

# Long-term determinants of fiscal policy

**António Afonso**

(ISEG/UL-University of Lisbon;  
UECE-Research Unit on Complexity and Economics)

**2020**

1. Debt-to-GDP ratios
2. Net debt
3. Other liabilities
4. Crisis and fiscal costs
5. Debt projections
6. Ageing projections

# Long-term fiscal sustainability

$$\underbrace{\frac{B_{-1}}{Y_{-1}}}_{\text{Current level}} \leq \underbrace{\sum_{i=0}^{+\infty} \rho_i \left( \frac{T_i}{Y_i} - \frac{E_i}{Y_i} \right)}_{\text{Present discounted value of primary surpluses (\% of GDP)}}$$

Current level of government debt      Present discounted value of primary surpluses (% of GDP)

Discount factor:  $\rho_i = \frac{1 + g_i}{1 + r_i} \rho_{i-1}$

- Derived from the intertemporal budget constraint (present value budget constraint).
- Fiscal sustainability implies that all debt must be matched by future primary surpluses.

## Debt-to-GDP ratio

- (Gross) general government debt as a percentage of GDP most widely used indicator
- High and rising debt to GDP ratios may signal sustainability problems.

# Debt-to-GDP ratios in EU countries (% of GDP)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
BE	107,8	106,5	103,4	98,4	94,0	92,0	87,9	84,0	89,2	95,7	95,7	98,0	99,8	99,8	100,5	100,0
BG	72,5	66,0	52,4	44,4	37,0	27,5	21,6	17,2	13,7	14,6	16,2	16,3	18,5	19,4	22,7	24,1
CZ	17,8	23,9	27,1	28,6	28,9	28,4	28,3	27,9	28,7	34,6	38,4	41,4	46,2	46,1	47,2	48,6
DK	52,4	49,6	49,5	47,2	45,1	37,8	32,1	27,1	33,4	40,7	42,8	46,4	45,4	42,4	41,6	43,1
DE	60,2	59,1	60,7	64,4	66,2	68,6	68,0	65,2	66,8	74,5	82,5	80,0	81,0	79,6	77,3	74,5
EE	5,1	4,8	5,7	5,6	5,0	4,6	4,4	3,7	4,5	7,1	6,7	6,1	9,8	10,0	10,1	9,8
IE	37,0	34,5	31,8	31,0	29,4	27,2	24,6	24,9	44,2	64,4	91,2	104,1	117,4	122,3	120,3	119,7
EL	104,4	104,7	102,6	98,3	99,8	110,0	107,8	107,3	112,9	129,7	148,3	170,3	156,9	177,3	177,0	171,9
ES	59,4	55,6	52,6	48,8	46,3	43,2	39,7	36,3	40,2	54,0	61,7	70,5	86,0	94,3	98,9	103,3
FR	57,5	57,1	59,1	63,3	65,2	66,8	64,1	64,2	68,2	79,2	82,4	85,8	90,2	93,9	96,1	97,3
HR										36,6	44,9	51,6	55,5	64,9	67,4	68,7
IT	108,6	108,3	105,4	104,1	103,7	105,7	106,3	103,3	106,1	116,4	119,3	120,7	127,0	132,7	133,7	132,4
CY	59,6	61,2	65,1	69,7	70,9	69,4	64,7	58,8	48,9	58,5	61,3	71,1	85,8	112,0	121,5	125,8
LV	12,4	14,1	13,6	14,7	15,0	12,5	10,7	9,0	19,8	36,9	44,4	41,9	40,6	38,4	38,7	32,7
LT	23,6	23,0	22,2	21,0	19,3	18,3	17,9	16,8	15,5	29,3	37,8	38,3	40,5	39,5	42,2	41,4
LU	6,2	6,3	6,3	6,2	6,4	6,1	6,7	6,7	14,4	15,5	19,5	18,7	21,7	24,3	25,5	28,1
HU	56,1	52,7	55,9	58,6	59,5	61,7	65,9	67,0	73,0	79,8	82,2	82,1	79,8	77,8	79,1	78,9
MT	53,9	58,9	57,9	66,0	69,8	68,0	62,5	60,7	60,9	66,5	66,7	69,3	71,1	72,0	72,4	71,5
NL	53,8	50,7	50,5	52,0	52,4	51,8	47,4	45,3	58,5	60,8	63,4	65,7	71,3	74,3	75,3	75,6
AT	66,2	66,8	66,2	65,3	64,7	64,2	62,3	60,2	63,8	69,2	72,3	72,8	74,0	74,6	74,3	73,7
PL	36,8	37,6	42,2	47,1	45,7	47,1	47,7	45,0	47,1	50,9	54,9	56,2	55,6	57,8	50,3	51,0
PT	50,7	53,8	56,8	59,4	61,9	67,7	69,4	68,4	71,7	83,7	94,0	108,2	124,1	129,4	126,6	125,8
RO	22,5	25,7	24,9	21,5	18,7	15,8	12,4	12,8	13,4	23,6	30,5	34,7	38,0	38,3	39,3	39,2
SI	26,3	26,5	27,8	27,2	27,3	26,7	26,4	23,1	22,0	35,2	38,7	47,1	54,4	71,9	75,4	78,0
SK	50,3	48,9	43,4	42,4	41,5	34,2	30,5	29,6	27,9	35,6	41,0	43,4	52,4	54,3	57,8	58,4
FI	43,8	42,5	41,5	44,5	44,4	41,7	39,6	35,2	33,9	43,5	48,7	49,2	53,6	57,2	60,4	62,0
SE	53,9	54,7	52,5	51,7	50,3	50,4	45,3	40,2	38,8	42,6	39,4	38,6	38,2	41,5	41,8	40,8
UK	40,5	37,3	37,1	38,7	40,3	41,7	42,7	43,7	51,9	67,1	78,4	84,3	88,6	91,4	93,4	94,5
EA-18	69,2	68,2	68,0	69,2	69,6	70,5	68,6	66,2	70,1	79,9	85,6	87,9	92,6	95,5	95,9	95,4
EU-28										74,3	80,0	82,8	86,6	89,4	89,6	89,4

Source: Ameco, April 2015.

