How risky is the high public debt in a context of low interest rates?

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Introduction

Since the financial crisis and the ensuing economic recession, government debt has risen considerably. Belgium is no exception to this trend and even now the current level of its public debt is still higher than that observed before 2008. This increased indebtedness may raise concern.

However, interest charges paid by the government have been constantly shrinking over the last few years as a result of a marked fall in interest rates. Rates are now at their lowest level ever. And so the cost of financing government debt has never before been as low as it is today.

These observations obviously raise a lot of questions. What risks are incurred with a high debt in this context of low interest rates and what are the consequences for optimal fiscal policy? How to manage debt when interest rates are low? The objective of this article is therefore to answer these questions and to put the challenges involved into perspective.

This article puts the accent on Belgium and the federal government debt. The first section explains the theoretical aspects of the public debt, showing how the level of optimal debt and debt sustainability are influenced by the interest rate paid on this debt. Some key figures on public debt are given in the second section. The third section focuses on interest rate movements and changes in interest charges and the snowball effect on the debt ratio. The fourth section analyses debt maturity management issues and presents a range of simulation results on the extra interest charges that a rise in interest rates would bring. The fifth and last section examines the issue of debt sustainability risks. The conclusion sums up the main findings to emerge from this article.

1. Theory of public debt in relation to the interest rate

1.1 Optimal debt level

From a theoretical point of view, government deficits and public debt are regarded as acceptable and even desirable if the return on public intervention is higher than the costs incurred by financing the debt. It is clear

that the interest rate plays a very important role here. By comparing debt financing costs and the return on public intervention, it is possible to determine the optimal level of public debt. If the interest rate comes down, that reduces the cost of the debt as well as the requirements associated with the return on public intervention, pushing up the optimal debt level.

Government intervention may concern different types of expenditure on infrastructure investment, education, the functioning of public institutions, security, as well as a reduction in taxation in order to moderate its adverse impact on economic growth. In practice, however, it proves to be difficult to measure the return on public intervention accurately because it is not necessarily financial; it may also consist of an improvement in well-being. It is therefore also difficult to quantify the optimal level of public debt. Owing to these methodological problems, the empirical literature on the optimal debt level is fairly limited and the findings are very divergent.

Fiscal policy can sometimes stray considerably from the macroeconomic optimum. In the last few decades, governments in many countries have shown a lack of budgetary discipline and have consequently pushed up their deficit and debt levels. The literature attributes that lack of fiscal discipline to the "deficit bias". This means that the democratic decision-making process may encourage deviation from an optimal fiscal policy.

Fiscal policy may be too improvident if the population focuses essentially on the short-term benefits of tax cuts or increases in expenditure, without always being aware of any possible adverse consequences in the long term of an excessively expansionary fiscal policy. There may also be a preference for deliberately favouring current generations and transferring the burden of the debt to future generations. The concept known in game theory as the "common pool problem" offers another explanation for the deficit bias. Regarding fiscal policy, this concept means that each interest group or each party in a coalition government looks after its own interests, so that the budget deficit and the public debt may exceed the optimum levels. The deficit bias and its undesirable effects may be counteracted by independent institutions and rules imposing restrictions on the budget.

A public debt that is above its optimum level can have a negative impact on economic activity in the long term. It may trigger a rise in interest rates as governments run the risk of paying a higher risk premium on their debt if it is high, which then narrows the scope for other types of public spending or for reducing the tax burden.

1.2 Maximum debt level

Looking beyond the optimal-debt concept, the literature also examines the concept of maximum acceptable public debt. That corresponds to a country's maximum capacity to repay its debts.

According to the intertemporal budget constraint, the current level of government debt is, by definition, equal to the present value of future primary balances (the primary balance is the result of budgetary operations other than interest charges). The higher the public debt ratio, the bigger future primary balances must be. So, the maximum acceptable debt ratio corresponds to the present value of maximum future primary balances deemed acceptable.

The primary balance can only be raised through higher revenues or expenditure restraint. The maximum debt level is therefore determined by the maximum acceptable level of public revenues and the minimum acceptable level of public primary expenditure. Those levels cannot be established only on the basis of economic elements, as it is essentially social and political considerations that may set the limits here. If the current level of government debt exceeds the present value of future primary balances that the population is prepared to generate, it will end up with a problem of sovereign debt default. However, it is difficult to quantify the theoretical concept of the maximum debt ratio and it may also vary from one country to another.

It is important to note that this intertemporal budget constraint is based on the condition that the implicit interest rate on the government debt (r) is higher than the nominal GDP growth rate (g). This is generally the case in the medium and long term and, in the literature, this is also considered as the normal situation. In fact, according to economic theory, if the difference between the nominal interest rate and nominal GDP growth is not positive in the medium and long term, the result would be a situation of dynamic inefficiency resulting from excess accumulation of capital.

Nevertheless, it is possible that sometimes nominal GDP growth is higher than the nominal interest rate on the debt. A recent article by Blanchard (2019) shows that the United States has frequently witnessed such a situation in the past. According to this study, as long as interest rates are low, and especially lower than the nominal GDP growth rate, government debt would not pose any problems. This observation has struck a resonant chord lately, all the more so as many euro area countries currently find themselves in a situation where the implicit interest rate on their public debt is below the nominal growth of their GDP.

However, the present context of low interest rates cannot be considered as normal in the medium and long run and it would be reckless for fiscal policy and debt management to rely on these conditions lasting.

1.3 Risk of slippage in the debt ratio

Leaving aside exogenous operations which influence the debt without affecting the budget balance, the endogenous evolution of the debt ratio is determined, on the one hand, by the difference between the cost of servicing the debt (r) and nominal GDP growth (g) and, on the other hand, by the primary balance.

When the nominal GDP growth rate is below the implicit interest rate on the debt, the debt ratio in fact tends to increase spontaneously under the impact of a self-sustaining process because interest charges widen the deficit, which in turn pushes up interest charges again and so on. In that case, the government should have a sufficiently high primary balance in order to offset this effect and to stabilise or lower the debt ratio. If the actual primary balance is too small, the debt ratio increases continuously. That explosive process whereby the public debt is fuelled by interest charges on the debt itself is commonly called the "snowball effect".

As long as the nominal GDP growth rate exceeds the implicit interest rate, there is no risk of a snowball effect: even with substantial primary deficits, exceeding the level compatible with debt stabilisation, the debt can increase endogenously, but only up to a point where the debt ratio would finally level off.

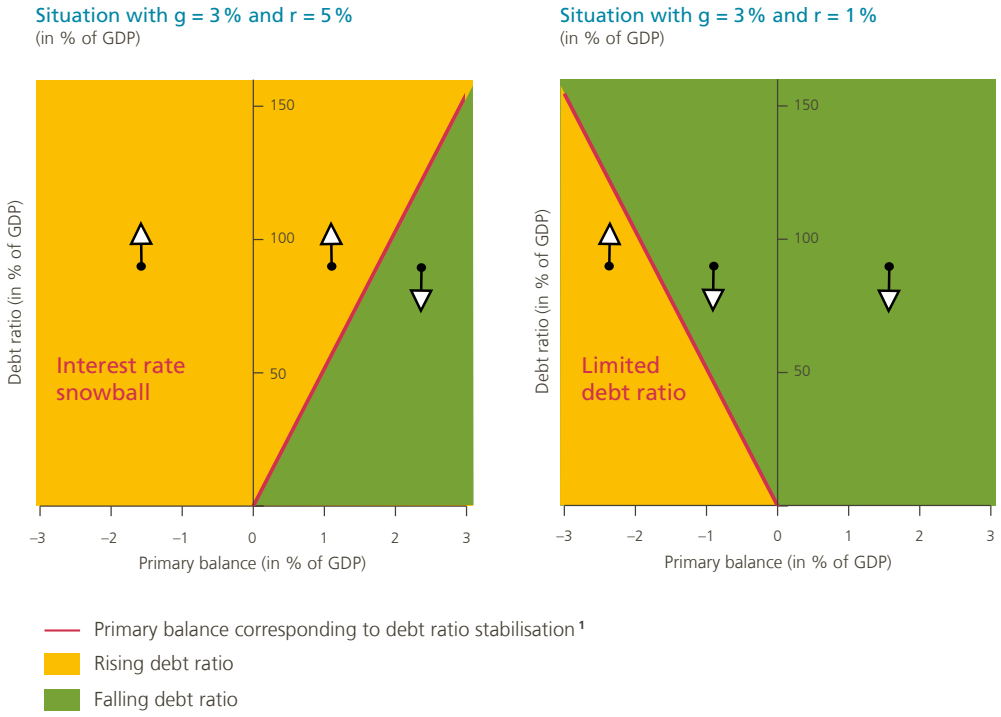
So, the level of the implicit interest rate is crucial for the debt ratio trend and the risk of any slippage from its projected path, as illustrated with theoretical examples in chart 1. The primary balance is shown on the x-axis and the debt ratio on the y-axis. The red lines indicate the size of primary balance required to stabilise the debt ratio.

