WORKING PAPER SERIES

Is Portugal potentially insolvent?

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Which primary surpluses are needed to stabilize the debt ratio ?

In the absence of any variation of net public assets, the following condition has to be met to guarantee intertemporal solvency of a country

In proportion of nominal GDP, a given year's primary deficit ratio must be lower than or equal to the previous year's debt ratio times the difference between the nominal growth rate and the implicit interest rate, divided by "1 plus the nominal growth rate":

$$\frac{primary\ deficit_{current\ year}}{GDP_{current\ year}}$$

$$\leq \left(\frac{debt_{previous\ year}}{GDP_{previous\ year}}\right)\frac{(growth\ rate_{current\ year} - implicit\ interest\ rate_{current\ year})}{(1 + growth\ rate_{current\ year})}$$

The reason why this condition must be met to guarantee solvency is explained in a later section.

A country may temporarily relax this constraint by selling public assets to decrease the gross debt by the amount of their price. For example, it is what Portugal does in 2013 by privatizing, selling assets and using deposits, for a value of about 7% of nominal gross domestic product. Without this policy of reducing net public assets, Portugal should have a primary of 5.1 % of nominal GDP in 2013, to stabilize the debt ratio at its level of 2012. By reducing assets belonging to the government, this objective can be reached with a planned primary deficit of 1.8% in 2013

But once the assets have been sold, solvency can only be guaranteed by applying the above rule. Portugal does not plan to sell assets after 2013.

It is thus interesting to compute what should be the primary deficit or surplus of Portugal in 2014 and later, in order to guarantee intertemporal solvency.

According to the ministry of finance of Portugal, the debt ratio should have the following value in 2013

$$\frac{debt_{2013}}{GDP_{2013}} = 1.223 = 122.3\%$$

and the rate of growth of nominal GDP is expected to be

$$growth\ rate_{2014} = 0.019 = 1.9\%$$

which is optimistic.

If interests rate remain at their current level, the implicit average interest rate paid on the whole debt should remain close to the current level of $0,03525 = 3.525\%$

Then, in order to guarantee that $\frac{debt_{2014}}{GDP_{2014r}} \leq \frac{debt_{2013}}{GDP_{2013}}$, the following condition must be met

$$, \frac{primary\ deficit_{2014}}{GDP_{2014}} \leq 1.223 \frac{(0.019 - 0.03525)}{(1 + 0.019)}$$

and thus

$$\frac{primary\ deficit_{2014}}{GDP_{2014}} \leq -0.0195$$

which means that Portugal should have a primary surplus of at least 1.95% of gross domestic product in 2014.

Relying on the official growth expectations of 2.7% in 2015, 3.5% in 2016, 3.7% in 2017, and supposing an unchanged implicit interest rate, the primary surplus ratio should be 1% in 2015, 0.03% in 2016 and a small primary deficit of 0.2% could even be allowed in 2017.

The ministry of finance of Portugal plans to borrow 8.2 billion € in 2014, 18.5 billion € in 2015, 14.2 billion € in 2016, 12.1 billion € in 2017, on the market.

If the government has to borrow this money at an interest rate of 8%, the implicit average interest rate on the debt would progressively increase to reach 3.7% in 2014, 4.1% in 2015, 4.4% in 2016, 4.6% in 2017, … Under unchanged growth perspectives, debt stabilization would then require a primary surplus of 2.2% in 2014, 1.7% in 2015, 1.1% in 2016 and in 2017. Of course a rate of 8%, which was recently observed, is an extreme scenario for a sustained period. It is however realistic to forecast that nominal interest rates will increase and that, since old bonds arriving at maturity are replaced by new bonds, the implicit interest rate on the whole debt will progressively increase.

The problem is that official growth forecasts are excessively optimistic. The government expects nominal GDP growth to increase and reach 3.7% in 2016. Even the IMF has also issued extremely optimistic forecasts for Portugal in July 2013: real GDP growth would reach 0.6% in 2014, 1.5% in 2015, 1.8% in 2016, and its average value would be 2% from 2017 to 2030. The DP deflator would increase by 1.3% in 2014, 1.1% in 2015 , 1.7% in 2016, and 2% on average from 2017 to 2030. Overall official forecasts thus favour an optimistic scenario where nominal GDP growth quickly increases and stabilizes at 4% from 2017 to 2030.

Considering the low record in research expenses and innovation performances of the country and the huge losses of production capacity, as well as its poor productivity growth and declining population perspectives, lower growth has to be forecasted. Starting from 2014, an average long term rate of nominal GDP growth of 2% would be adequate, or maybe 2.5% if the inflation rate is somewhat higher. Note that this forecast would already seem overly optimistic to certain analysts.