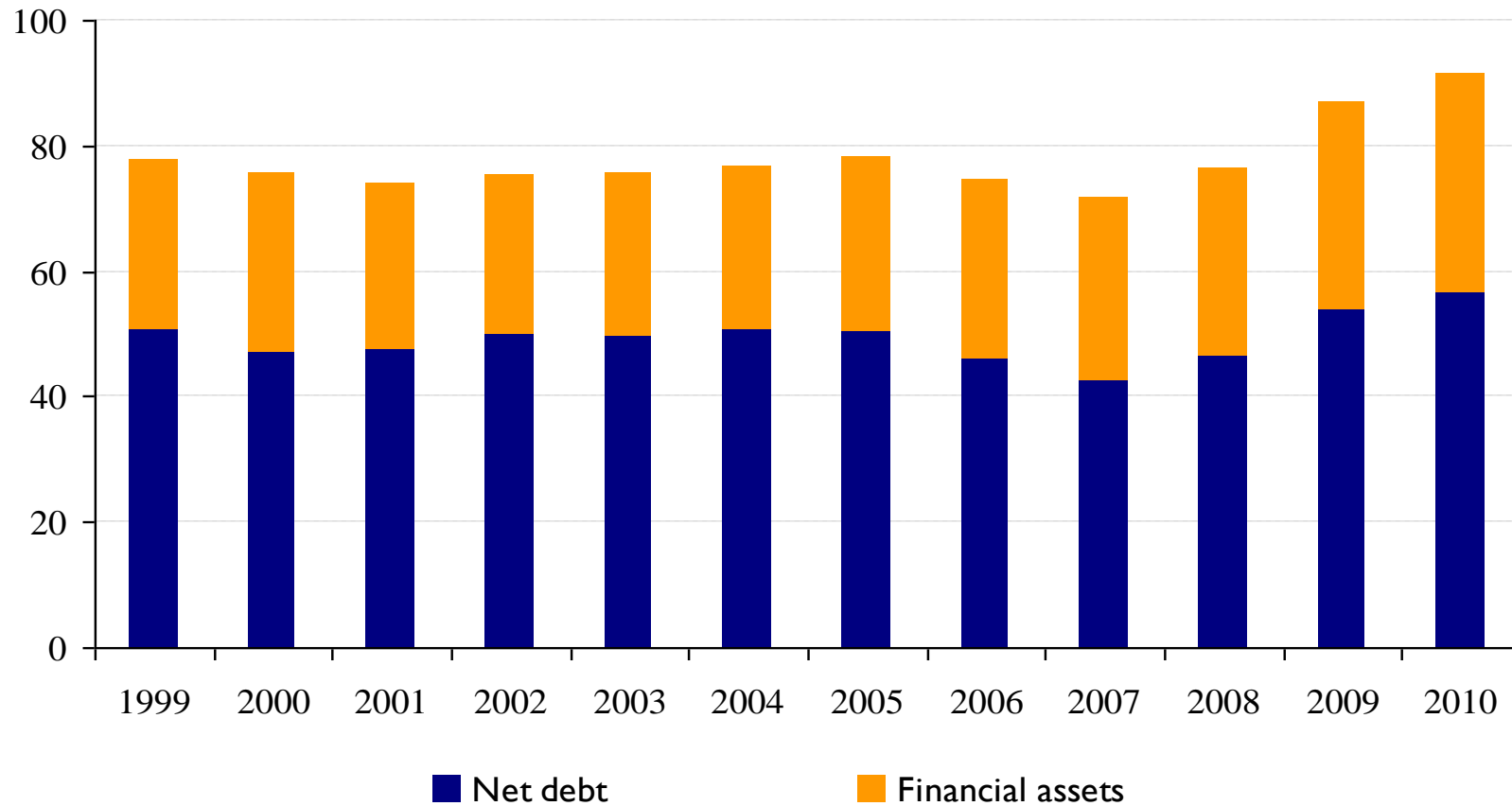
## Budget balance ratios in EU countries (% of GDP)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
BE	0,0	0,4	-0,1	-0,1	-0,1	-2,5	0,4	-0,1	-1,0	-5,6	-3,7	-3,7	-4,0	-2,8	-2,6	-2,5
BG	-0,5	1,1	-1,2	-0,4	1,9	1,0	1,9	1,2	1,7	-4,3	-3,1	-2,0	-0,8	-2,0	-2,0	-1,8
CZ	-3,6	-5,6	-6,5	-6,7	-2,8	-3,2	-2,4	-0,7	-2,2	-5,8	-4,7	-3,2	-4,4	-2,9	-3,0	-3,5
DK	2,3	1,5	0,4	0,1	2,1	5,2	5,2	4,8	3,2	-2,7	-2,5	-1,8	-4,1	-1,7	-1,7	-2,7
DE	1,1	-3,1	-3,8	-4,2	-3,8	-3,3	-1,6	0,2	-0,1	-3,1	-4,2	-0,8	0,1	0,0	0,1	0,2
EE	-0,2	-0,1	0,3	1,7	1,6	1,6	2,5	2,4	-2,9	-2,0	0,2	1,1	-0,2	-0,4	-0,1	-0,1
IE	4,9	0,9	-0,4	0,4	1,4	1,6	2,9	0,2	-7,4	-13,7	-30,6	-13,1	-8,2	-7,4	-5,0	-3,0
EL	-3,7	-4,5	-4,8	-5,7	-7,6	-5,5	-5,7	-6,5	-9,8	-15,7	-10,7	-9,5	-9,0	-13,5	-2,0	-1,1
ES	-0,9	-0,5	-0,3	-0,3	-0,1	1,3	2,4	2,0	-4,5	-11,1	-9,6	-9,6	-10,6	-6,8	-5,9	-6,6
FR	-1,5	-1,6	-3,3	-4,1	-3,6	-2,9	-2,3	-2,7	-3,3	-7,5	-7,1	-5,3	-4,8	-4,1	-3,8	-3,7
HR										-5,3	-6,4	-7,8	-5,0	-5,4	-6,5	-6,2
IT	-0,8	-3,1	-3,1	-3,6	-3,5	-4,4	-3,4	-1,6	-2,7	-5,5	-4,5	-3,8	-3,0	-3,0	-2,7	-2,5
CY	-2,3	-2,2	-4,4	-6,6	-4,1	-2,4	-1,2	3,5	0,9	-6,1	-5,3	-6,3	-6,4	-8,3	-8,4	-6,3
LV	-2,8	-2,0	-2,3	-1,6	-1,0	-0,4	-0,5	-0,4	-4,2	-9,8	-8,1	-3,6	-1,3	-1,4	-1,0	-1,0