On the left-hand chart, the implicit interest rate on the government debt is 5 % and nominal GDP growth stands at 3 %. In this situation, if the debt ratio is 100 % of GDP, a positive primary balance of about 2 % of GDP would be required to stabilise the debt ratio. If the primary balance is higher, the debt ratio would come down and vice versa. If the primary balance were to remain insufficient, the debt ratio would continue to rise, starting the snowball effect. The only way to avoid an explosive debt dynamic would then be to increase the primary balance.

On the right-hand side, the implicit interest rate on the government debt is 1 % and therefore less than nominal GDP growth, which is 3 %. In this situation, if the debt ratio is 100 % of GDP, a primary balance of about –2 % is enough to stabilise the debt ratio. A higher primary balance would bring down the debt ratio. However, even

Chart 1

The difference between the interest rate and nominal GDP growth (r – g) and the primary balance determine movements in the government debt ratio



Source : NBB.

1 The primary balance expressed in per cent of GDP that makes it possible to stabilise the government debt ratio (pb_t^*) depends on the debt ratio at the end of the previous year (d_{t-1}) and the difference between the implicit rate on the debt (r_t) and nominal GDP growth (g_t), namely : $pb_t^* = d_{t-1} \cdot \frac{(r_t - g_t)}{(1+g_t)}$.

with a more negative primary balance, the debt ratio would rise but would level out. With a primary balance of –3 % of GDP, the debt ratio would stabilise at about 150 % of GDP.

2. Key figures on the public debt

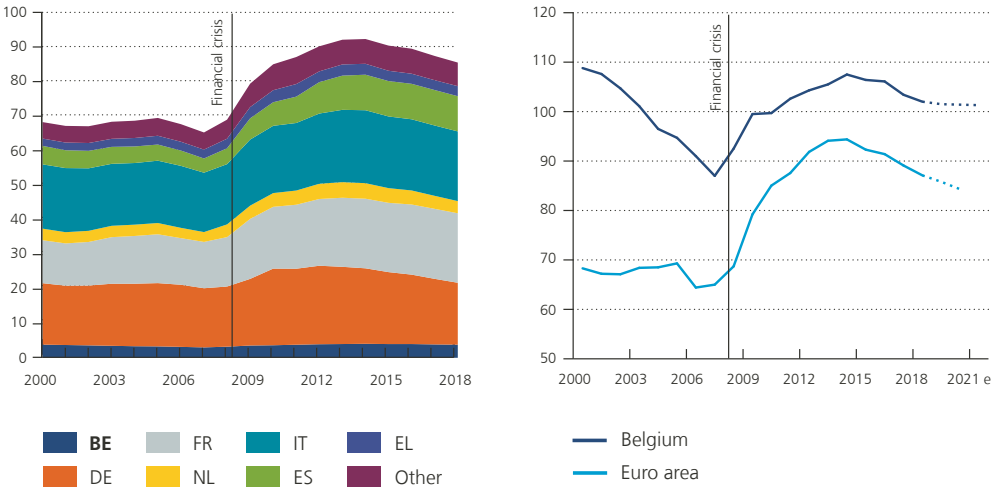
Since the financial crisis, the euro area countries' debt burden has increased significantly. Expressed as a percentage of GDP, the euro area's government debt grew from 65 % in 2007 to 94.4 % in 2014. In the last few years, the rise in GDP (in nominal terms) has gradually brought down the debt ratio, which for the euro area worked out at 85.8 % of GDP in 2018.

Compared with the euro area as a whole, the government debt is still very high in Belgium, running at 102 % of GDP in 2018, and the process of debt reduction is also relatively slower. Within the euro area, only Greece (181 %), Italy (132 %) and Portugal (121 %) have a higher debt ratio than Belgium.

Chart 2

Public debt has risen sharply since the financial crisis. Belgium's debt is high and coming down very slowly

(consolidated gross debt, end-of-period data, as a percentage of GDP[1])



Sources: EC, NBB.

1 The left-hand side of the graph expresses the countries' government debt as a percentage of euro area GDP.

3. Movements in interest rates and charges

3.1 Interest rates

The widespread decline in interest rates is a long-term trend and this trend is not unique to Belgium. Historically, the average rate on 10-year government bonds hit an all-time high in 1982 in many countries. At that time, it stood at more than 13 % in Belgium's case. Except for a slight increase at the end of the 1980s and the beginning of the current decade, interest rates have continued on their downward path to reach an all-time low, thanks to a decline that has been gathering pace in the last few years.

In 2018, the average rate for 10-year sovereign bond issues stood at 0.81 % in Belgium, 0.78 % in France, 0.52 % in the Netherlands and 0.40 % in Germany, levels slightly higher than those observed in 2017.

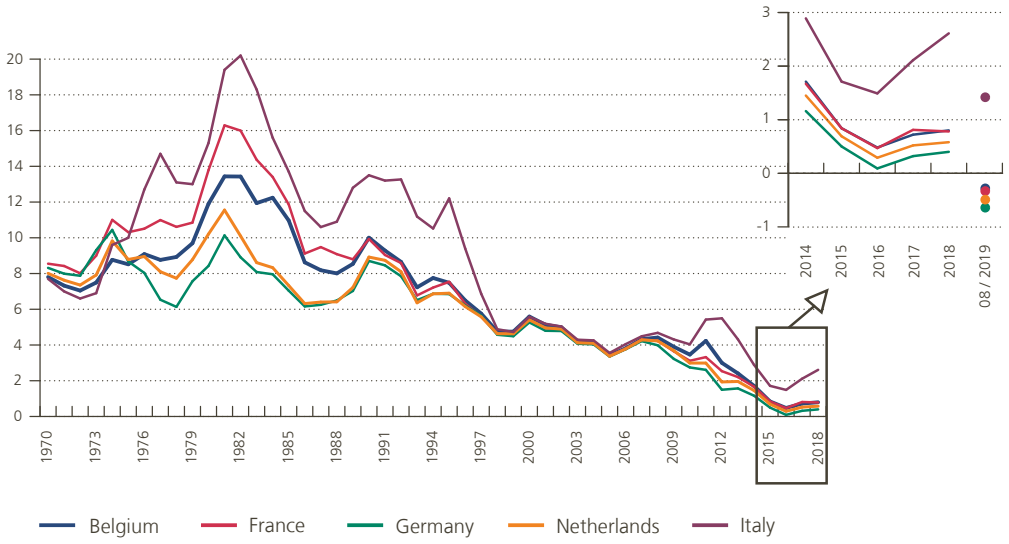
Since the beginning of this year, the reference rate on 10-year Belgian government bonds (OLOs) has embarked on a new descent, reaching an average of 0.15 % for the month of June 2019. In early July 2019, the rate on 10-year OLOs fell below the symbolic 0 % mark and at the end of August 2019, the rate had reached its lowest level ever.

The fall in interest rates has also affected rates associated with other maturities than 10-year OLOs. In Belgium, rates on very short-term Treasury Certificates have even been negative for some years now.

Chart 3

Interest rates on public debt are still historically low

(movements in interest rates 10 years ahead, in %)



Sources: EC, NBB.

3.2 Interest charges

In 1990, interest charges for the general government sector in Belgium accounted for 11.5 % of GDP. Since then, they have come down continuously, dropping to 2.3 % of GDP in 2018. In the same year, they were 1.8 % of GDP on average in the euro area and 0.9 % of GDP in Germany. Debt and interest charges levels in Belgium have remained above the average for the euro area and Germany for almost 30 years.

Cheaper refinancing operations in the last few years have made it possible to reduce the implicit interest rate on the public debt, which is currently about 2 %. As long as the average market rate is below the implicit interest rate, the latter will continue to fall. In the future, the gap between the market rate and the implicit interest rate is nevertheless expected to narrow. Consequently, the decline in interest charges is likely to become much less pronounced.

