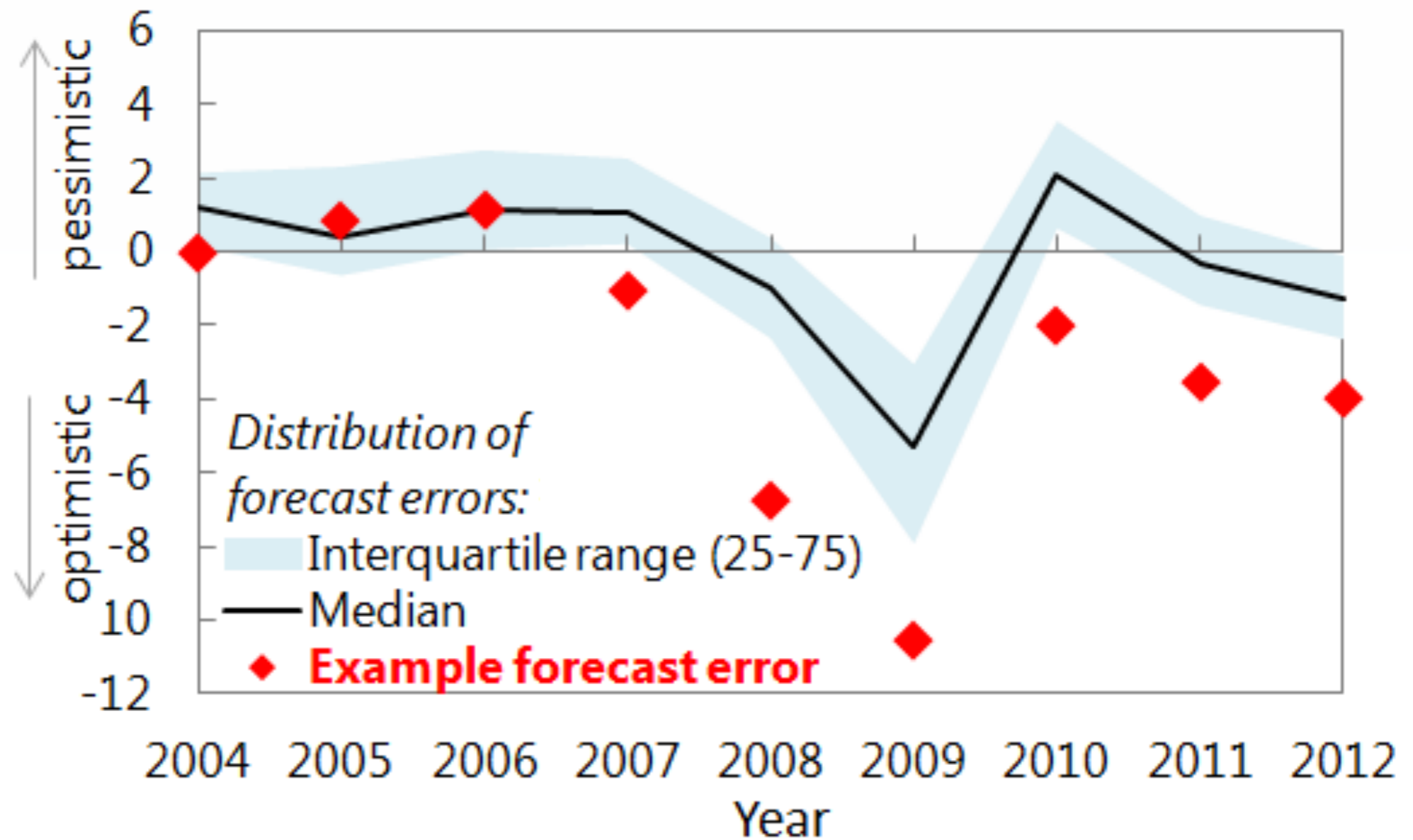
(in percent, actual-projection)

Example median forecast error, 2004-2012:

-2.00

Has a percentile rank of:

3%



Forecast track record

Primary Balance

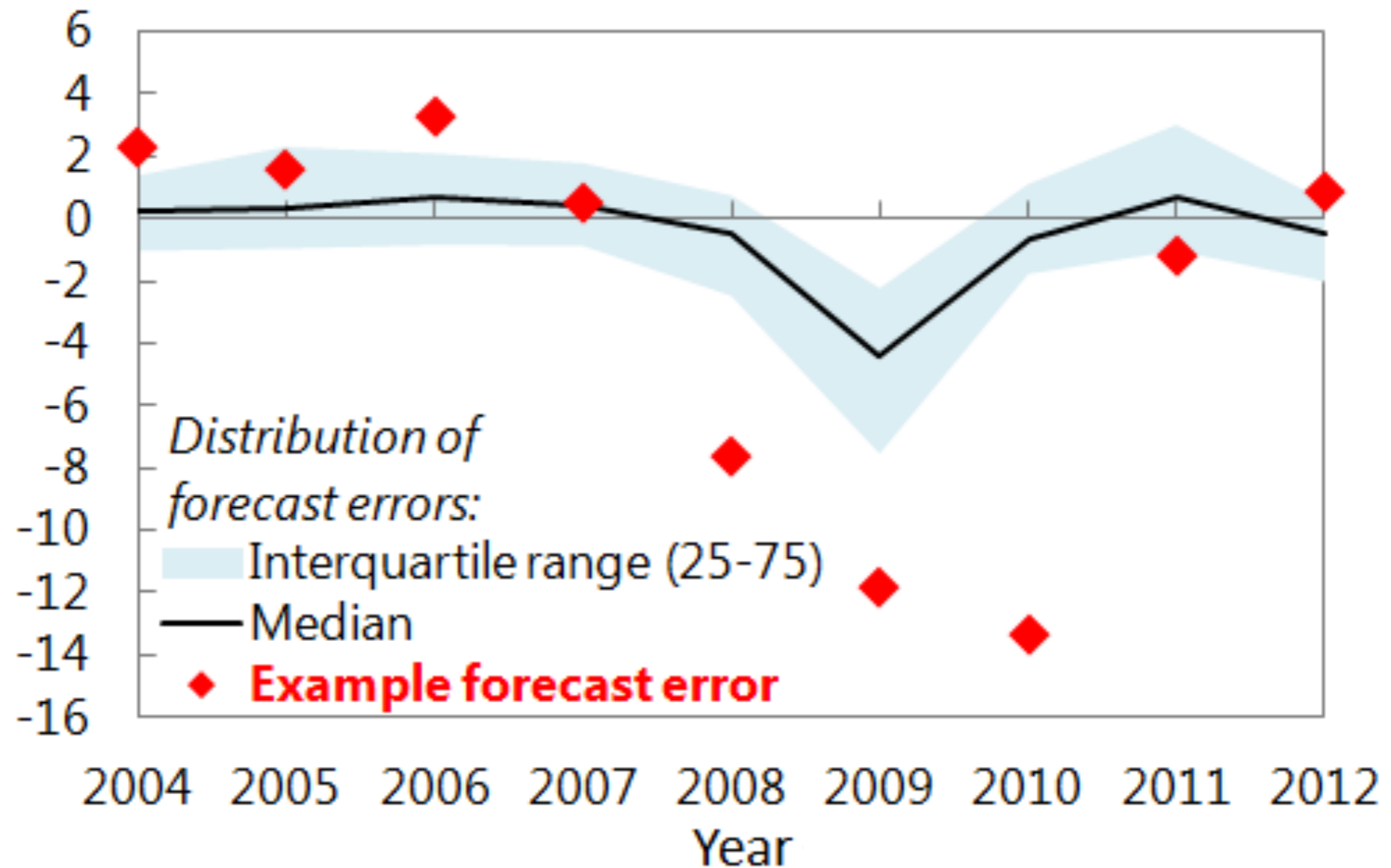
(in percent of GDP, actual-projection)

Example median forecast error, 2004-2012:

0.54

Has a percentile rank of:

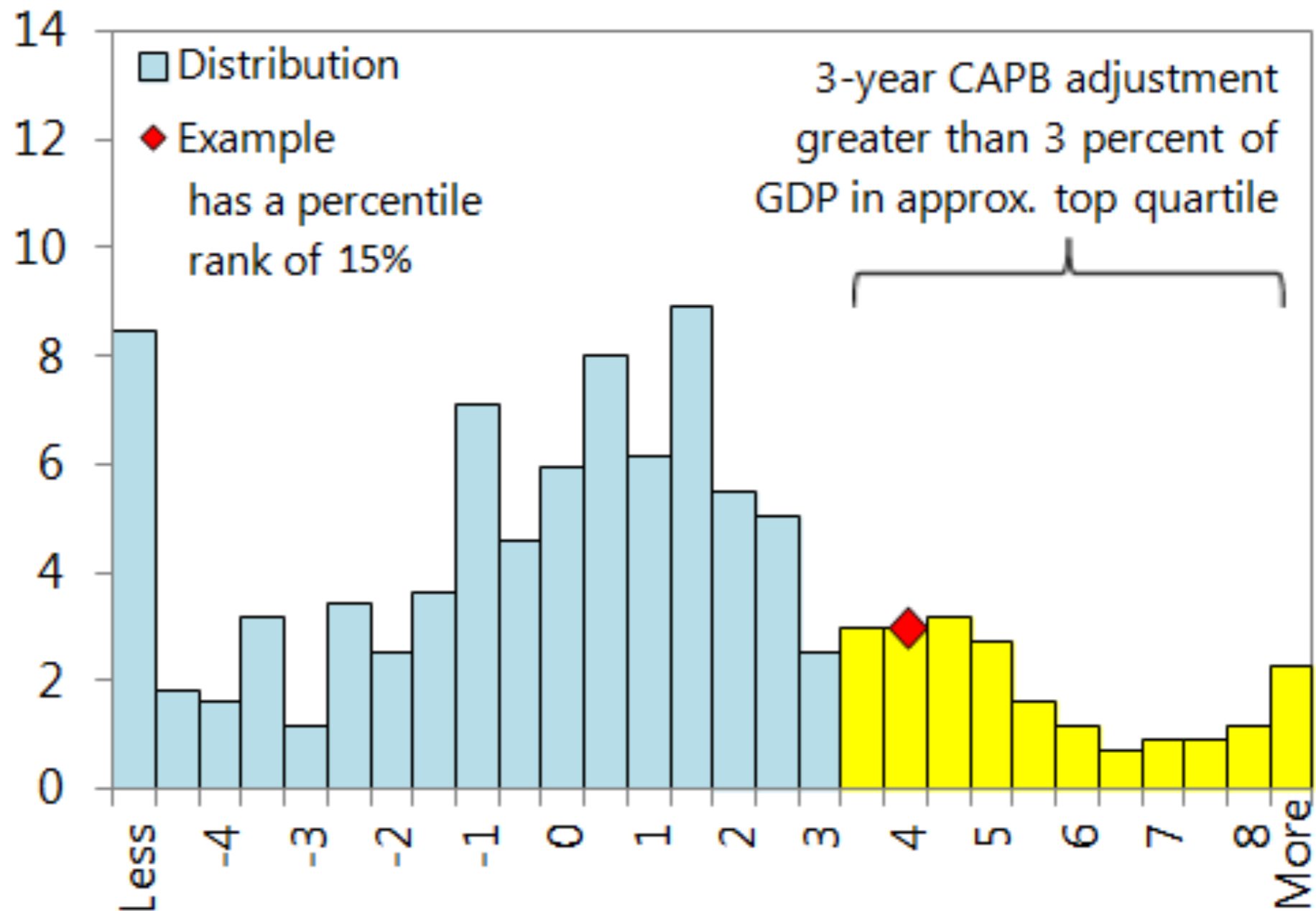
71%



Projected fiscal adjustment

3-Year Adjustment in Cyclically-Adjusted Primary Balance (CAPB)

(Percent of GDP)



Heat map

Risks to debt level and debt profile

Example Public DSA Risk Assessment

Heat Map

Debt level

Gross financing needs

Debt Profile

Real GDP Growth Shock	Primary Balance Shock	Real Interest Rate Shock	Exchange Rate Shock	Contingent Liability shock
Real GDP Growth Shock	Primary Balance Shock	Real Interest Rate Shock	Exchange Rate Shock	Contingent Liability Shock
Market Perception	External Financing Requirements	Change in the Share of Short-Term Debt	Public Debt Held by Non-Residents	Foreign Currency Debt

Risks to debt level

Benchmarks

Debt Burden Benchmarks (%)	Debt-to-GDP	GFN-to-GDP
Emerging Markets	70	15
Advanced Economies	85	20

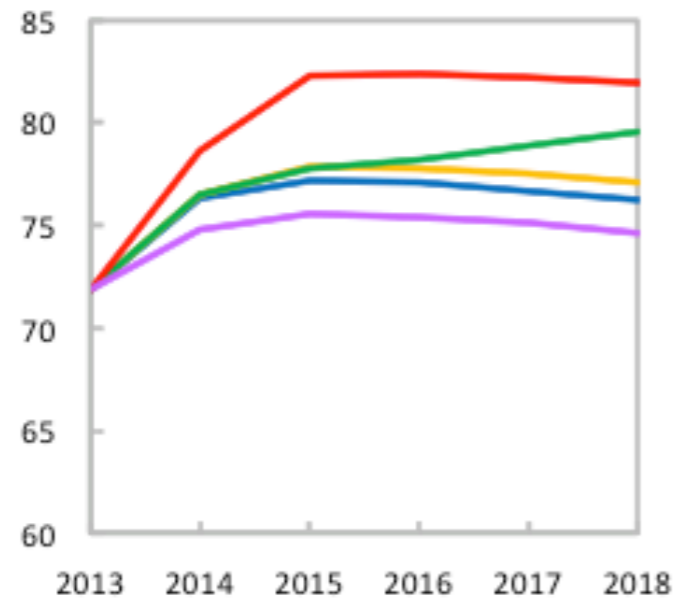
Risk level	Baseline above benchmark?	Stress test above benchmark?
High	Yes	Yes
Moderate	No	Yes
Low	No	No

Macro-Fiscal Stress Tests

— Baseline
— Real GDP Growth Shock

Gross Nominal Public Debt

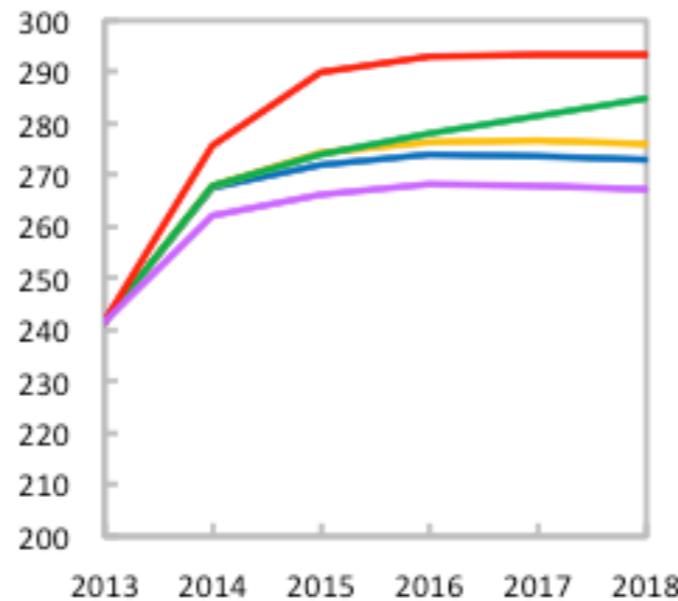
(in percent of GDP)



— Primary Balance Shock
— Real Exchange Rate Shock

Gross Nominal Public Debt

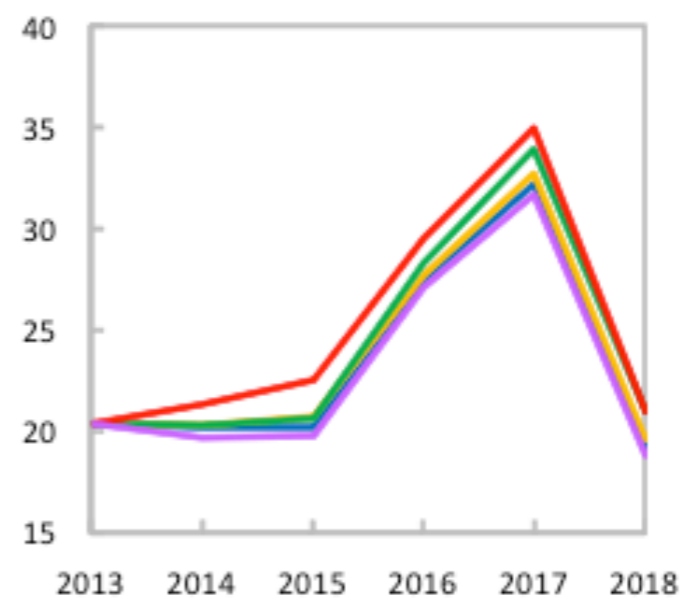
(in percent of Revenue)



— Real Interest Rate Shock

Public Gross Financing Needs

(in percent of GDP)