LT	-3,2	-3,5	-1,9	-1,3	-1,5	-0,5	-0,4	-1,0	-3,3	-9,4	-7,2	-5,5	-3,2	-3,0	-2,5	-1,9
LU	6,0	6,1	2,1	0,5	-1,1	0,0	1,4	3,7	3,2	-0,7	-0,8	0,1	-0,6	-0,9	-1,0	-2,7
HU	-3,0	-4,1	-9,0	-7,3	-6,5	-7,9	-9,4	-5,1	-3,7	-4,6	-4,3	-4,3	-2,0	-2,9	-3,0	-2,7
MT	-5,7	-6,3	-5,7	-9,0	-4,6	-2,9	-2,7	-2,3	-4,6	-3,7	-3,5	-2,8	-3,3	-3,4	-3,4	-3,5
NL	2,0	-0,2	-2,1	-3,1	-1,7	-0,3	0,5	0,2	0,5	-5,6	-5,1	-4,3	-4,1	-3,3	-3,3	-3,0
AT	-1,7	0,0	-0,7	-1,5	-4,4	-1,7	-1,5	-0,9	-0,9	-4,1	-4,5	-2,5	-2,5	-2,5	-1,9	-1,5
PL	-3,0	-5,3	-5,0	-6,2	-5,4	-4,1	-3,6	-1,9	-3,7	-7,5	-7,9	-5,0	-3,9	-4,8	-4,6	-3,3
PT	-3,3	-4,8	-3,4	-3,7	-4,0	-6,5	-4,6	-3,1	-3,6	-10,2	-9,8	-4,3	-6,4	-5,9	-4,0	-2,5
RO	-4,7	-3,5	-2,0	-1,5	-1,2	-1,2	-2,2	-2,9	-5,7	-9,0	-6,8	-5,6	-3,0	-2,5	-2,0	-1,8
SI	-3,7	-4,0	-2,4	-2,7	-2,3	-1,5	-1,4	0,0	-1,9	-6,3	-5,9	-6,3	-3,8	-5,8	-7,1	-3,8
SK	-12,3	-6,5	-8,2	-2,8	-2,4	-2,8	-3,2	-1,8	-2,1	-8,0	-7,7	-5,1	-4,5	-3,0	-3,2	-3,8
FI	7,0	5,1	4,2	2,6	2,5	2,9	4,2	5,3	4,4	-2,5	-2,5	-0,7	-1,8	-2,2	-2,3	-2,0
SE	3,6	1,5	-1,3	-1,0	0,6	2,2	2,3	3,6	2,2	-0,7	0,3	0,2	-0,2	-0,9	-1,2	-0,5
EA-18	-0,1	-2,0	-2,7	-3,1	-2,9	-2,5	-1,4	-0,7	-2,1	-6,4	-6,2	-4,2	-3,7	-3,1	-2,5	-2,4
EU-28										-6,9	-6,5	-4,4	-3,9	-3,5	-2,7	-2,6