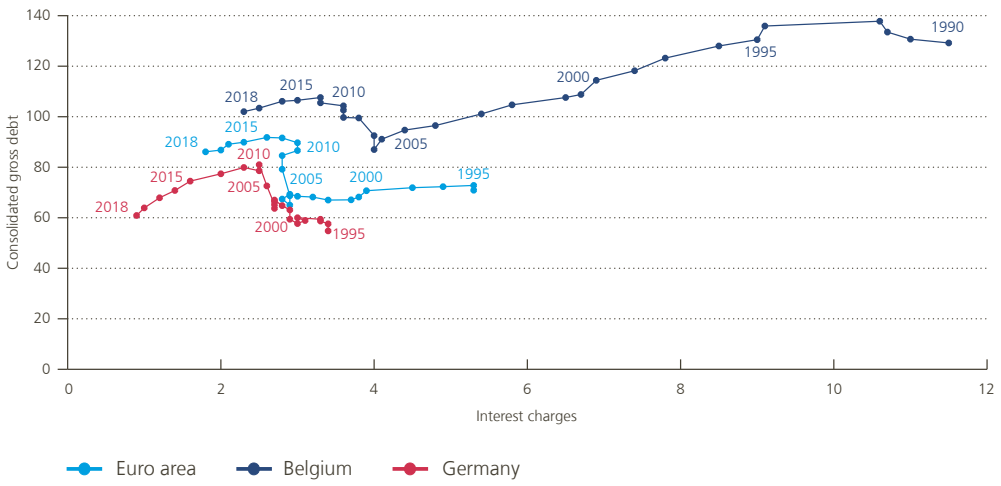
According to the Bank's latest economic projections, interest charges should work out at 1.9 % of GDP in 2021. But in the following years, there should be less and less scope for any further reduction in interest charges associated with low interest rates.

So, in order to cut interest charges further significantly, the debt burden has to be brought down. Before the financial crisis, the decline in the debt ratio was also an important factor in the reduction in interest charges. Since the crisis, this reduction has been mainly the result of falling interest rates.

Chart 4

Interest charges have fallen continuously since 1990

(changes in the public debt and interest charges, in % of GDP)



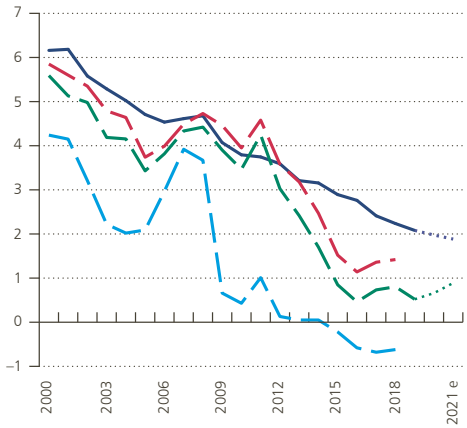
Sources: EC, NBB.

Chart 5

Since the financial crisis, the decline in interest charges has mainly been due to falling interest rates rather than lower debt

Implicit interest rate on public debt and market rate

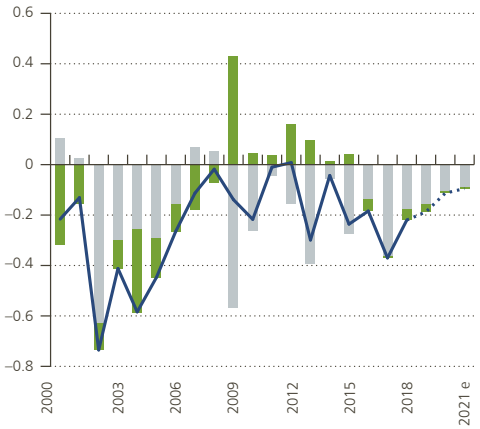
(in percentages)



Implicit interest rate
Short-term rate (3 months)
Long-term rate (10 years)
Very long-term rate (20 years)

Breakdown of changes in interest charges

(in percentage points of GDP)



Change in interest charges

Of which:

Debt ratio effect
Implicit interest rate effect

Sources: NAI, FPS Finance, NBB.

3.3 The risks of a "snowball effect" of interest charges on the debt ratio

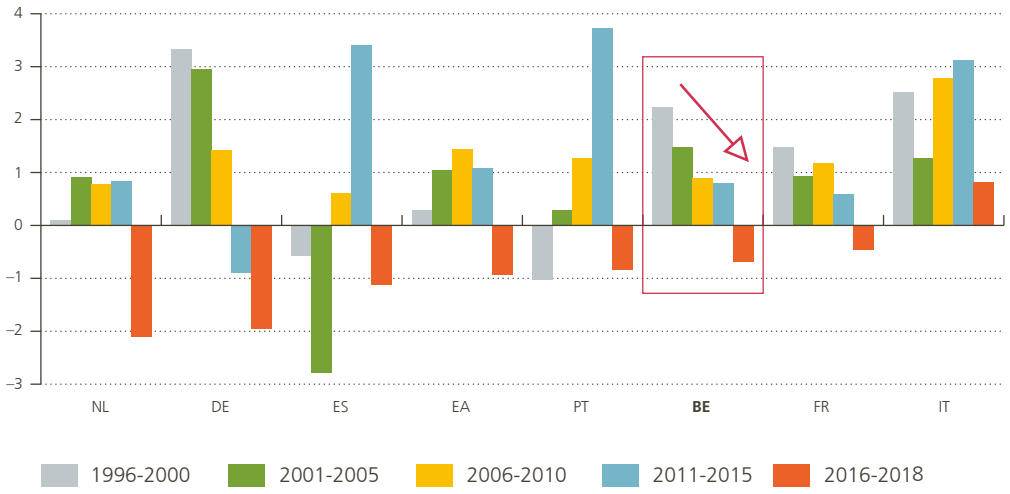
Falling interest rates have reduced the risk of a snowball effect from interest charges on the debt ratio.

In Belgium, the differential between the implicit interest rate (r) and the nominal GDP growth rate (g) has narrowed constantly since 1996. From 2016 onwards, the implicit interest rate has even been below nominal GDP growth. This has also been the case in the Netherlands, Germany and on average in the euro area. Italy stands out as an exception here. Historically, that is something that had not happened over such a long period in Belgium for more than 40 years.

Chart 6

The fall in interest rates has reduced the risk of a snowball effect on the debt ratio

(difference between the implicit interest rate (r) and nominal GDP growth (g), in percentage points)



Source: EC.

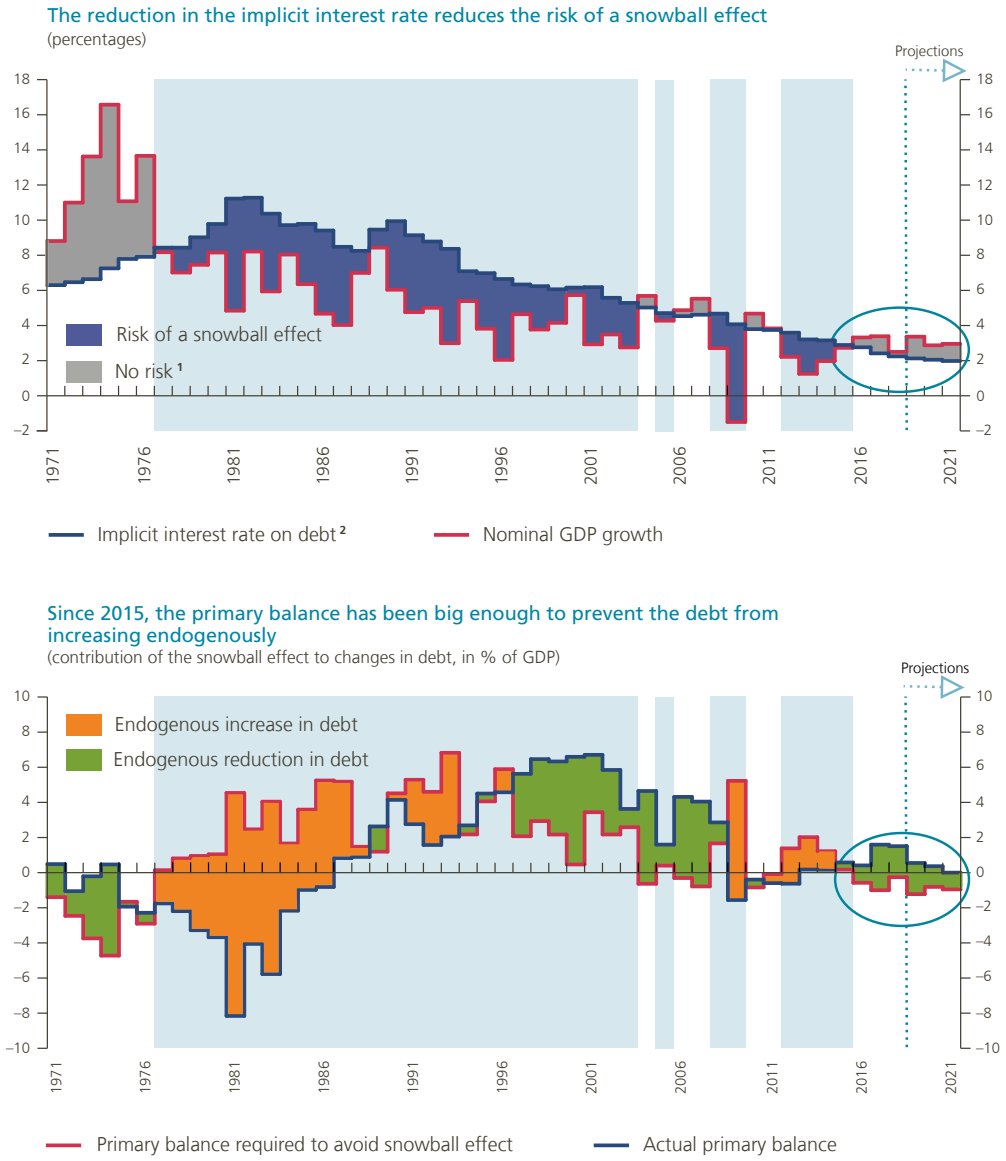
In fact, it was back in the first half of the 1970s that Belgian governments were last spared from the snowball effect over a period of several years. Fuelled by galloping inflation, nominal GDP growth was then above the implicit interest rate on the government debt. Although market interest rates at the time had risen sharply, that increase was only gradually reflected in the implicit rate as loans contracted at lower rates reached maturity and were refinanced at the higher market rate. In that context, in the absence of substantial primary deficits, the government debt ratio followed a downward trend on the basis of its endogenous dynamics.