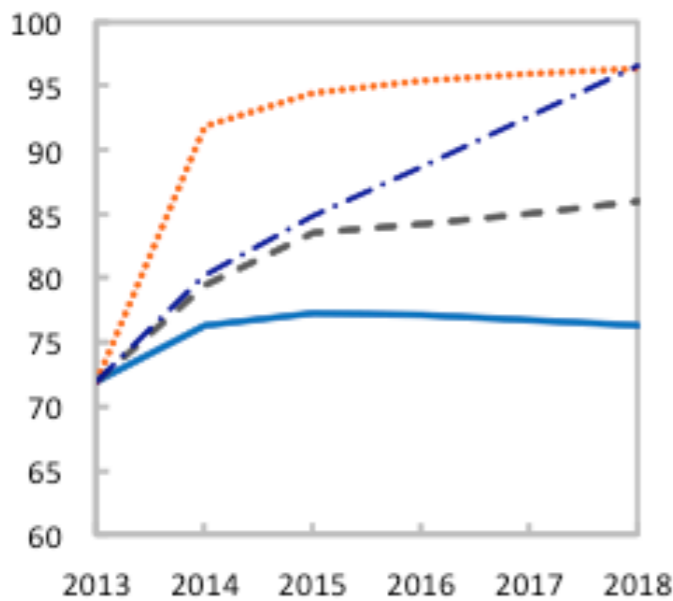


Additional Stress Tests

— Baseline

Gross Nominal Public Debt

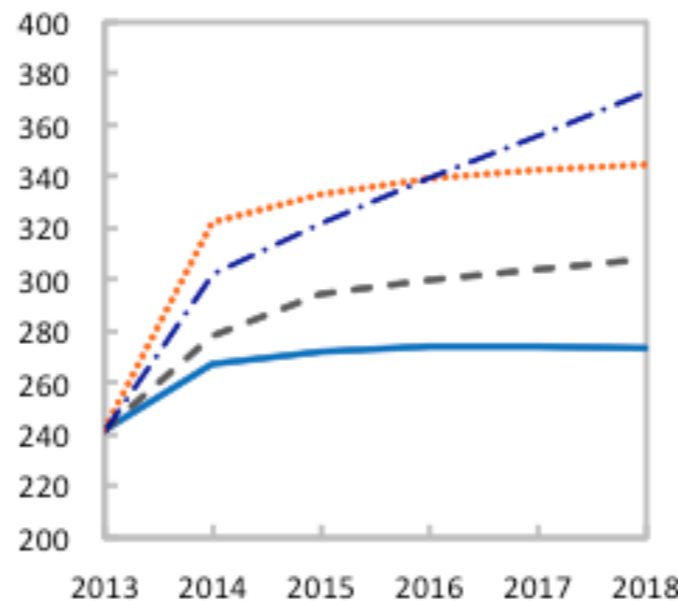
(in percent of GDP)



--- Combined Macro-Fiscal Shock
- · - Customized Shock

Gross Nominal Public Debt

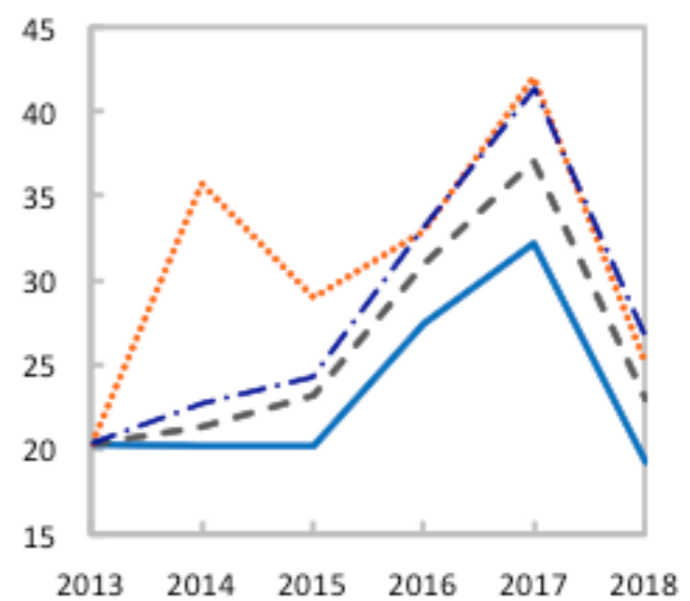
(in percent of Revenue)



····· Contingent Liability Shock

Public Gross Financing Needs

(in percent of GDP)



Risks to debt level

Stress tests

	Risk	Size and Duration of Shocks	Default Interaction
1.	Primary balance	Minimum shock equivalent to 50 percent of planned cumulative adjustment or baseline minus half of the 10-year historical standard deviation, whichever is larger. ¹	Additional borrowing leads to increase in interest rate of 25 basis points per 1 percent of GDP worsening of the deficit. ²
2.	Real GDP growth	Real GDP growth is reduced by 1 standard deviation for 2 consecutive years.	Primary balance deteriorates (the revenue-to-GDP ratio remains the same as in the baseline, but the ratio of non-interest expenditures to GDP increases as the level of spending is kept the same as in the baseline). Deterioration in primary balance leads to higher interest rate (see above). Decline in growth leads to lower inflation (0.25 percentage point per 1 percentage point decrease in GDP growth). ³
3.	Interest rate	Nominal interest rate increases by the difference between the maximum real interest rate over history (last 10 years) and the average real interest rate level over projection, or by 200bp, whichever is larger. ⁴	Size of shock can be adjusted if risks are high (gross financing needs are higher).
4.	Exchange rate	Estimate of real exchange rate overvaluation, or maximum historical movement of exchange rate over 10 years, whichever is highest. ⁵	Pass-through to inflation with default elasticity of 0.25 for EMs and 0.03 for AEs. ⁶

Risks to debt level

Contingent liabilities

Relevant for countries with financial sector vulnerabilities

Triggers	AEs	EMs
Private sector credit-to-GDP (3-year cumulative level change)	30%	15%
Loan-to-deposit ratio	1.5	1.5

Also look at:

5-year average growth in nominal house prices	7.5%
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Financial sector CL shock

Shock of 10 percent of financial system assets

One standard-deviation shock to growth

Primary balance deteriorates, interest rate increases, inflation decreases

Other CLs: natural disasters, PPPs, SOEs

Heat map

Risks to debt level and debt profile

Example Public DSA Risk Assessment

Heat Map

Real GDP Growth Shock	Primary Balance Shock	Real Interest Rate Shock	Exchange Rate Shock	Contingent Liability shock
Real GDP Growth Shock	Primary Balance Shock	Real Interest Rate Shock	Exchange Rate Shock	Contingent Liability Shock
Market Perception	External Financing Requirements	Change in the Share of Short-Term Debt	Public Debt Held by Non-Residents	Foreign Currency Debt