Source: Ameco, April 2015.

**Net debt = Gross debt minus liquid financial assets**

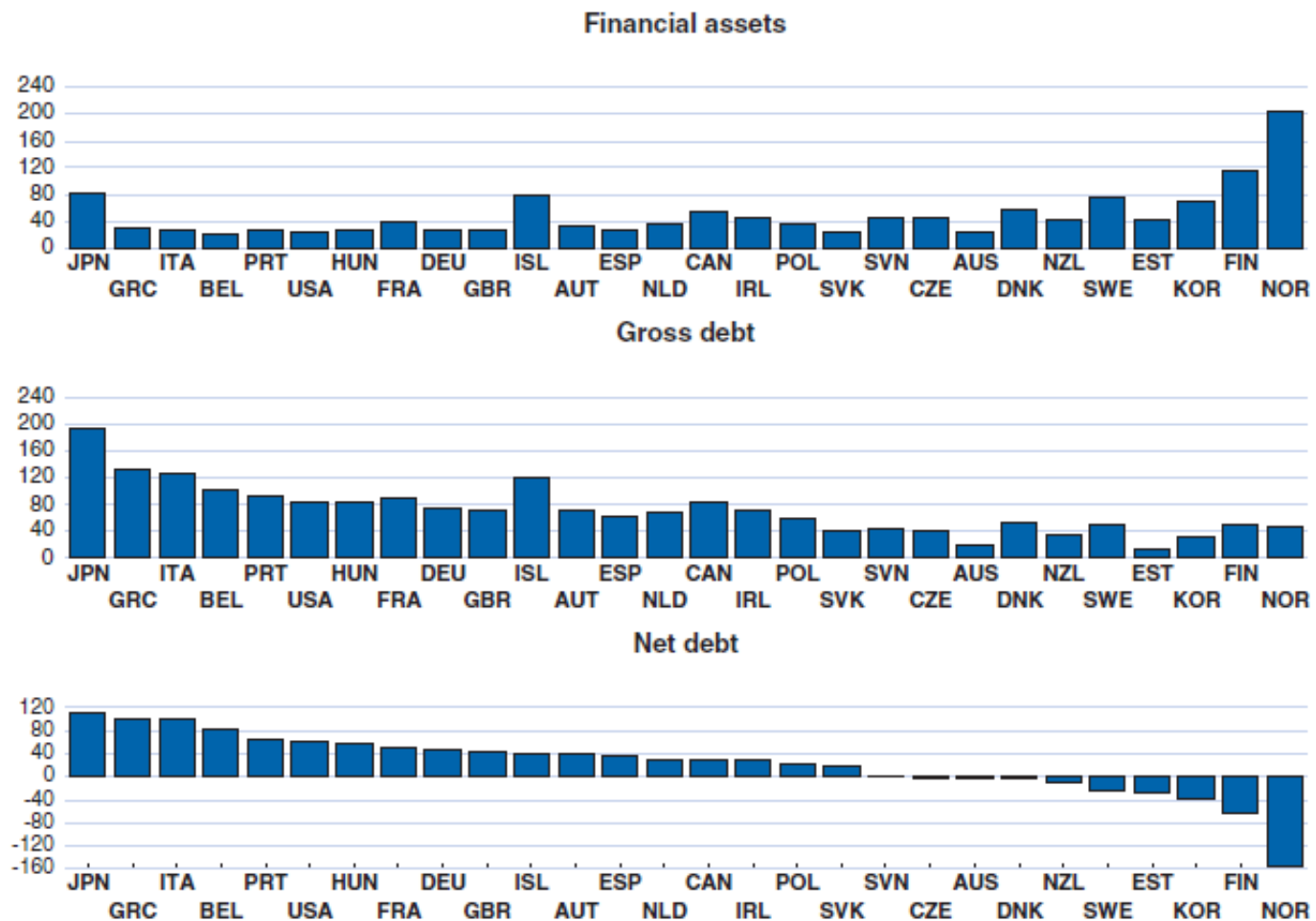
**Euro area government net debt and financial assets  
(1999-2010) (% of GDP)**



Net debt (1/2)

# Net debt ratio

General government debt and financial assets in OECD countries, 2009 (% of GDP)



Source: OECD Economic Outlook (May 2011).

Notes: Based on the ESA95/SNA (as opposed to Maastricht) definition. Financial assets are consolidated across layers of government, with the exception of Korea. Countries are sorted by net debt ratios.