From 1977 onwards, the implicit interest rate exceeded the nominal GDP growth rate, and the gap tended to widen up to the beginning of the 1980s. Consequently, an ever bigger primary surplus was needed to avoid triggering the snowball effect. At the time, however, deficits were growing incessantly, contributing to a spiralling debt ratio.

From 1984 onwards, the primary balance steadily improved, curbing the endogenous increase in the debt. But it was not until the middle of the 1990s that the primary surplus got large enough to reduce the debt ratio, which reached its historical peak of about 135 % of GDP in 1993.

Chart 7

The snowball effect on the debt ratio



Sources: NAI, NBB.

1 Assuming that the implicit interest rate and nominal GDP growth are kept at a constant level in the coming years.

2 Ratio between interest charges for the current year and the debt situation at the end of the next year.

Between 1996 and 2007, a sufficiently healthy primary balance effectively enabled an endogenous reduction in the national debt at an average pace of almost 3 percentage points of GDP per annum. The debt ratio was thus cut back to 87 % of GDP in 2007. This favourable trend was not only due to high primary surpluses, but also to the declining trend in the implicit interest rate on government debt resulting from the fall in interest rates.

In 2008, the reduction in the debt ratio was abruptly interrupted by the financial crisis and the ensuing recession. In 2009, the debt showed an endogenous increase of 7 percentage points of GDP, resulting from the drop in GDP in nominal terms.

Since the crisis, two different periods can be distinguished. The first one runs from 2012 to 2015. At the time, nominal GDP growth was lower than the implicit interest rate on the debt. During this period of fairly low growth and inflation, the actual primary balance was below the level needed to avoid a self-sustained increase in the debt ratio.

After that, and since 2016, the conditions necessary for reducing the debt ratio have been met once again. The implicit interest rate has continued the fall that began several years ago and nominal growth has overtaken it again. Consequently, the risk of a snowball effect has been avoided. Owing to the currently very low interest rates, even slight primary surpluses are enough to reduce the debt ratio. Based on the Bank's latest macroeconomic projections, this situation is projected to last for the next few years.

4. Debt management: maturity extension strategy

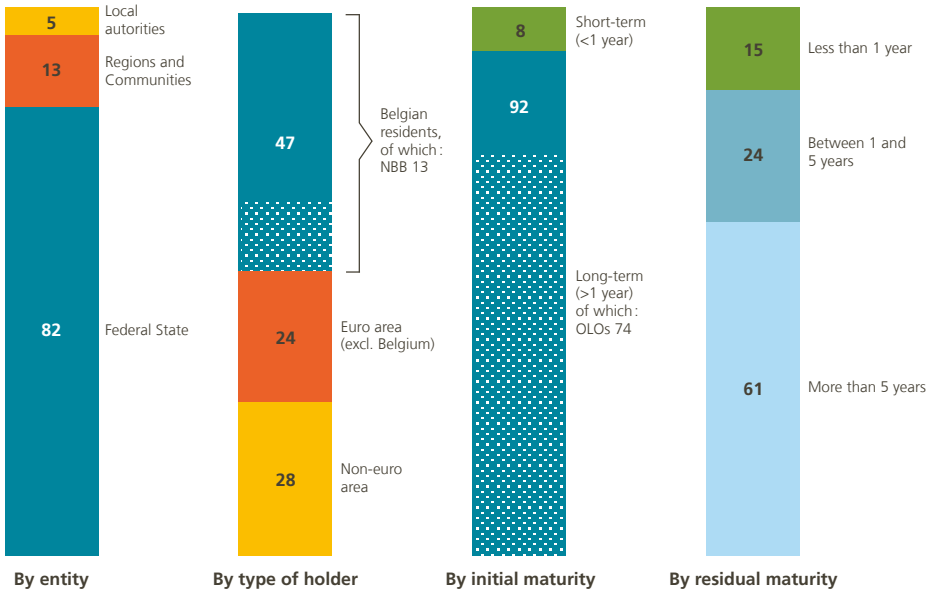
4.1 Characteristics of the Belgian public debt

In 2018, the federal State debt accounted for 82 % of Belgium's total government debt. The debt is almost exclusively held in euro, and about half of it is in the hands of Belgian residents. The NBB holds a sizeable share of the debt (13 % of the total, while this was less than 2 % in 2014), mainly on account of the

Chart 8

The Belgian public debt is largely federal government debt [1]

(breakdown of gross debt of Belgian general government, in percentages of the total at the end of 2018)



Source: NBB.

1 A distinction is made between initial maturity, that is, the maturity at the time the debt is issued, and the residual maturity. The notion of residual maturity of the debt always corresponds to the average residual term of the debt. For example, in 2019, debt issued in 2000 with an initial maturity of 20 years will have a residual maturity of one year.

monetary-policy-related asset purchase operations decided by the ECB. However, the Belgian residents' share has dropped in recent years. If the share held by the NBB is excluded, it came down from more than 60 % in 2000 to 34 % in 2018. The bulk of debt issues in Belgium consist of bonds with long maturity.

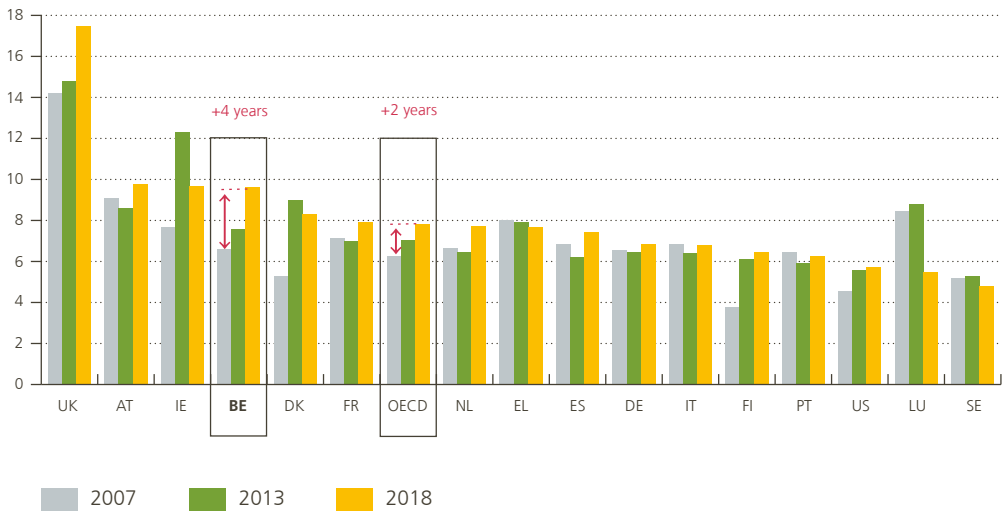
4.2 Extension of the federal debt maturity

An extension of government debt maturities can be observed in several countries. Between 2007 and 2018, the average maturity for public debt in the OECD went up from 6.3 to 7.9 years. This trend is nevertheless more pronounced in some countries, including Belgium. In 2007, the residual maturity of the Belgian federal public debt was barely higher than the OECD average, while it was at 9.6 years at the end of 2018. The residual maturity lengthened particularly between 2013 and 2018, showing one of the biggest increases among the euro area countries. In 2018, only the national debt held by the United Kingdom (17.5 years), Austria (9.8 years) and Ireland (9.7 years) had a higher residual maturity than Belgium's debt.