Debt level

Gross financing needs

Debt Profile

Risks to debt profile

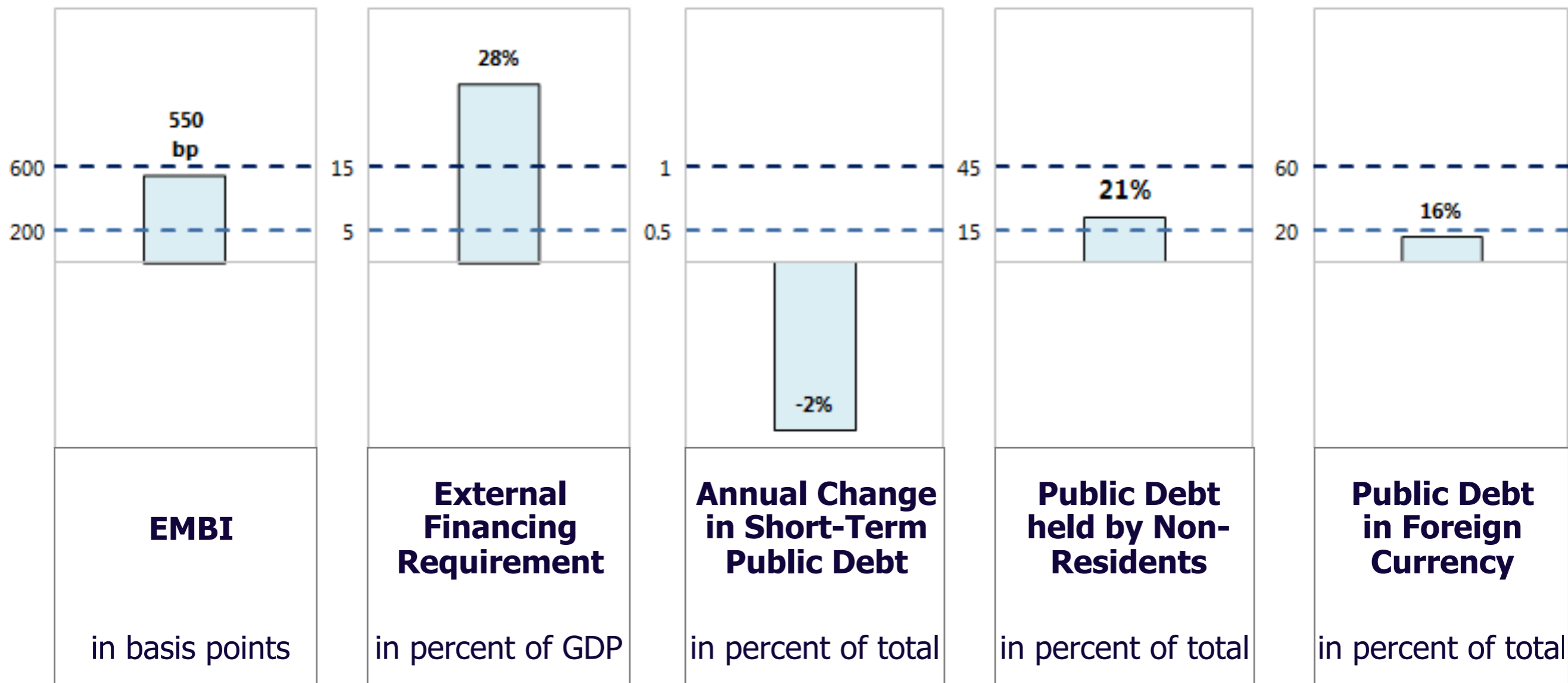
Debt Profile Vulnerabilities

(Indicators vis-à-vis risk assessment benchmarks)

Example

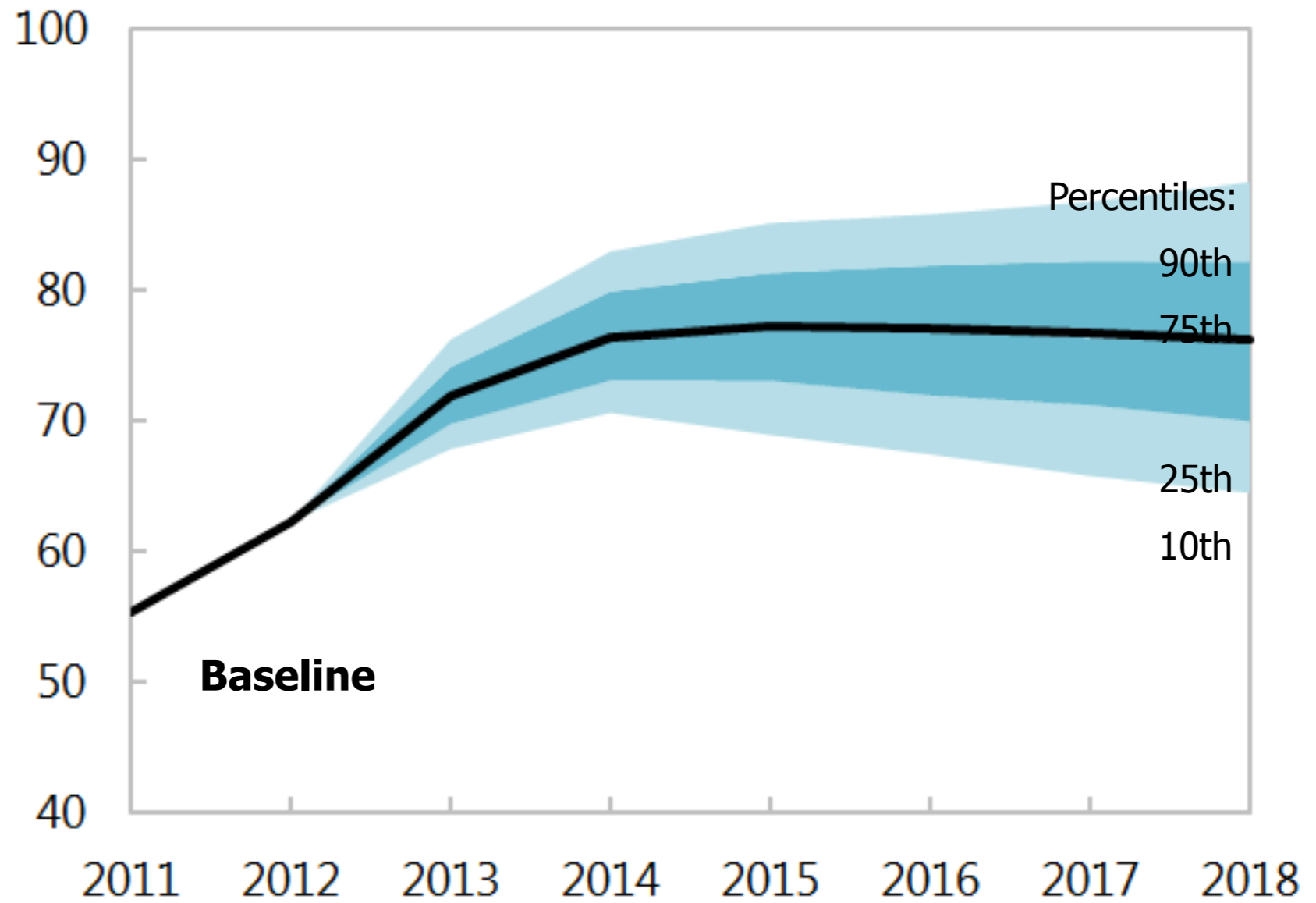
--- Lower early warning

--- Upper early warning



Fan charts

Symmetric Distribution



Fan charts

Evolution of Predictive Densities of Gross Nominal Public Debt

(in percent of GDP)

— Baseline

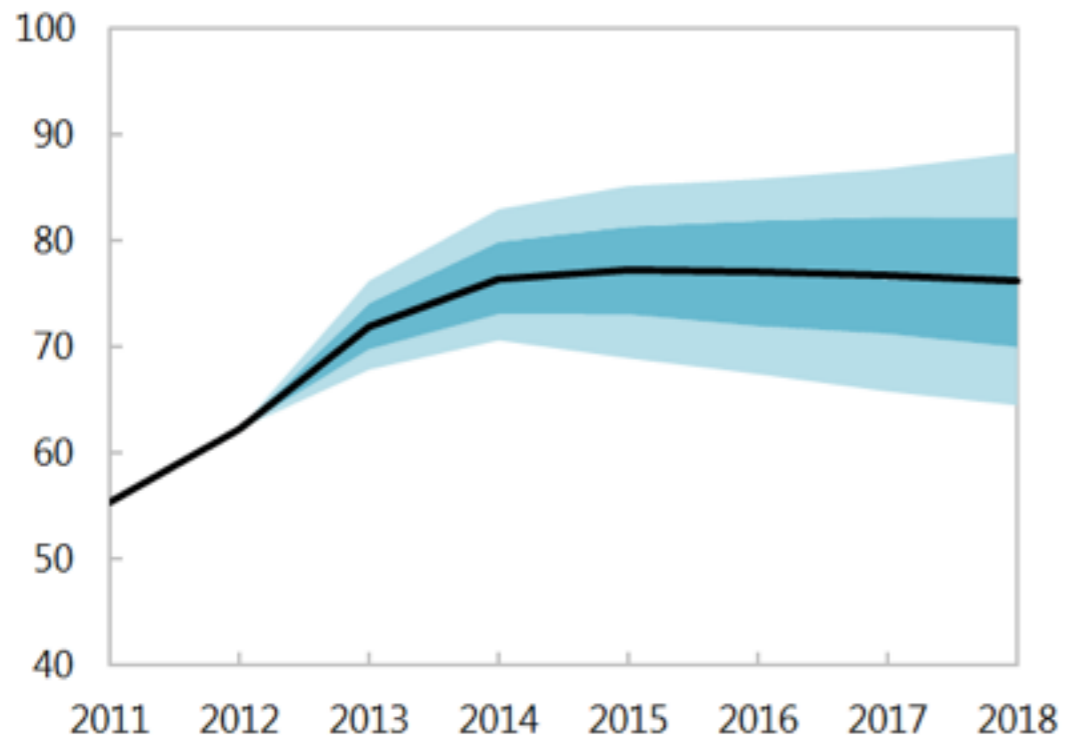
Percentiles:

■ 10th-25th

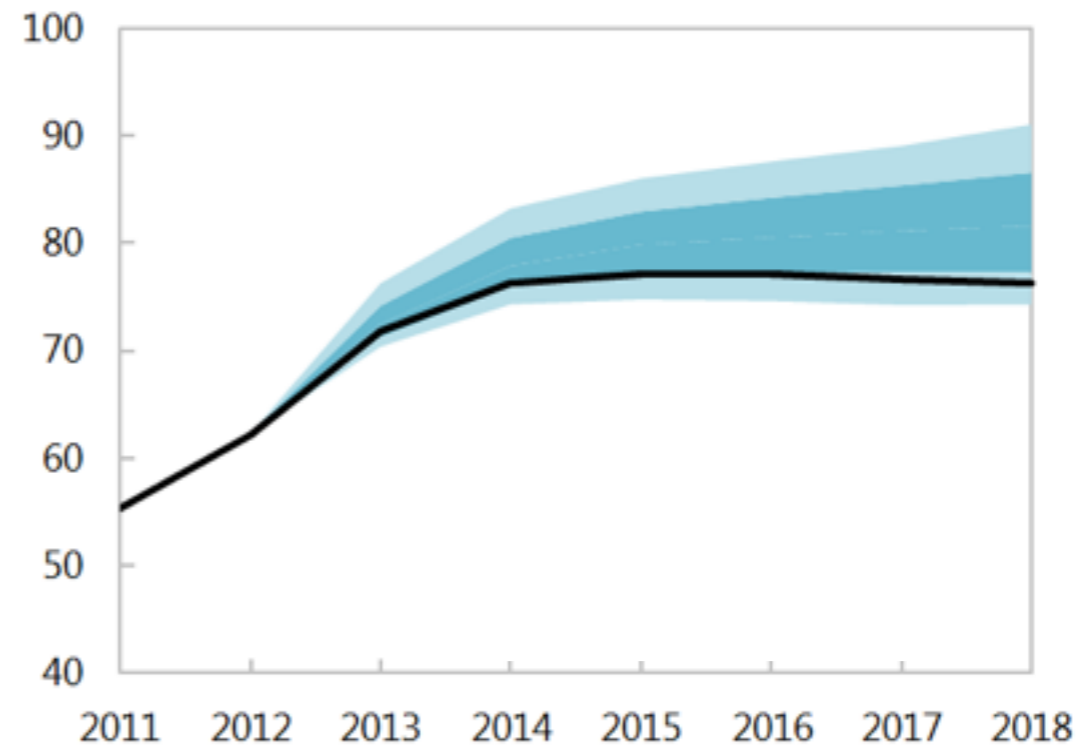
■ 25th-75th

■ 75th-90th

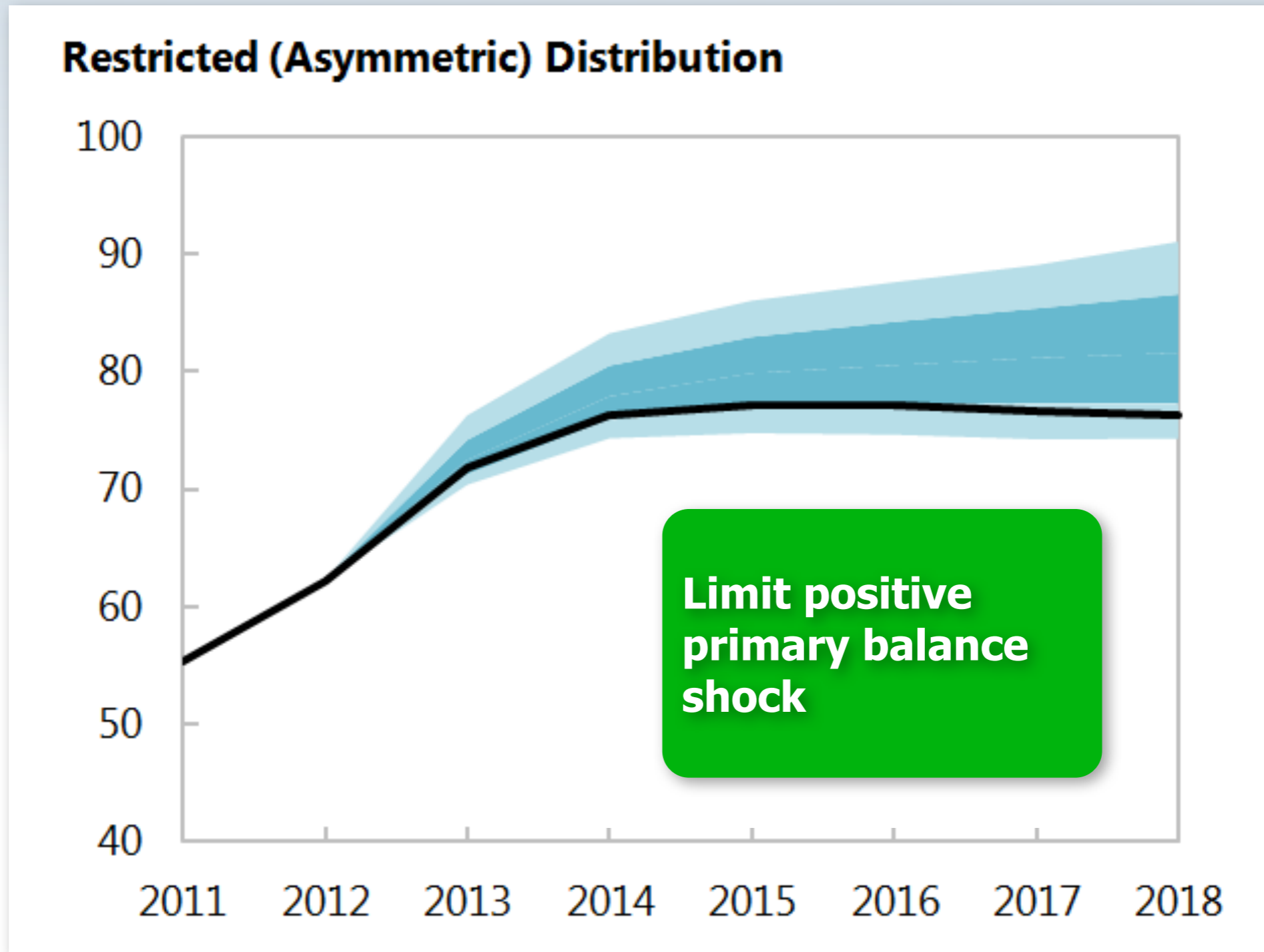
Symmetric Distribution



Restricted (Asymmetric) Distribution



Fan charts



DSA write-up

Country-specific judgement

factors that mitigate risks

factors that amplify risks

New DSA chartpack (1)