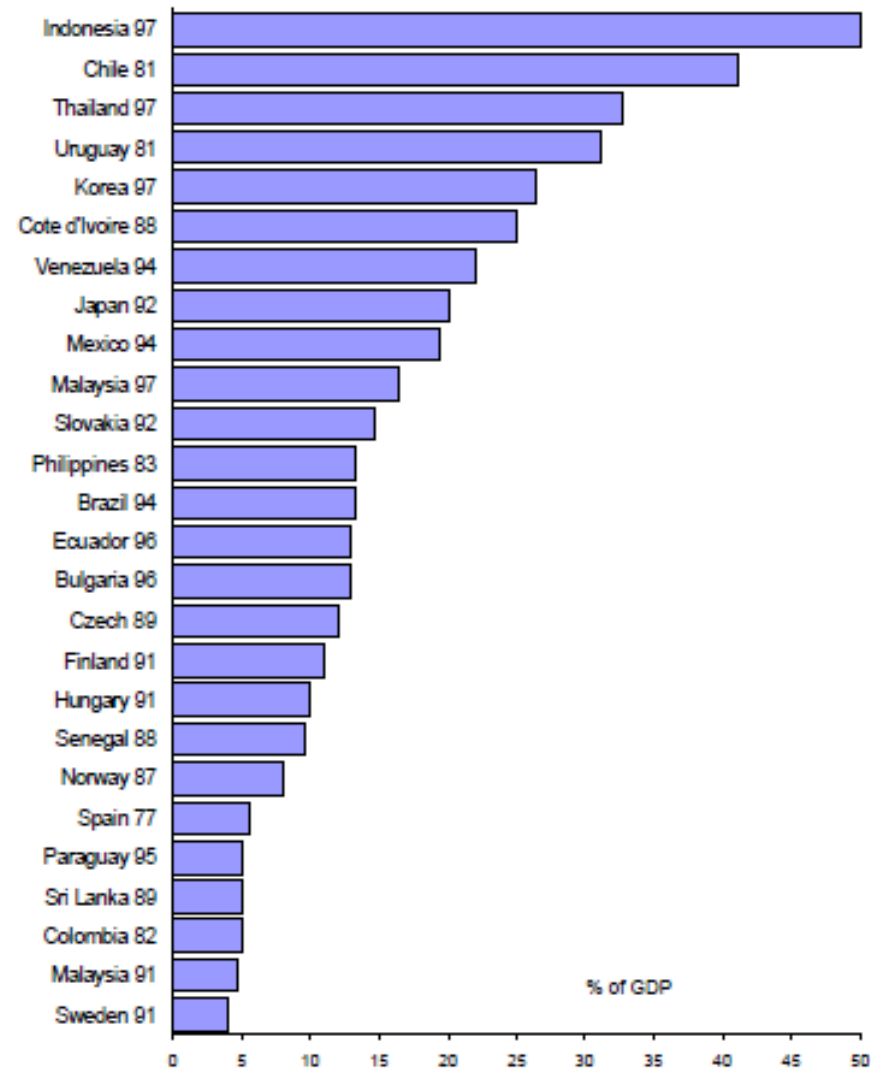


Table 1.1 Government Fiscal Risk Matrix

<i>Sources of obligations</i>	<i>Direct liabilities (obligation in any event)</i>	<i>Contingent liabilities (obligation if a particular event occurs)</i>
<i>Explicit</i> Government liability as recognized by a law or contract	<ul style="list-style-type: none"> <li>• Sovereign debt (loans contracted and securities issued by central government)</li> <li>• Expenditure composition (nondiscretionary spending)</li> <li>• Expenditures legally binding in the long term (civil service salaries and pensions)</li> </ul>	<ul style="list-style-type: none"> <li>• State guarantees for non-sovereign borrowing by and other obligations of sub-national governments and public and private sector entities (development banks)</li> <li>• Umbrella state guarantees for various types of loans (mortgage loans, student loans, agriculture loans, small business loans)</li> <li>• Trade and exchange rate guarantees issued by the state</li> <li>• State guarantees on private investments</li> <li>• State insurance schemes (deposit insurance, income from private pension funds, crop insurance, flood insurance, war-risk insurance)</li> </ul>
<i>Implicit</i> A moral obligation of government that reflects public and interest group pressures	<ul style="list-style-type: none"> <li>• Future public pensions (as opposed to civil service pensions)<sup>a</sup></li> <li>• Social security schemes<sup>a</sup></li> <li>• Future health care financing<sup>a</sup></li> <li>• Future recurrent costs of public investment projects</li> </ul>	<ul style="list-style-type: none"> <li>• Default of a subnational government or public/private entity on nonguaranteed debt/obligations</li> <li>• Banking failure (support beyond government insurance, if any)</li> <li>• Cleanup of liabilities of entities being privatized</li> <li>• Failure of a nonguaranteed pension fund, employment fund, or social security fund (protection of small investors)</li> <li>• Possibly negative net worth and/or default of central bank on its obligations (foreign exchange contracts, currency defense, balance of payments)</li> <li>• Other calls for bailouts (for example, following a reversal in private capital flows)</li> <li>• Environmental recovery, disaster relief, military financing</li> </ul>

Source: Brixi, and Mody, 2002.

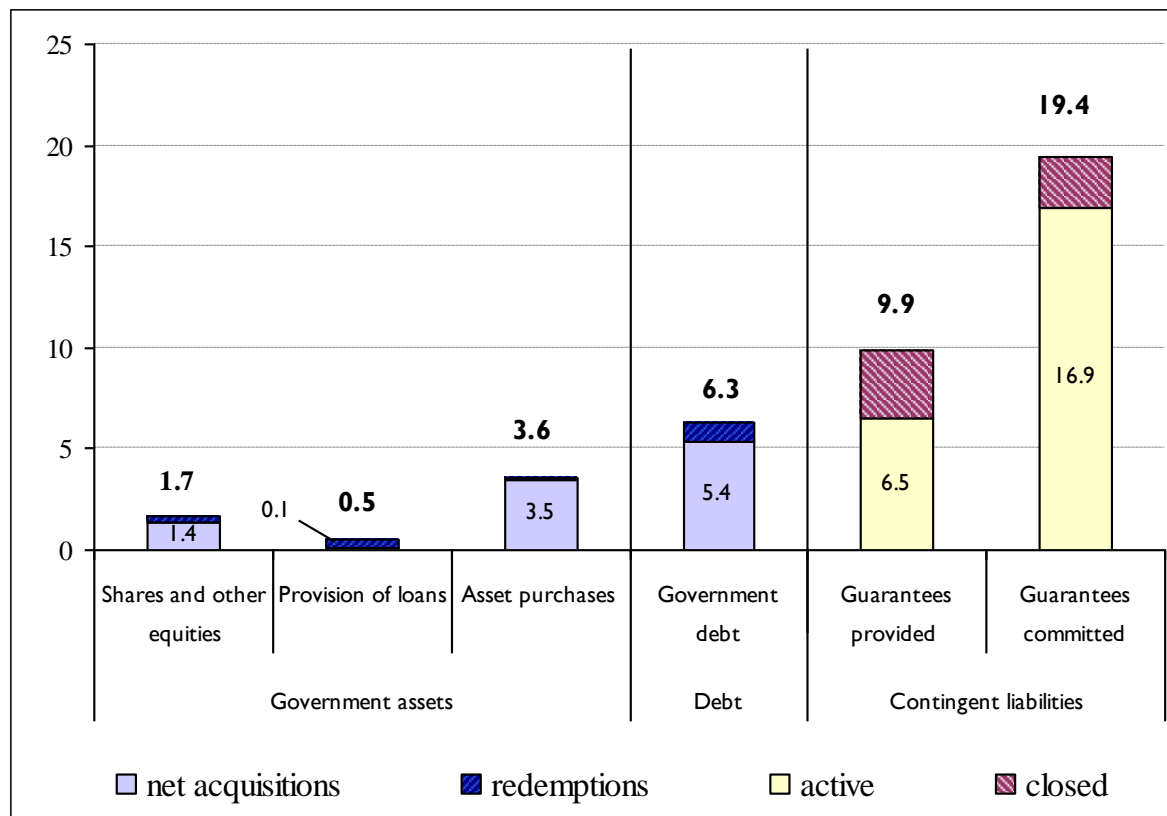
# Fiscal costs of banking crises



Source: Honohan, P. and D. Klingebiel, "Controlling Fiscal Costs of Banking Crises", The World Bank. 2000.