Chart 9

The extension of the national debt maturity has been greater in Belgium than the average for OECD countries

(residual maturity of the public debt[1], in years)



Source: OECD.
1 Only federal government debt in Belgium's case.

On average, the residual maturity of the debt goes up if the debt issues in the current year have an average higher initial maturity than the average residual maturity of all outstanding debt. Issuing new debt loans at an initial maturity that is sufficiently higher than the average residual duration is a necessary precondition for extending the latter, in order to offset the natural decline in the residual maturity of outstanding debt.

The Belgian Debt Agency started its maturity extension strategy in 2010. In practice, the increase in the residual maturity of the federal public debt is essentially the fruit of issues of very long-term OLOs. In 2018, the initial average maturity of all debt issues taken together was almost 15 years. That pushed up the average residual maturity of all outstanding debt from 9.2 years at the end of 2017 to 9.6 years by

the end of 2018. Among these debt issues are very long-term bonds, some of which will fall due in 2047, 2057 and 2066.

The Belgian Debt Agency has continued to issue a series of OLOs with a very high initial maturity in 2019. The average maturity of all debt issues between 1 January and 30 April 2019 was almost 17 years. Consequently, the average residual maturity of the debt has recently reached an all-time high of almost 10 years.

Keeping the average residual maturity of the federal public debt at a minimum level of 9 years is explicitly mentioned in the latest report from the Belgian Debt Agency on the forecasts for 2018-2019. Moreover, the strategy of extending the debt maturity is considered to be near completion. It should therefore stay close to the level currently observed.

Chart 10

Extension of the residual maturity of the federal government debt from 2010

(residual maturity of the federal debt, in years)

Source: FPS Finance.

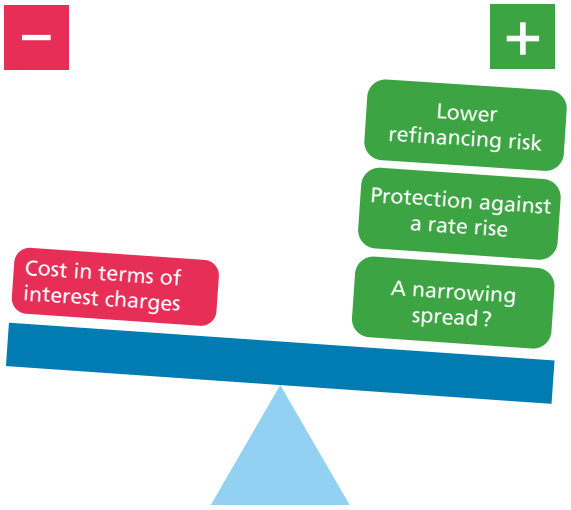
1 Figures as at 24 June for the year 2019.

4.3 Advantages and disadvantages of extending the debt maturity

Extending the residual maturity is a strategy that has many implications. Borrowing over a longer term makes it possible, on the one hand, to scale back refinancing requirements. It reduces the risks associated with an increase in interest rates in the not too distant future, making the public debt more resilient in the event of an interest rate shock. Extending the debt maturity could also have had a favourable (downward) influence on the spread. However, a maturity extension strategy also has a cost in terms of higher interest charges.

Chart 11

Consequences of extending the debt maturity



Source : NBB.

4.3.1 Cost in terms of interest charges

The main disadvantage of extending the residual maturity of the debt is an additional cost in interest charges. The longer the maturity of the loan issues, the higher the interest rate on them (term premium).

It is possible to calculate the difference between the rates associated with the initial maturity of new borrowings (which has pushed up the residual maturity of all outstanding Belgian federal State debt since 2010) and rates associated with the maturity of debt security issues which would have kept the maturity of the entire federal debt at its 2009 level.

From 2010 onwards, the annual costs in interest charges have gradually built up over the years, along with the pace of issues of OLOs with a longer maturity. The extension of the maturity of the debt since 2010 brought additional interest charges in 2018 worth about 0.42 % of GDP, or €1.9 billion, compared with a policy of keeping the maturity at 6 years. This cost corresponds to the sum of additional interest charges paid in 2018 on the medium- and long-term instruments issued since 2010[1].

With no change in policy, there would also be an extra cost of € 200 million on top of this amount in 2019, or some 0.04 % of GDP. The total cost for the year 2019 of extending the maturity of the debt should therefore work out at around € 2.1 billion in 2019, or 0.45 % of GDP.

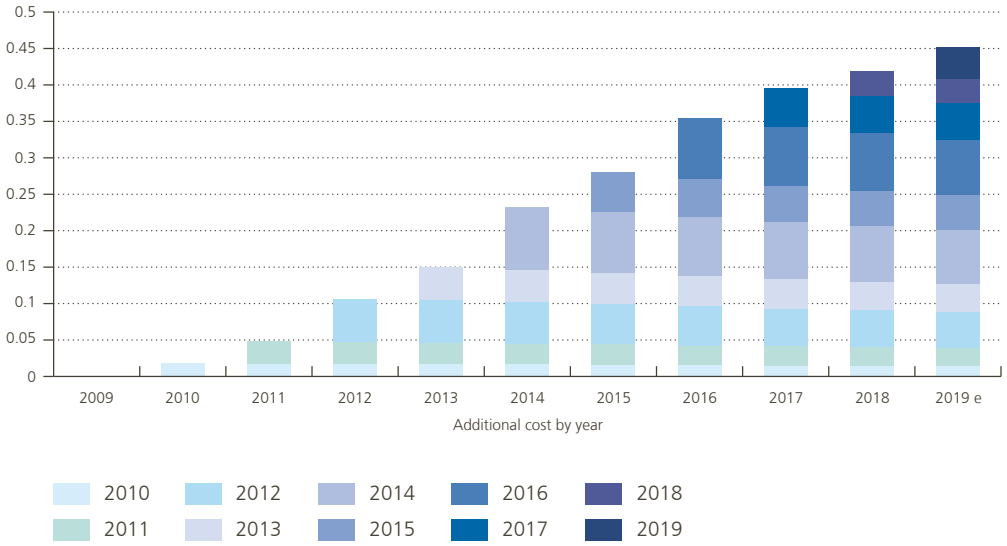
This estimation exercise was conducted on the basis of historical interest rate data. The cost of maturity extension could therefore probably be over-estimated as it is possible that, without any extension of the

1 This estimation exercise assumes that any change in the maturity of the debt is based solely on a variation in the maturity of medium- and long-term debt issues, without changing the share of short-term debt. That basically corresponds to the policy conducted in recent years, although a small decline in the share of borrowings with a term of less than one year has been observed.

Chart 12

Extension of the residual maturity of the debt cost 0.42 % of GDP in 2018

(additional interest charges incurred by the maturity extension, instead of keeping the maturity at 6 years, in % of GDP)



Source: NBB.

average residual maturity of the debt and in the face of the risk of interest rates rising, Belgian debt could have been punished by the markets through a higher risk premium on Belgian OLOs. Moreover, the reasoning is based on annual average interest rates. The results should consequently be interpreted with some caution but should nevertheless give a good idea of the financial consequences of the maturity extension.