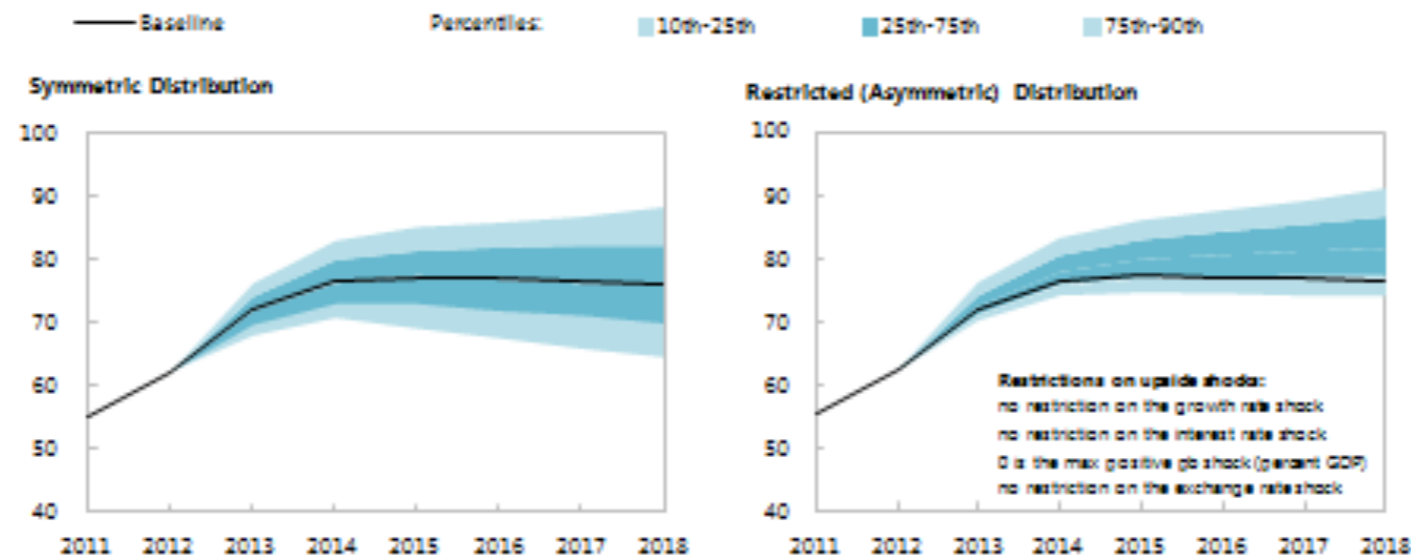
Example Public DSA Risk Assessment

Heat Map



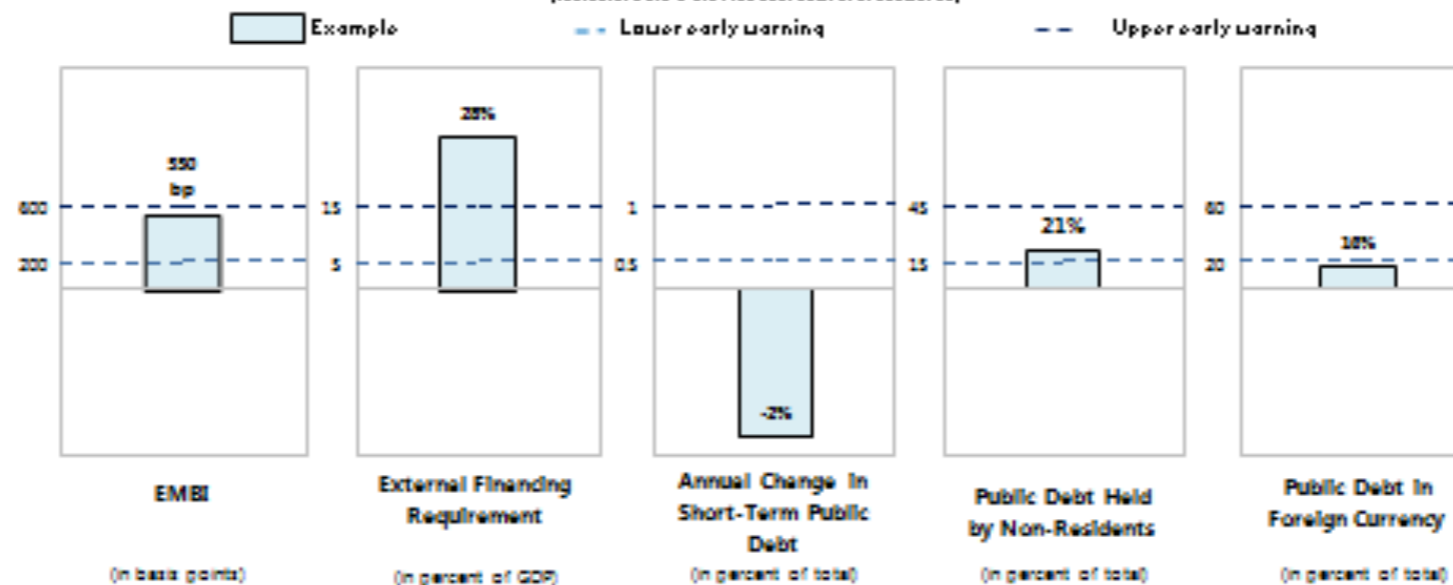
Evolution of Predictive Densities of Gross Nominal Public Debt

(in percent of GDP)



Debt Profile Vulnerabilities

(Indicators six-2-16 risk assessment benchmarks)



New DSA chartpack (2)

Example Public DSA - Realism of Baseline Assumptions

Forecast Track Record, versus all countries

Real GDP Growth

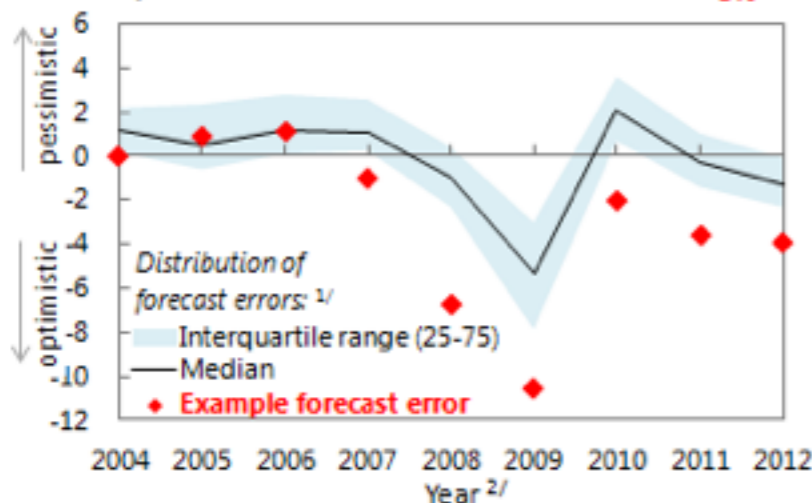
(in percent, actual-projection)

Example median forecast error, 2004-2012:

-2.00

Has a percentile rank of:

3%



Primary Balance

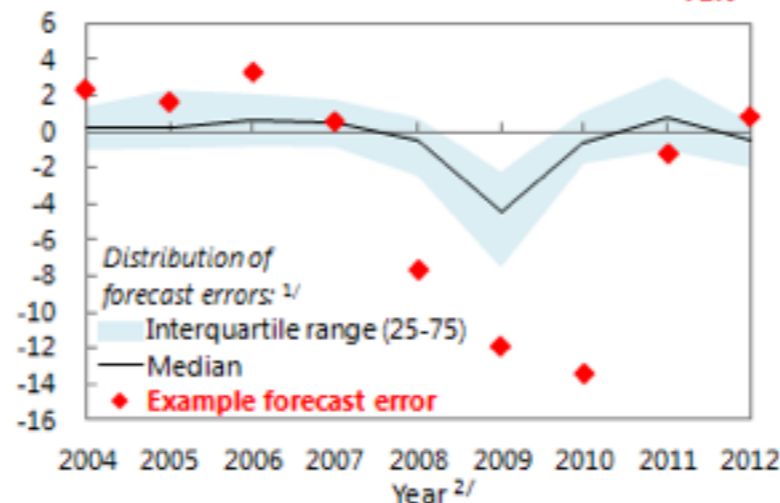
(in percent of GDP, actual-projection)

Example median forecast error, 2004-2012:

0.54

Has a percentile rank of:

71%



Inflation (Deflator)

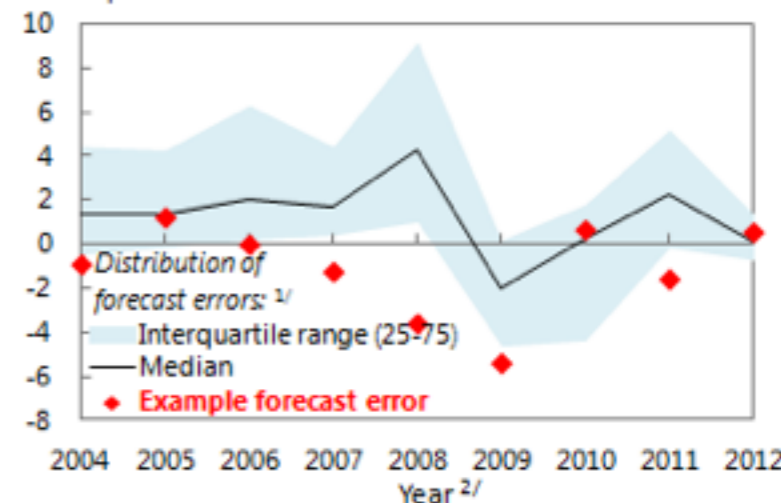
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Example median forecast error, 2004-2012:

-0.95

Has a percentile rank of:

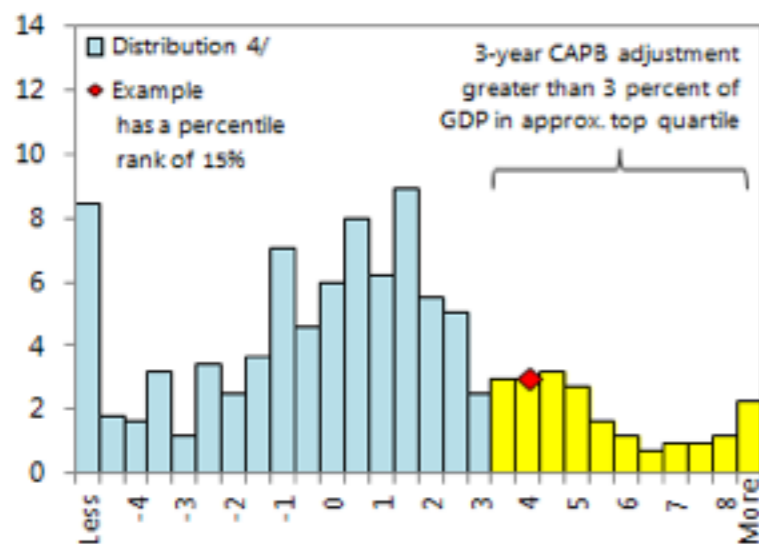
2%



Assessing the Realism of Projected Fiscal Adjustment

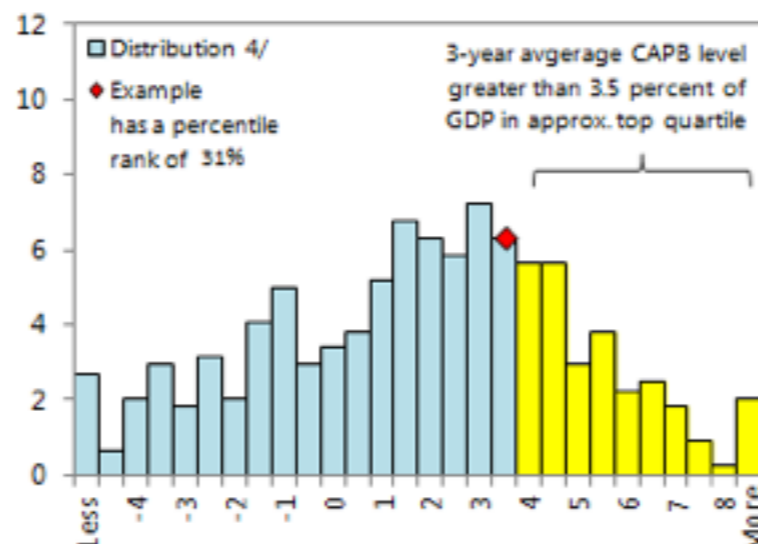
3-Year Adjustment in Cyclically-Adjusted Primary Balance (CAPB)

(Percent of GDP)



3-Year Average Level of Cyclically-Adjusted Primary Balance (CAPB)

(Percent of GDP)

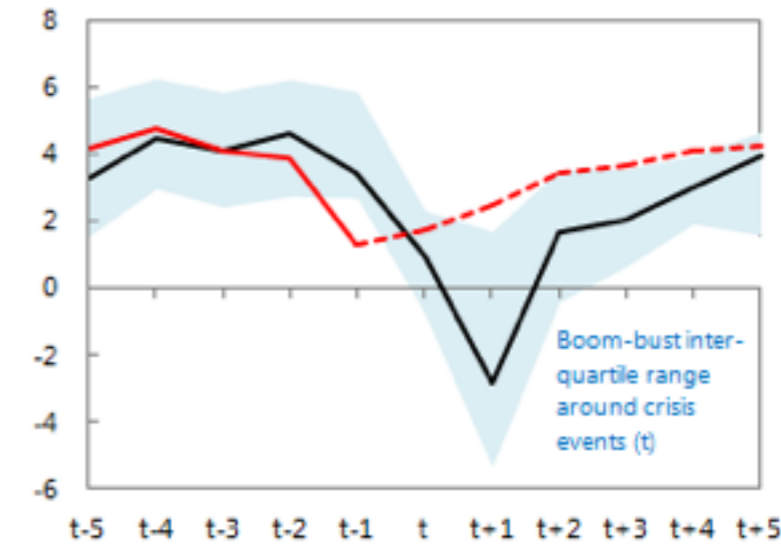


Boom-Bust Analysis^{3/}

Real GDP growth

(in percent)

— Example



Source: IMF Staff

^{1/} Plotted distribution includes all countries, percentile rank refers to all countries.

^{2/} Projections made in the spring WEO vintage of the preceding year

^{3/} Example has had a cumulative increase in private sector credit of 44 percent of GDP, 2009-2012. For Example, t corresponds to 2013; for the distribution, t corresponds to the first year of the crisis.

^{4/} Data cover annual observations from 1990 to 2011 for advanced and emerging economies with debt greater than 60 percent of GDP. Percent of sample on vertical axis.

Country Public DSA - Baseline Scenario

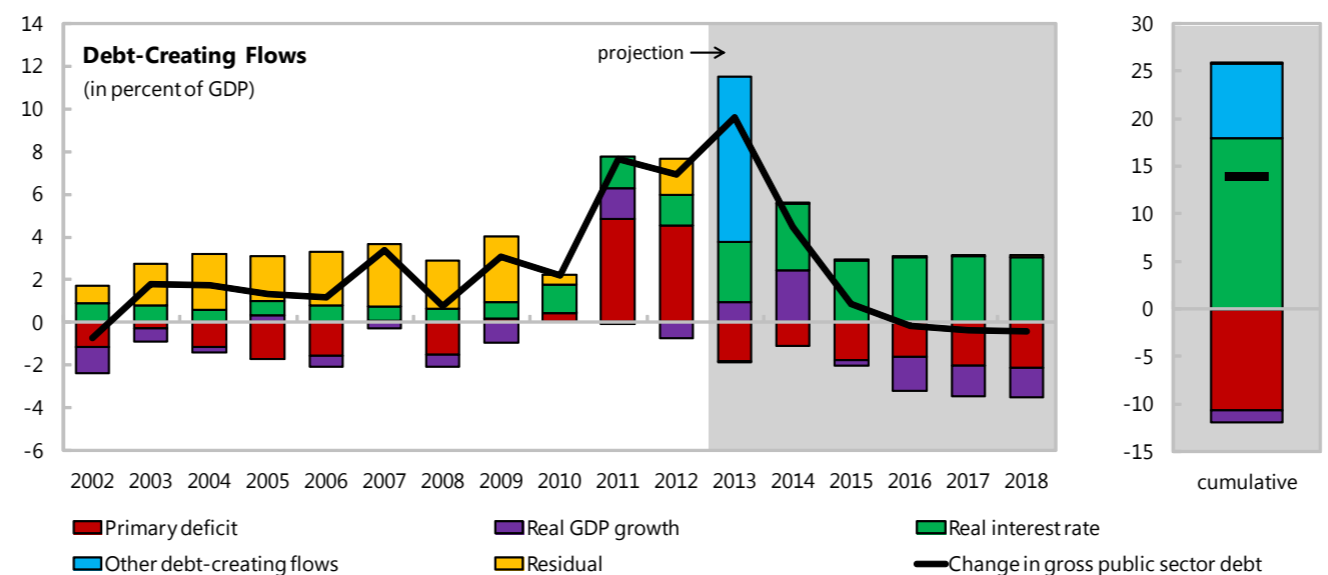
(in percent of GDP unless otherwise indicated)

Debt, Economic and Market Indicators ^{1/}

	Actual			Projections						As of March 26, 2013		
	2002-2010	2011	2012	2013	2014	2015	2016	2017	2018			
Nominal gross public debt	39.4	55.4	62.3	71.9	76.4	77.2	77.1	76.7	76.3	Sovereign Spreads Spread (bp) ^{2/} 550 CDS (bp) 575		
Public gross financing needs	-0.8	4.8	4.5	20.3	20.1	20.2	27.4	32.2	19.2			
Real GDP growth (in percent)	1.3	-2.9	1.4	-1.5	-3.3	0.3	2.1	1.9	1.9	Ratings Foreign Local Moody's Aa3 Aa3 S&Ps AA AA- Fitch AA A		
Inflation (GDP deflator, in percent)	2.9	0.9	1.0	1.0	1.0	1.3	1.3	1.4	1.6			
Nominal GDP growth (in percent)	4.2	-2.0	2.4	-0.5	-2.3	1.7	3.4	3.4	3.6			
Effective interest rate (in percent) ^{3/}	5.1	4.0	3.7	5.4	5.2	5.2	5.4	5.6	5.8			

Contribution to Changes in Public Debt

	Actual			Projections						cumulative	debt-stabilizing primary balance ^{7/}
	2002-2010	2011	2012	2013	2014	2015	2016	2017	2018		
Change in gross public sector debt	1.6	7.65	6.93	9.6	4.5	0.9	-0.1	-0.4	-0.4	14.0	primary balance ^{7/} 1.7
Identified debt-creating flows	-0.4	7.71	5.28	9.6	4.5	0.8	-0.1	-0.4	-0.5	14.0	
Primary deficit	-0.8	4.8	4.5	-1.8	-1.1	-1.8	-1.7	-2.1	-2.2	-10.6	
Revenue and grants	26.6	26.5	27.7	29.8	28.5	28.4	28.1	28.0	27.9	170.8	
Primary (noninterest) expenditure	25.9	31.3	32.3	28.0	27.4	26.6	26.5	26.0	25.8	160.2	
Automatic debt dynamics ^{4/}	0.3	2.9	0.8	3.7	5.6	2.7	1.5	1.7	1.7	16.8	
Interest rate/growth differential ^{5/}	0.3	2.9	0.7	3.7	5.5	2.6	1.5	1.6	1.6	16.6	
Of which: real interest rate	0.8	1.5	1.4	2.8	3.1	2.9	3.0	3.1	3.0	18.0	
Of which: real GDP growth	-0.5	1.4	-0.7	0.9	2.4	-0.3	-1.6	-1.4	-1.4	-1.3	
Other identified debt-creating flows	0.0	0.0	0.0	7.8	0.0	0.0	0.0	0.0	0.0	7.8	
Privatization receipts (negative)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Contingent liabilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Other debt-creating flows (specify)	0.0	0.0	0.0	7.8	0.0	0.0	0.0	0.0	0.0	7.8	
Residual ^{6/}	2.1	-0.1	1.7	-0.1	0.1	0.0	0.1	0.0	0.1	0.2	



Source: IMF staff.