# The cost of the banking crisis

Cumulated financial sector stabilisation operations: impact on government assets, debt, contingent liabilities (cumulated 2008-10: as a percentage of 2010 GDP)



- For the years 2008-10, the cumulative impact on euro area government **assets** and on **debt** owing to bank support was 6.3% of GDP (while net impact on the deficit was small)
- The guarantees granted (**contingent liabilities**) were 9.9% of GDP
- The ceiling of potential guarantees is estimated to be at least 19.4% of GDP.

Sources: Eurostat (April 2011) and ESCB estimates (May 2011).

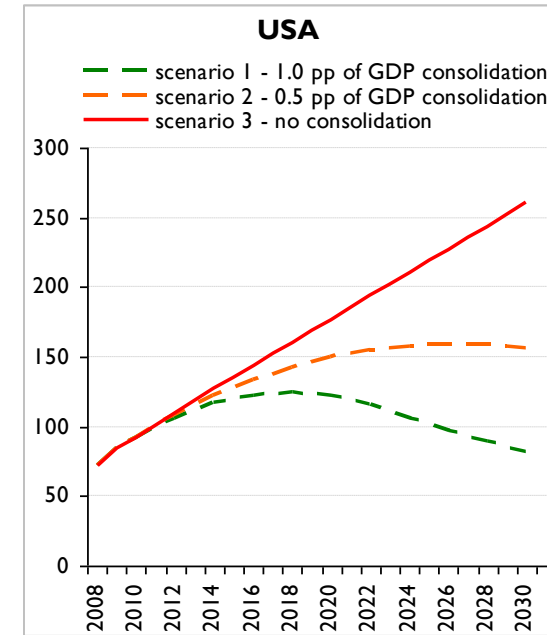
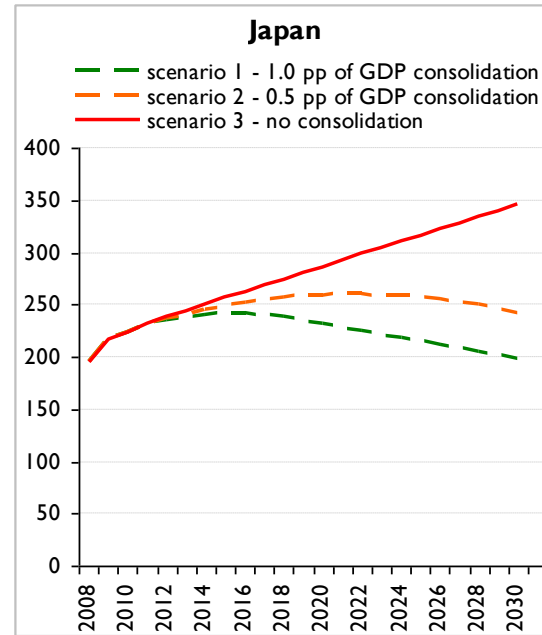
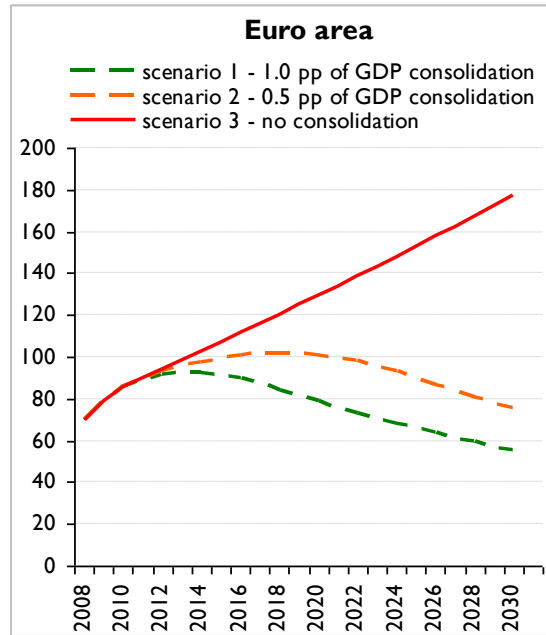
# Debt projections

- Given its long-term nature, projections of the debt ratio represent a central element for the assessment of fiscal sustainability.
- Ingredients: assumptions about the long-term behaviour of output, the interest rate, government revenue, government expenditure.

$$\underbrace{\frac{B_t}{Y_t}}_{\text{Debt-to-GDP ratio}} = \left( \underbrace{\frac{E_t}{Y_t} - \frac{T_t}{Y_t}}_{\text{Primary deficit ratio}} + \underbrace{\frac{1 + r_t}{1 + g_t} \frac{B_{t-1}}{Y_{t-1}}}_{\text{Legacy of past fiscal policies}} \right)$$

- See pp. 8 of the fiscal sustainability lecture (equation (5), without seigniorage) or pp. 25 , equation (53).