4.3.2 Reduction in the financing risk

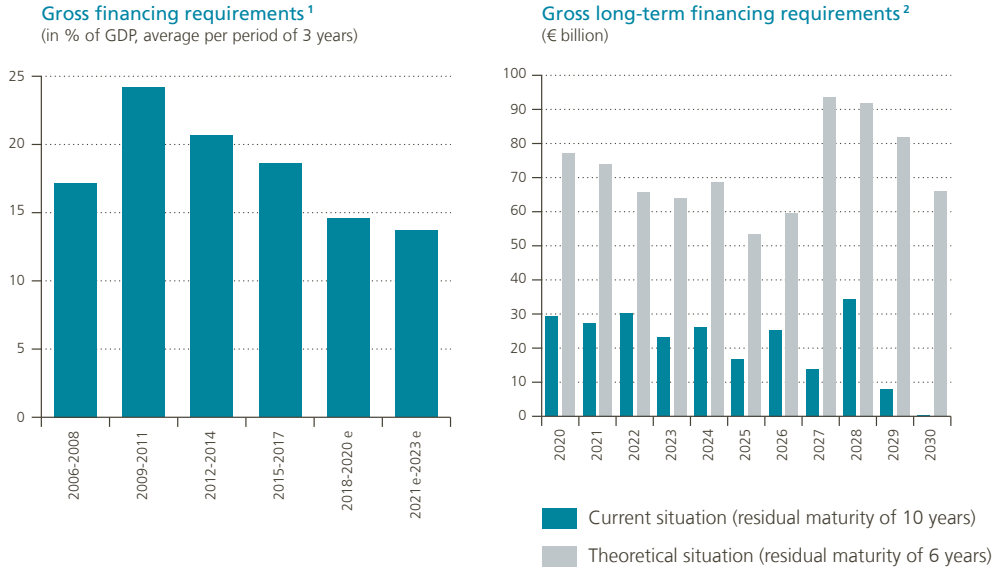
A major advantage of extending the debt maturity is a reduction in the risks associated with borrowing requirements, which may be heavy in countries with a high public debt ratio, such as Belgium. In extreme cases, it may even become impossible to finance deficits or refinance loans. There is also the risk of having to pay more for loans owing to very high borrowing requirements. The financing risk is thus related to the annual amount of public debt that needs to be refinanced. The longer the debt repayment schedule, the more the financing risk diminishes and vice versa.

The Belgian federal State's gross financing requirements have been coming down since the financial crisis. Having been close to 24 % of GDP between 2009 and 2011, they are expected to stabilise around 14 % of GDP over the next few years.

The extension of the debt maturity to around 10 years enables the gross financing requirements to be kept lower than in a situation where the maturity of the debt had been held at 6 years. Hence, the Belgian federal State's debt is now already less subject to the financing risk, which was higher before the increase in the residual maturity of debt.

Chart 13

Borrowing requirements are inversely proportional to the residual maturity of the debt



Sources: IMF, FPS Finance, NBB.

1 Gross financing requirements cover short- and long-term borrowing requirements.

2 In these estimates, only long-term borrowing requirements are taken into consideration. Figures are based on the assumption of a balanced budget from 2021 onwards (stable nominal debt). The gross financing requirements shown here may therefore be considered as minimum values.

4.3.3 Protection against a rise in interest rates

Borrowing long-term helps protect a larger part of the debt from the possibility of a rise in interest rates, as gross financing requirements are lower in that case.

The fact that rates today are at an all-time low could suggest that the extension of the debt maturity began too early. But this needs to be qualified, as real-time market forward rates predicted almost systematically a rise in interest rates. It therefore seems logical that the Belgian Debt Agency would have wanted to benefit from low interest rates over the last few years because financial market participants anticipated a rise almost every year.

Simulations have been made of the impact of a gradual increase in market interest rates on the interest charges paid by the Belgian federal State. The base scenario is with the 10-year OLO rate at 0.52 % on average in 2019 – this is the assumption of the NBB's June 2019 macroeconomic projections – and stable thereafter. Five interest rate rise scenarios have also been set, with the 10-year OLO rate rising to 2025 and being stable thereafter, as is shown in chart 15.

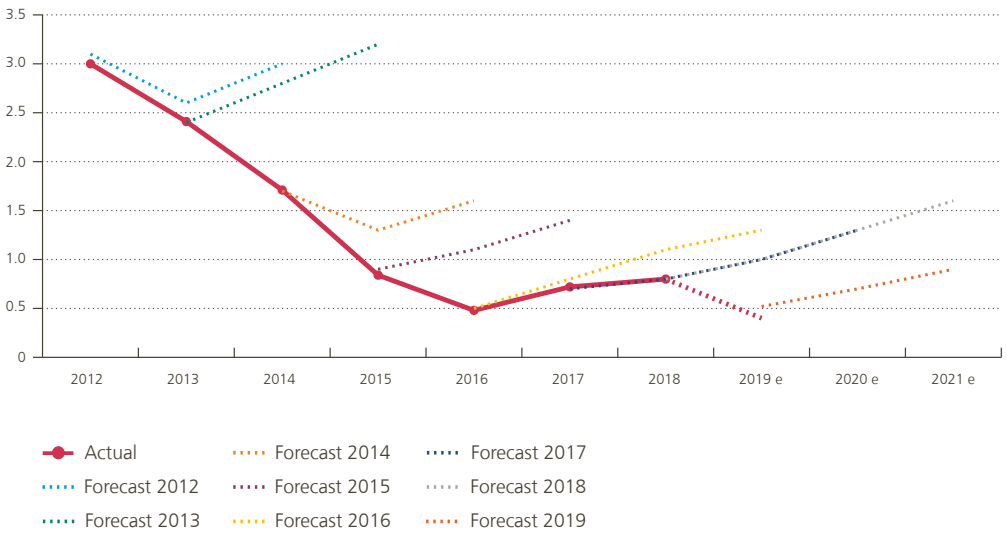
The estimates also assume that, as of 2021, public finances are in balance and so there is no longer any budget deficit adding to the annual borrowing requirements. In this way, borrowing requirements consist solely of replacing medium- and long-term securities that have fallen due. All the estimates presented here may therefore be considered as minimum values.

Regardless of the residual debt maturity, a rate rise will always have an upward impact on interest charges. The higher the rate rise in relation to the base scenario, the higher the additional interest charges to be paid.

Chart 14

An interest rate rise has been predicted for several years

(comparison between actual and forecast interest rates, 10-year OLOs, in %)



Source : NBB.

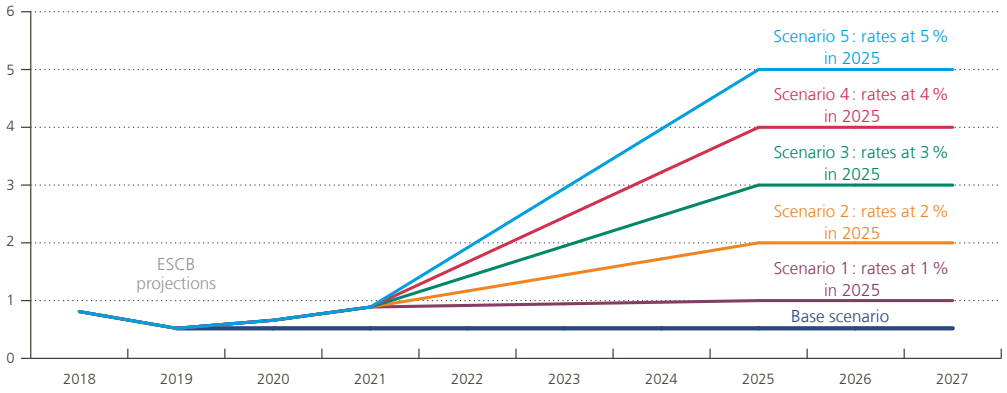
1 Assumptions based on market forward rates as used in December Eurosystem macroeconomic projections between 2012 and 2019 (June for 2019).