As shown above the primary surplus ratio which is required to stabilize the public debt ratio depends on assumptions about the future rate of growth of nominal GDP and implicit interest rates levels. The following table shows the primary surplus ratio that is required for different combinations of assumptions about the nominal growth rate and the implicit interest rate on the public debt.

Primary surplus needed to stabilize the debt ratio
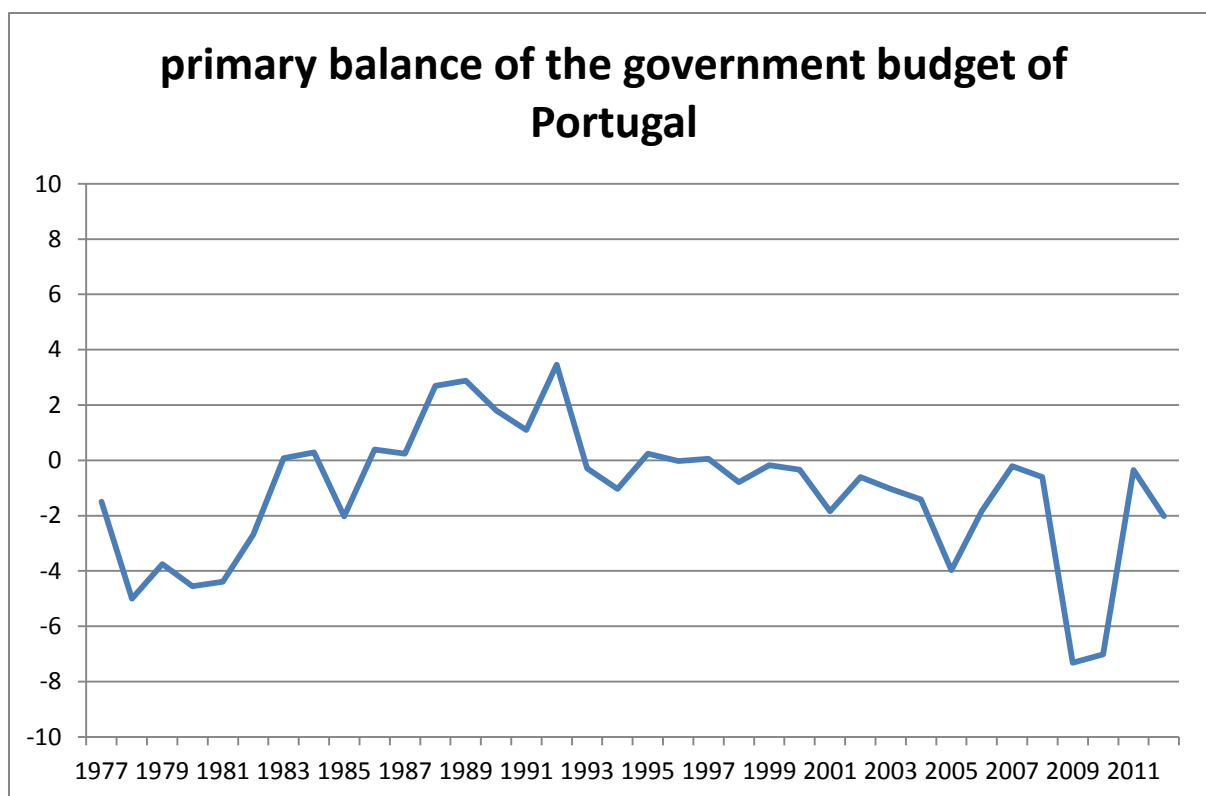
In % of nominal gross domestic product

		implicit average interest rate paid on the whole debt								
		3.5	**3.75**	**4**	**4.5**	**5**	**5.5**	**6**	**6.5**	**7**
	-1	5.6	5.9	6.2	6.8	7.4	8.0	8.6	9.3	9.9
	-0.5	4.9	5.2	5.5	6.1	6.8	7.4	8.0	8.6	9.2
	0	4.3	4.6	4.9	5.5	6.1	6.7	7.3	7.9	8.6
	0.5	3.7	4.0	4.3	4.9	5.5	6.1	6.7	7.3	7.9
nominal growth rate	**1**	3.0	3.3	3.6	4.2	4.8	5.4	6.1	6.7	7.3
	1.5	2.4	2.7	3.0	3.6	4.2	4.8	5.4	6.0	6.6
	2	1.8	2.1	2.4	3.0	3.6	4.2	4.8	5.4	6.0
	2.5	1.2	1.5	1.8	2.4	3.0	3.6	4.2	4.8	5.4
	3	0.6	0.9	1.2	1.8	2.4	3.0	3.6	4.2	4.7
	3.5	0.0	0.3	0.6	1.2	1.8	2.4	3.0	3.5	4.1
	4	-0.6	-0.3	0.0	0.6	1.2	1.8	2.4	2.9	3.5

Under the official scenario of a long term nominal growth rate of 4% and un unchanged implicit interest rate of 3.5%, Portugal may even have a small deficit of the primary surplus. However, under realistic forecasts of a 2.5% rate of nominal growth, and an implicit interest rate at 4.5%, debt stabilization requires that Portugal has a huge primary surplus amounting to 3% of nominal GDP.