# Debt projections – an example



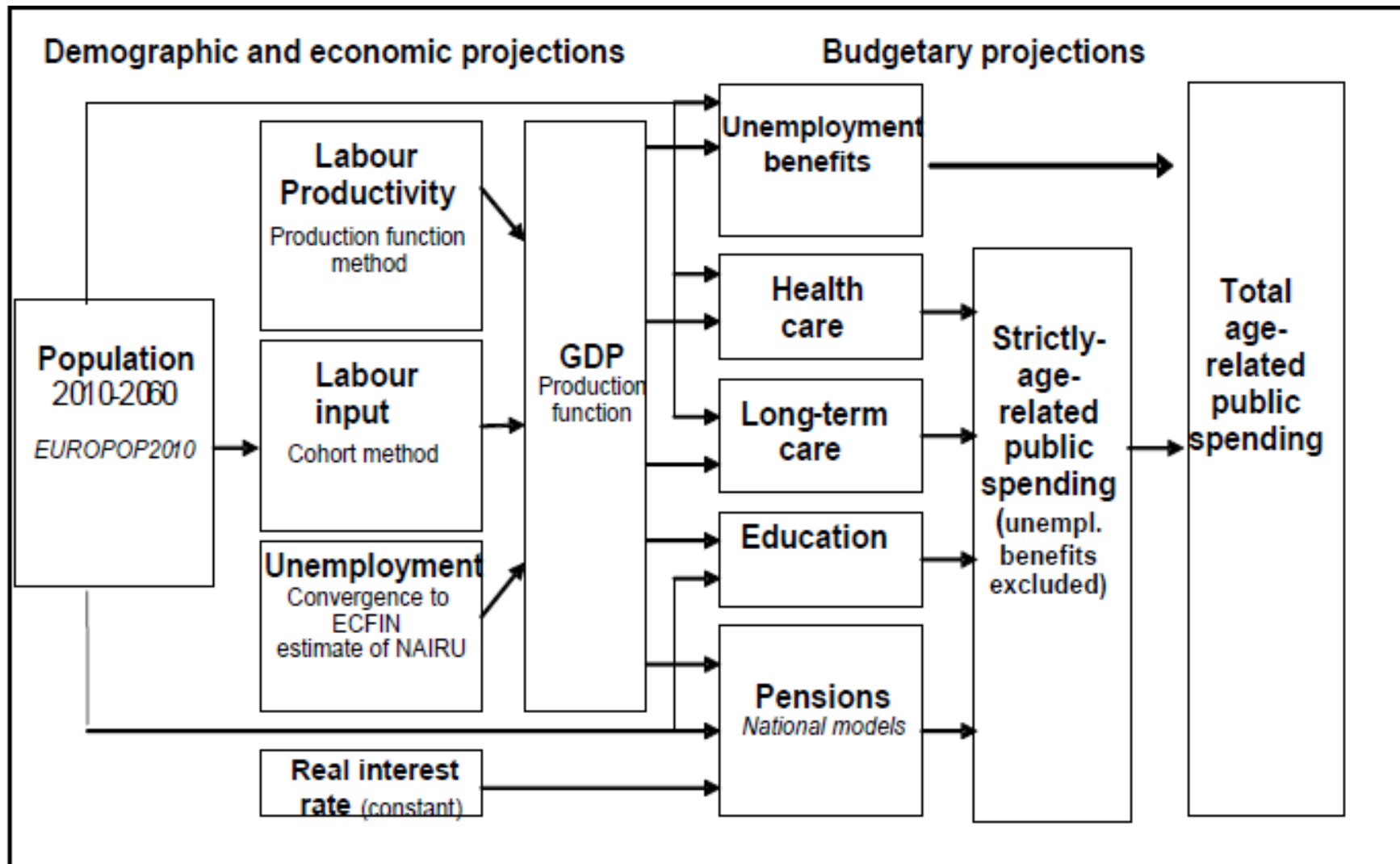
# Assumptions

- All three scenarios use the European Commission's spring 2011 forecast for general government debt and primary balance up to 2010 as a starting point.
- Fiscal developments as of 2011 are determined by three alternative scenarios:
- Scenario 1 assumes a more rapid fiscal consolidation process, with the primary balance improving by 1.0 percentage point of GDP per year until an overall balanced budget is reached.
- Scenario 2 assumes a less ambitious consolidation path, with the primary balance improving by only 0.5 percentage point of GDP per year until an overall balanced budget is reached.
- Scenario 3 assumes that no consolidation efforts are made. The primary balance remains constant at the forecast value for 2010 over the whole simulation period.
- The macroeconomic assumptions underlying the three scenarios are as follows: the nominal GDP growth comes from IMF World Economic Outlook (April 2011) up to 2015 and afterwards it is constant and equal to the latest value. The nominal implicit interest rate on government debt is assumed constant at the value recorded in 2008 (as the values for the period 2009-10 could be distorted by the financial crisis).
- One caveat: Cost of ageing not considered ...

# The effects of ageing on public expenditure

- 2012 Ageing Report by the Economic Policy Committee's Ageing Working Group (AWG) and the European Commission:
- The starting point was the population projection EUROPOP 2010, produced by Eurostat.
- Common set of assumptions and methodologies for the labour force (participation, employment and unemployment rates), labour productivity and the real interest rate. GDP was calculated combining these assumptions.
- Separate budgetary projections for five age-related expenditure items.
  - Member States run the projections for pensions using their own national models.
  - The Commission services (DG ECFIN) ran the projections for health care, long-term care, education and unemployment on the basis of projection models for each expenditure item.
- For each expenditure item, the same projection model was used for the 27 Member States and for Norway.
- The results of this set of projections were aggregated to provide the overall age-related public expenditure over the next 50 years.

## Projection methodology/input:



Source: 2012 Ageing Report, European Commission.