As mentioned earlier in this article, one of the benefits of extending the residual maturity of the debt is precisely to reduce borrowing requirements so as to protect a bigger proportion of the public debt in the event of a rise in interest rates. Intuitively, applying the opposite reasoning, if the residual maturity of the public debt had not

Chart 15

Gradual interest rate rise scenarios used in the simulations

(10-year OLOs, in %)

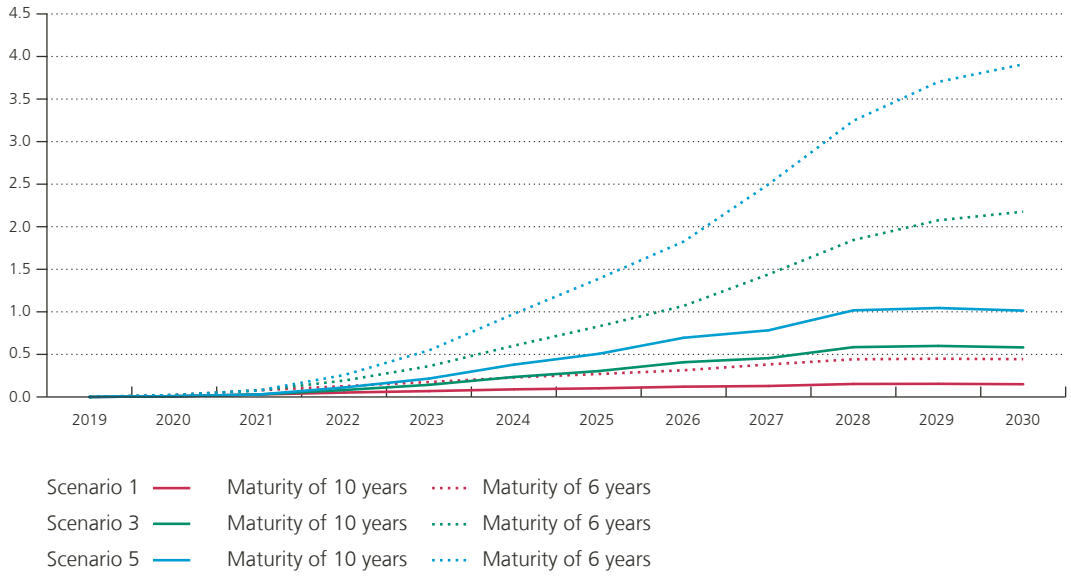


Source : NBB.

Chart 16

The benefits of maturity extension will be proportional to the rise in interest rates

(additional interest charges compared with the base scenario, in % of GDP)



Source: NBB.

been extended since 2010, borrowing requirements today would have been a lot higher than they actually are (the debt has to be refinanced much more frequently), thus triggering an even higher increase in interest charges in the event of a rate rise.

Over time and depending on the different interest rate rise scenarios envisaged, the differences in interest charges between a debt falling due in 6 years and debt with an extended maturity of about 10 years will get bigger. If interest rates do not go up, there will of course be no extra costs because the loans are refinanced at unchanged rates (even though that happens more frequently). If interest rates rise, the difference in interest charges between a maturity of 6 years and keeping the current maturity of 10 years may be considered as an advantage of extending the debt maturity. In particular, according to our estimates and depending on the size of the interest rate rise, in 2030, these gaps would reach:

- 0.3 % of GDP for scenario 1: 10-year OLO rate rising to 1 % in 2025 and stable thereafter
- 0.9 % of GDP for scenario 2: 10-year OLO rate rising to 2 % in 2025 and stable thereafter
- 1.6 % of GDP for scenario 3: 10-year OLO rate rising to 3 % in 2025 and stable thereafter
- 2.2 % of GDP for scenario 4: 10-year OLO rate rising to 4 % in 2025 and stable thereafter
- 2.9 % of GDP for scenario 5: 10-year OLO rate rising to 5 % in 2025 and stable thereafter.

4.3.4 Comparison of the costs and benefits of extending the debt maturity

For the base scenario as well as for each of the five interest rates rise scenarios, it is possible to calculate the difference between the cost of extending the debt maturity to 10 years and the benefit of this strategy, namely the extra interest charges paid each year if the debt maturity had been kept at 6 years instead of 10 years.

In all interest rate rise scenarios, the extra interest charges from not extending the residual maturity of the debt would end up exceeding the annual cost of the extension. This would be when the curves associated with the

different interest rate rise scenarios in chart 17 move into negative territory. The extent to which this is the case depends on the scenario: the bigger the rate rise, the faster this will happen.

Applying the same reasoning not annually, but cumulatively since the start of the extension of the residual maturity of the debt, it is possible to compare the cumulative cost of the extension with the cumulative cost of the extra interest charges if the residual maturity of the debt had not been extended, for each of the different interest rate rise scenarios.

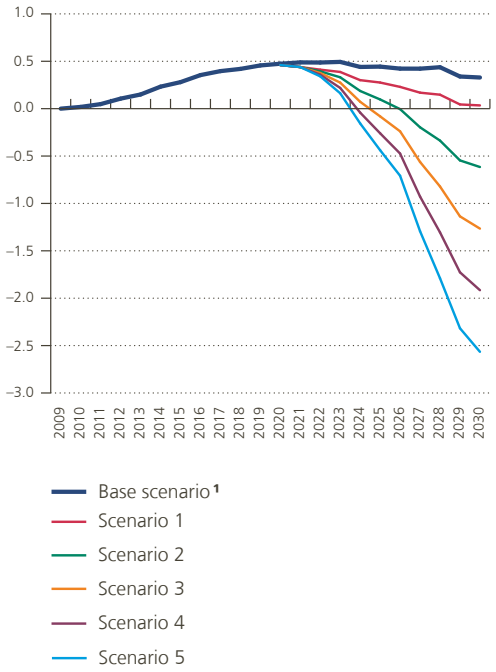
Whether ten-year OLO rates are running at 1 % or 5 % in 2025 (and stable thereafter), the cumulative cost of extending the debt maturity systematically ends up lower than the additional interest charges resulting from keeping the debt maturity at 6 years instead of 10 years. The higher the rate increase, the more likely this tuning point is to come in the near future, which according to our estimates is as early as 2028 for the rise to 5 %, in 2029 for the increase to 4 %, 2030 for the rise to 3 %, 2033 for the rise to 2 % and after 2040 for the rise to 1 % in 2025.

In the absence of any rise in interest rates above their current level, the increase in the residual maturity of the debt can be considered as an undeniably costly hedge. However, it would only take a moderate, yet lasting, rise in rates for this strategy to become more worthwhile, in the long term, than keeping the residual maturity of the debt at its 2010 level.

Chart 17

The benefits of maturity extension will exceed the costs in the event of a rate rise

Annual difference between the cost and benefit of extending maturity rather than keeping it at 6 years
(in % of GDP)



Cumulatively, the maturity extension turns out to be a good move if interest rates rise

Date when the maturity extension is likely to become less costly than keeping the maturity at 6 years

Base scenario	Never
Scenario 1	After 2040
Scenario 2	2033
Scenario 3	2030
Scenario 4	2029
Scenario 5	2028

A very slight rise in rates is enough to make the maturity extension less costly than keeping the status quo

Source: NBB.

1 The annual cost of extending the residual maturity of the debt will gradually decline in future years. That is due to securities issued between 2010 and 2019 gradually reaching maturity. But also, in the long run, keeping the residual debt maturity at 10 years is more expensive than keeping the residual debt maturity at 6 years, as a term premium will have to be paid.

4.3.5 A narrowing interest rate spread?

The last advantage of an extended maturity is a potential positive effect on the interest rate spread between Belgian government bonds and government bonds issued in Germany, the latter being regarded as a low-risk benchmark.

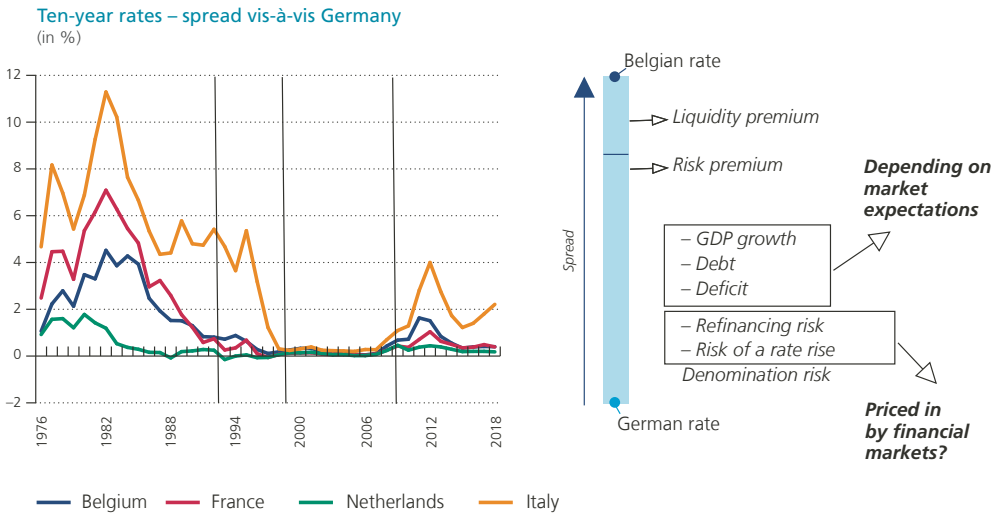
Historically, three major events have been followed by a change in the level of spread relative to the German Bund. First of all, the Maastricht Treaty in 1992 marked the beginning of the gradual convergence of sovereign rates for most European countries, among which was Belgium. After that, the introduction of the euro was the start of a period when sovereign spreads were historically low. This relative convergence of interest rates on the public debt came to an end with the outbreak of the financial crisis, as the markets have paid more attention to risks associated with national debt since then. In 2018, the interest rate premium on Belgian debt via-à-vis German debt was on average around 0.4 %.