Why most of these required primary surpluses are unrealistic

The question arises as to whether the required primary surplus can be politically and socially accepted during a long period. To provide an answer it is useful to observe the record of past primary balances of Portugal.

From 1977 to 2012, Portugal had an average primary **deficit** of 1.15% of gross domestic product. It provides an idea of what seems to be politically and socially accepted in the country.

primary balance of the government budget of Portugal

Source of the data AMECO European Commission

Under the official scenario which is excessively optimistic, the primary balance of Portugal should be better than its average historical record by 1%. Such an effort could maybe be accepted. However, under realistic assumptions, the balance of Portugal should exceed its average historical record by 4%. It is extremely unrealistic to assume that such an effort could be politically and socially be accepted.

The intertemporal solvency condition

A simple definition of the solvency of a sovereign country is at least its ability to stabilize the debt ratio at its current level.

A country is thus solvent if conditions are met to guarantee that

$$\frac{debt_{current\ year}}{GDP_{current\ year}} \leq \frac{debt_{previous\ year}}{GDP_{previous\ year}}$$

year after year.

By definition

$$\frac{debt_{current\ year}}{GDP_{current\ year}} =$$

$$\frac{debt_{previous\ year}}{GDP_{current\ year}} + \frac{primary\ deficit_{current\ year}}{GDP_{current\ year}} + \frac{interest\ payment_{current\ year}}{GDP_{current\ year}}$$
$$+ \frac{net\ asset\ variation_{current\ year}}{GDP_{current\ year}}$$

and thus

$$\frac{debt_{current\ year}}{GDP_{current\ year}} = \frac{primary\ deficit_{current\ year}}{GDP_{current\ year}}$$

$$+ \left(\frac{debt_{previous\ year}}{GDP_{previous\ year}}\right)\frac{(1 + implicit\ interest\ rate_{current\ year})}{(1 + growth\ rate_{current\ year})} + \frac{net\ asset\ variation_{current\ year}}{GDP_{current\ year}}$$

since

$$interest\ payment_{current\ year} = debt_{previous\ year}(1 + implicit\ interest\ rate_{current\ year})$$

$$GDP_{current\ year} = GDP_{previous\ year}(1 + growth\ rate_{current\ year})$$

Therefore. the country is solvent if the following condition holds:

$$\frac{primary\ deficit_{current\ year}}{GDP_{current\ year}}$$

$$\leq \left(\frac{debt_{previous\ year}}{GDP_{previous\ year}}\right)\frac{(growth\ rate_{current\ year} - implicit\ interest\ rate_{current\ year})}{(1 + growth\ rate_{current\ year})}$$
$$- \frac{net\ asset\ variation_{current\ year}}{GDP_{current\ year}}$$

Computations for 2013

Using the official data of the AMECO data base of the European Commission. the following values can be computed:

$$\left(\frac{debt_{2012}}{GDP_{2012}}\right) = 1.236 = 123.6\%$$

$$growth\ rate_{2013} = -0.0057052449 = -0.57052449\%$$

$$implicit\ interest\ rate_{2013} = 0.0352381418092909 = 3.52381418092909\%$$

Therefore the solvency condition is

$$\frac{primary\ deficit_{2013}}{GDP_{2013}} \leq 1.236\frac{(-0.0057052449 - 0.0352381418092909)}{(1 - 0.0057052449)}$$

and thus

$$\frac{primary\ deficit_{2013}}{GDP_{2013}} \leq -0.0508964$$

or

$$\frac{primary\ deficit_{2013}}{GDP_{2013}} \leq -5.08964\%$$

Therefore. to meet the intertemporal solvency conditions without selling assets in 2013. **Portugal should have a primary surplus of at least 5.1 % of nominal gross domestic product**. In 2013 however, there is an expected primary deficit of 1.8%. Debt stabilization can only be achieved in 2013 by using deposits, privatizing and selling assets for an amount close to 7% of nominal GDP. It is this way that Portugal plans to bring down the debt ratio from 123.6% in 2012 to 122.9% in 2013.

$$\frac{net\ asset\ variation_{current\ year}}{GDP_{current\ year}} \approx -0.07$$

It is of course an exceptional policy measure that cannot be repeated in the longer term.

In July the ministry of finance of Portugal even announced a target of 123.3% for the debt ratio in 2013. before going up to 123.7% in 2014.