^{1/} Public sector is defined as general government.

^{2/} Bond Spread over U.S. Bonds.

^{3/} Defined as interest payments divided by debt stock at the end of previous year.

^{4/} Derived as $[(r - p(1+g) - g + ae(1+r)] / (1+g+p+gp)$ times previous period debt ratio, with r = interest rate; p = growth rate of GDP deflator; g = real GDP growth rate; a = share of foreign-currency denominated debt; and e = nominal exchange rate depreciation (measured by increase in local currency value of U.S. dollar).

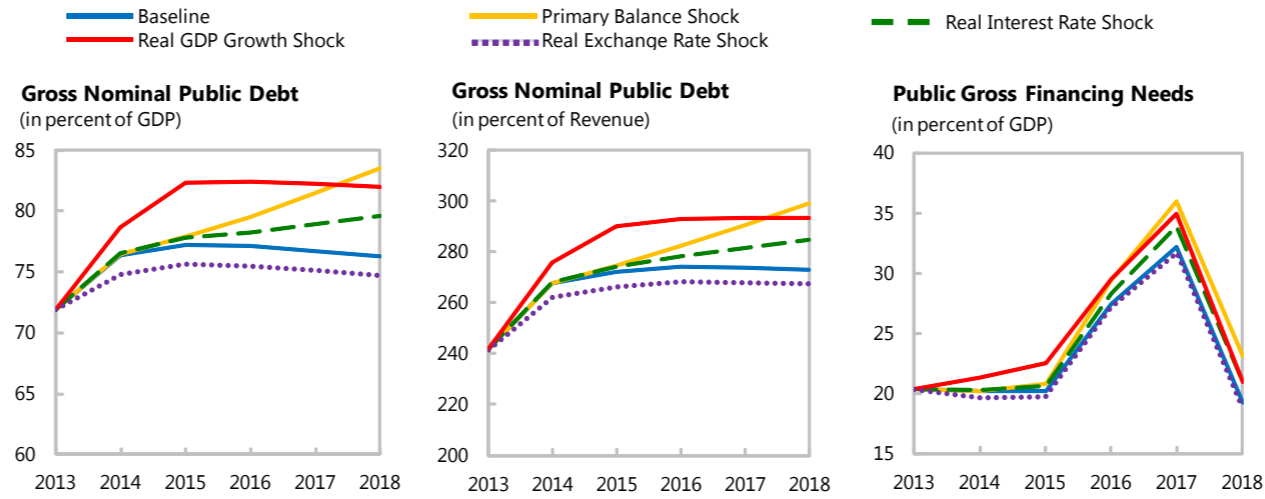
^{5/} The real interest rate contribution is derived from the denominator in footnote 2/ as $r - \pi(1+g)$ and the real growth contribution as $-g$.

^{6/} Including asset and exchange rate changes.

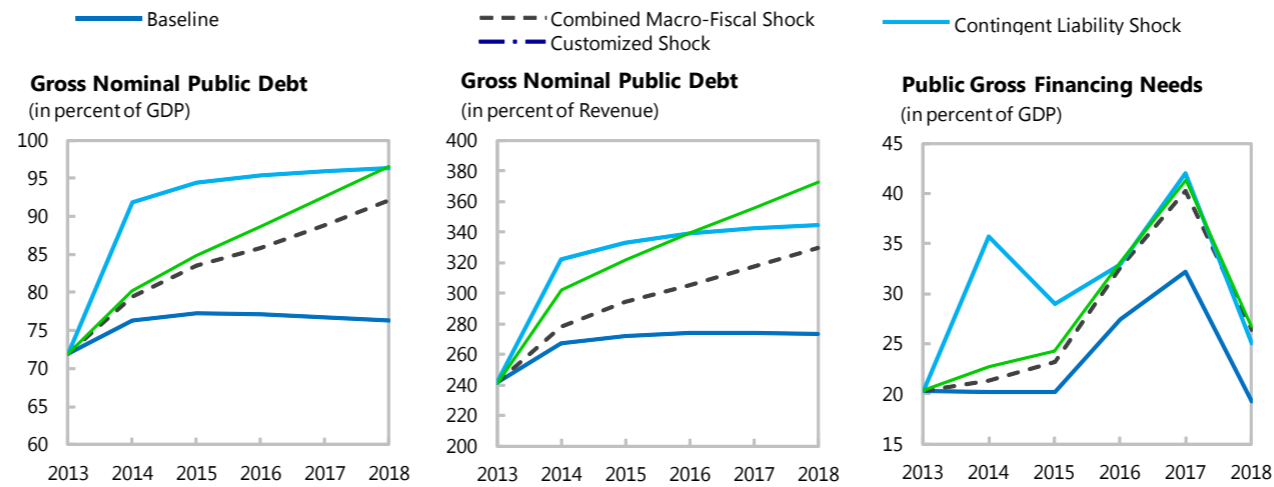
^{7/} Assumes that key variables (real GDP growth, real interest rate, and other identified debt-creating flows) remain at the level of the last projection year.

Country Public DSA - Stress Tests

Macro-Fiscal Stress Tests



Additional Stress Tests



Underlying Assumptions (in percent)

Scenario	2013	2014	2015	2016	2017	2018
Baseline Scenario						
Real GDP growth	-1.5	-3.3	0.3	2.1	1.9	1.9
Inflation	1.0	1.0	1.3	1.3	1.4	1.6
Primary balance	1.8	1.1	1.8	1.7	2.1	2.2
Effective interest rate	5.4	5.2	5.2	5.4	5.6	5.8
Real GDP Growth Shock						
Real GDP growth	-1.5	-4.8	-1.2	2.1	1.9	1.9
Inflation	1.0	0.6	1.0	1.3	1.4	1.6
Primary balance	1.8	0.6	0.7	1.7	2.1	2.2
Effective interest rate	5.4	5.4	5.2	5.5	5.7	5.8
Real Exchange Rate Shock						
Real GDP growth	-1.5	-3.3	0.3	2.1	1.9	1.9
Inflation	1.0	4.3	1.3	1.3	1.4	1.6
Primary balance	1.8	1.1	1.8	1.7	2.1	2.2
Effective interest rate	5.4	5.4	5.2	5.3	5.7	5.8
Contingent Liability Shock						
Real GDP growth	-1.5	-3.3	0.3	2.1	1.9	1.9
Inflation	1.0	1.0	1.3	1.3	1.4	1.6
Primary balance	1.8	-13.9	1.8	1.7	2.1	2.2
Effective interest rate	5.4	5.9	6.5	6.1	6.1	6.2
Primary Balance Shock						
Real GDP growth	-1.5	-3.3	0.3	2.1	1.9	1.9
Inflation	1.0	1.0	1.3	1.3	1.4	1.6
Primary balance	1.8	1.2	1.2	0.0	0.0	0.0
Effective interest rate	5.4	5.4	5.2	5.4	5.9	6.1
Real Interest Rate Shock						
Real GDP growth	-1.5	-3.3	0.3	2.1	1.9	1.9
Inflation	1.0	1.0	1.3	1.3	1.4	1.6
Primary balance	1.8	1.1	1.8	1.7	2.1	2.2
Effective interest rate	5.4	5.4	5.7	6.2	6.9	7.2
Combined Shock						
Real GDP growth	-1.5	-4.8	-1.2	2.1	1.9	1.9
Inflation	1.0	0.6	1.0	1.3	1.4	1.6
Primary balance	1.8	0.6	0.7	0.0	0.0	0.0
Effective interest rate	5.4	5.4	5.7	6.2	6.9	7.3
Customized Shock						
Real GDP growth	-1.5	-5.3	-1.7	0.1	-0.1	-0.1
Inflation	1.0	1.0	1.3	1.3	1.4	1.6
Primary balance	1.8	-0.9	-0.2	-0.3	0.1	0.2
Effective interest rate	5.4	5.4	5.2	5.5	5.8	6.0

Source: IMF staff.



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REZA BAQIR

Division Chief

Debt Policy Division

Strategy, Policy, and Review Department