Projection exercise 2018						
	Total population (million)			Old-age dependency ratio		
	2016	2070	% change 2016-2070	2016	2070	pps. change 2016-70
BE	11.3	13.9	22.8%	28.4	45.2	16.7
BG	7.1	4.9	-31.9%	31.5	56.2	24.7
CZ	10.6	10.0	-5.7%	28.1	49.7	21.6
DK	5.7	6.8	19.2%	29.5	50.2	20.8
DE	82.5	79.2	-3.9%	32.2	55.9	23.7
EE	1.3	1.2	-10.5%	29.7	52.7	23.0
IE	4.7	6.0	28.9%	20.9	41.2	20.4
EL	10.8	7.7	-28.8%	33.4	63.1	29.7
ES	46.4	49.9	7.4%	28.6	46.6	18.0
FR	66.8	77.0	15.3%	30.4	44.8	14.4
HR	4.2	3.4	-18.6%	29.3	56.2	26.9
IT	60.8	54.9	-9.7%	34.5	60.3	25.8
CY	0.9	1.0	19.8%	22.2	61.0	38.7
LV	2.0	1.3	-31.7%	30.5	53.8	23.3
LT	2.9	1.7	-40.1%	29.0	53.1	24.1
LU	0.6	1.0	78.0%	20.6	48.9	28.2
HU	9.8	8.9	-9.7%	27.5	52.0	24.5
MT	0.4	0.5	19.3%	29.1	55.8	26.6
NL	17.0	19.6	14.8%	28.1	48.4	20.3
AT	8.7	10.2	16.5%	27.6	54.4	26.9
PL	38.0	30.9	-18.7%	23.7	62.2	38.5
PT	10.3	8.0	-22.7%	32.1	67.2	35.1
RO	19.7	15.0	-23.8%	26.3	52.8	26.6
SI	2.1	2.0	-5.3%	28.1	50.2	22.1
SK	5.4	4.9	-9.8%	21.0	56.8	35.8
FI	5.5	5.6	2.3%	32.8	52.0	19.1
SE	9.9	13.9	39.9%	31.6	43.2	11.6
UK	65.6	81.0	23.5%	27.9	46.0	18.0
NO	5.2	7.0	33.9%	25.2	47.2	22.1
EA	340.3	345.6	1.5%	30.9	51.8	20.9
EU*	510.9	520.3	1.8%	29.6	51.2	21.6
EU27	445.3	439.2	-1.4%	29.9	52.2	22.4

Source: 2018  
Ageing Report,  
European  
Commission.

# Macroeconomic assumptions: Labour force

- Cohort methodology
- Labour force participation rates
  - Overall participation rates are projected to increase.
- Assumptions on structural unemployment
  - Using the Spring 2011 EC Forecast,
  - In the EU27, the unemployment rate is assumed to decline by 3.2 p.p. (from 9.7% in 2010 to 6.5% in 2060),
  - In the euro area, the unemployment rate is expected to fall from 10.1% in 2010 to 6.7% in 2060.
- Employment projections
  - total employment rate (for individuals aged 20 to 64) in the EU27 is projected to increase from 68 ½ % in 2010 to 71 ½ % in 2020 and to 74% in 2060,
  - Over the projection period (i.e. 2010-2060), annual average growth in total hours worked is projected to be negative; down by 0.1%.

# Macroeconomic assumptions: Potential growth

- Labour productivity
  - Labour productivity will become the key driver of growth in the EU.
  - Total factor productivity growth is assumed to converge to 1% (annual average TFP growth in the EU, proxied by EU15, over 1971-2010).
- Potential growth
  - Potential growth is projected to be 1.5 % on average up to 2020 in the EU.
  - In the period 2010-2060, annual average potential GDP growth in the EU27 is projected to be about 1.5%, slightly lower than in the 2009 projection. A similar picture emerges for the euro area.

# Pensions

- Commonly agreed demographic and macro assumptions + national pension models.
- Peer reviews
- Focus: Social security pension expenditure
  - Old-age; early retirement; disability; survivors' pensions
  - But coverage still not fully comparable
- Role of private pensions: crucial for pension adequacy/fiscal sustainability
  - *However*: insufficient coverage due to data problems
- Drivers of spending on public pensions: overall percentage change in the public pension expenditure to GDP ratio can be expressed as a sum of the contribution of five main factors, i.e. the dependency ratio, the coverage ratio, the employment rate, the benefit ratio, the labour intensity.

# Healthcare

- Commonly agreed demographic and macroeconomic assumptions + commonly agreed health care cost model + partly national data on health care costs
- Total spending on health care - Baseline:
  - Age-related expenditure profiles: half of extra years of life gained through higher life expectancy spent in good health,
  - Unit cost development: GDP per capita,
  - Income elasticity of demand: 1.1 in the base year and converges to by the end of the projection period (2060)
- → Projections still tend to underestimate increase in costs up to 2060

# Long-term care

- Commonly agreed demographic/ macro assumptions + commonly agreed long-term care cost model + mostly national (non-comparable) data on LTC costs
- Long-term care provision: → *Shift to formal care or not?*
  - Informally: spouses, children – no impact on public finances
  - Formally: public/private professional care (at home or in institution)
- Total spending on long-term care - Baseline:
  - Age-related expenditure profiles: as in health care cost projections
  - Unit cost development: GDP per capita
  - Policy setting: probability of receiving formal care unchanged – various scenarios
- → Projections still tend to underestimate increase in costs up to 2060.

- The 2012 Ageing Report. Economic and budgetary projections for the 27 EU Member States (2010-2060). European Economy, 2/2012. Joint Report prepared by the European Commission (DG ECFIN) and the Economic Policy Committee (AWG).
- Brixi, H., Mody, A. (2002). “Dealing with government fiscal risk”, in (eds.) Brixi, H., Schick, (eds.) *The Government at Risk*, The World Bank.
- ECB (2001). “Fiscal policies and economic growth,” ECB Monthly Bulletin, August.
- ECB (2003). “The need for comprehensive reforms to cope with population ageing,” ECB Monthly Bulletin, April.
- Giammarioli, N., Nickel, C., Rother, P., Vidal, J.-P. (2007). “Assessing Fiscal Soundness – Theory and Practice”, ECB Occasional Paper 56.