Empirical evidence proves that the markets' expectations regarding the macroeconomic and fiscal outlook (economic growth, debt, deficit) do influence the size of the interest rate spreads. A sustainable fiscal policy has its importance here, as market anticipations of healthy public finances may have a favourable influence on spreads, thus reducing interest rates and charges to be paid by the government.

Apart from the expectations regarding macroeconomic and fiscal fundamentals, it is also quite possible that the extension of the residual maturity of the federal public debt has had an effect on the spread between the Belgian and the German rate. Belgium's spread vis-à-vis Germany may have been influenced downwards if the markets considered a longer-term debt to be relatively safer (less financing risk and less sensitive to a rate rise). The maturity extension of the Belgian federal State's debt has been given a positive welcome by the

Chart 18

Maturity extension reduces certain risks that may lead to a wider spread



Sources: EC, NBB.

ratings agencies, which underline the lower interest rate risk over the next decade[1]. There is no doubt that lower financing risks related to government debt are priced in by the financial markets, even though there is no empirical research into this matter.

5. Debt sustainability: a risk analysis

Even though longer debt maturity helps reduce some risk, especially for a country with a high public debt like Belgium, more dimensions must be examined in order to assess sovereign risk. In that respect, many institutions conduct a debt sustainability analysis (DSA) on a regular basis in their surveillance procedures.

5.1 The EC's debt sustainability analysis

In line with other institutions' practice and given the high relevance of debt sustainability analysis for country surveillance, the European Commission has developed a fiscal sustainability assessment framework. A multi-dimensional approach is used to assess and differentiate fiscal sustainability risks in the short, medium and long term.

The short-term dimension is assessed by the S0 indicator, which allows for early detection of short-term risks of fiscal stress (within the coming year) stemming from the fiscal and/or the macrofinancial and competitiveness sides of the economy. Fiscal sustainability challenges over the medium term are captured through the joint use of the medium-term fiscal sustainability indicator S1 and the debt sustainability analysis. The latter pays due consideration to medium-term public debt dynamics over a ten-year horizon. Finally, challenges over the long term are identified through combined use of the long-term fiscal sustainability indicator S2 and the DSA. The joint use of these two tools helps identify long-term challenges arising from population ageing (mostly through the S2 indicator that is particularly suited to this purpose), while capturing potential vulnerabilities stemming from high debt levels (through the DSA tool).

In addition to the elements already mentioned, the Commission's fiscal sustainability framework provides an analysis of additional mitigating and aggravating risk factors. For instance, the assessment of short-term risks is complemented (beyond the S0 indicator) by a focus on forthcoming government borrowing requirements and an analysis of the ease of financing government debt. Borrowing requirement projections over the medium term, stemming from the debt projection model, are also reported and analysed. Furthermore, three main types of additional risk factors – of horizontal nature – are considered in the assessment, in particular: i) the composition of government debt (in terms of maturity, currency and investor base); ii) 'hidden debt' in the form of implicit and contingent liabilities, notably for the part stemming from the banking sector; iii) government assets, and related indicators (net debt and net worth).

The results are summarised in an overall heat map of fiscal sustainability risks per time dimension (short, medium and long term). The EC's Fiscal Sustainability Report 2018 provides the most recent snapshot of the situation, updating the European Commission's Autumn 2018 forecast. While in 2009 more than half of the EU Member States were deemed to be at high risk of fiscal stress in the short run, short-term vulnerabilities are identified in this report in just one country (Cyprus), although risks appear on the rise compared to last year in some countries. Five countries (Belgium, Spain, France, Italy, and Portugal) are deemed to be at high fiscal sustainability

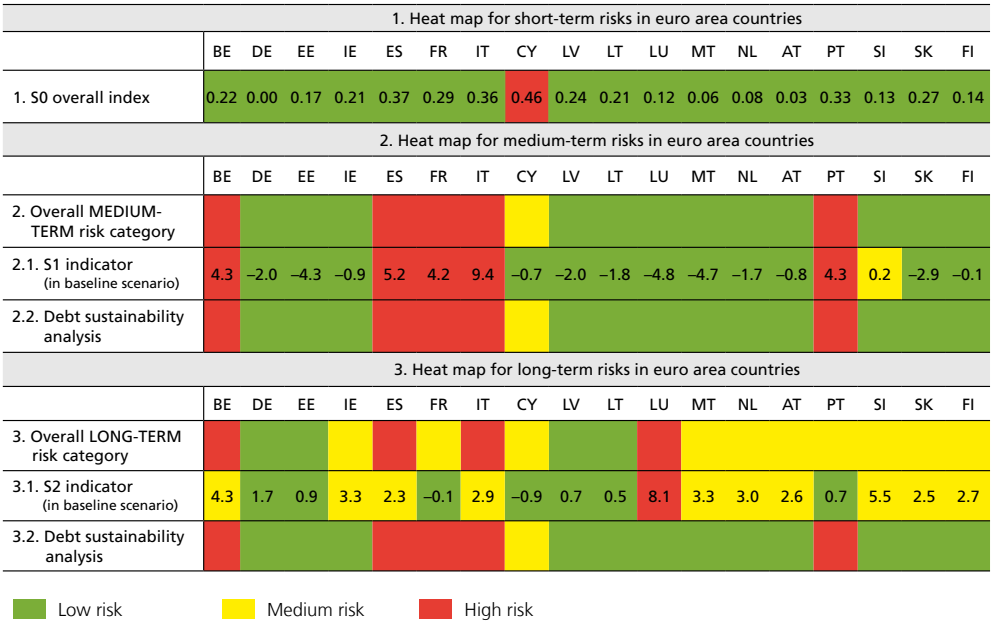
1 "The Belgian Treasury has pushed up the weighted average maturity of the country's debt stock. […] This will reduce gross borrowing requirements significantly in the coming years, as the government is currently replacing the shorter-dated debt that was issued during the euro area sovereign debt crisis with much longer-dated instruments. This has entailed some short-term cost, as it is more expensive for the government to finance itself further out on the yield curve, but it also mitigates a substantial amount of interest rate risk in the coming decade."
Extract from a press release issued by ratings agency Moody's (2017).

risk in the medium term, as a result of inherited high post-crisis debt burdens, weak forecast fiscal positions in some cases and/or sensitivity to unfavourable shocks. In the long term, four countries (Belgium, Spain, Italy and Luxembourg) appear to be at high fiscal sustainability risk.

For Belgium, over the short term (within one year), no significant risks of fiscal stress are foreseen. But over the medium and long term, fiscal sustainability risks appear to be high. This is mainly due to the distance of the public debt ratio from the 60% reference value, projected age-related public spending, and the unfavourable initial budgetary position. The stubbornly high debt-to-GDP ratio over the medium term in the baseline scenario and the sensitivity to possible macro-fiscal shocks also contribute to this assessment.

Chart 19

Debt sustainability risks remain relatively high for Belgium



Source: EC.

5.2 Impact of a steep increase in the interest rate on fiscal consolidation

The EC's fiscal sustainability assessment framework comprises a central benchmark debt path on the basis of explicit assumptions for the underlying variables (GDP growth, interest rates, fiscal position). Various adverse shock scenarios are constructed around the benchmark scenario in order to gauge the resilience of sovereign debt to such developments.

Specific metrics are introduced to evaluate the risks surrounding the debt paths in both the benchmark and the adverse shock scenarios. First, the level of debt at the end of the simulation period is assessed. The motivation for this criterion is justified because high levels of debt are associated, *inter alia*, with a high debt servicing burden and higher sensitivity to adverse shocks. Second, the dynamics of the debt path are evaluated in terms of the projected peak year of debt. Longer horizons to stabilise the debt ratio imply higher uncertainty and higher

debt sustainability risks. Third, a fiscal fatigue criterion is used (only in the benchmark) to assess the likelihood of maintaining sustained primary balances. More precisely, the political feasibility of the cumulative primary surpluses inherent in the respective debt paths is assessed against the EU's historical track record.

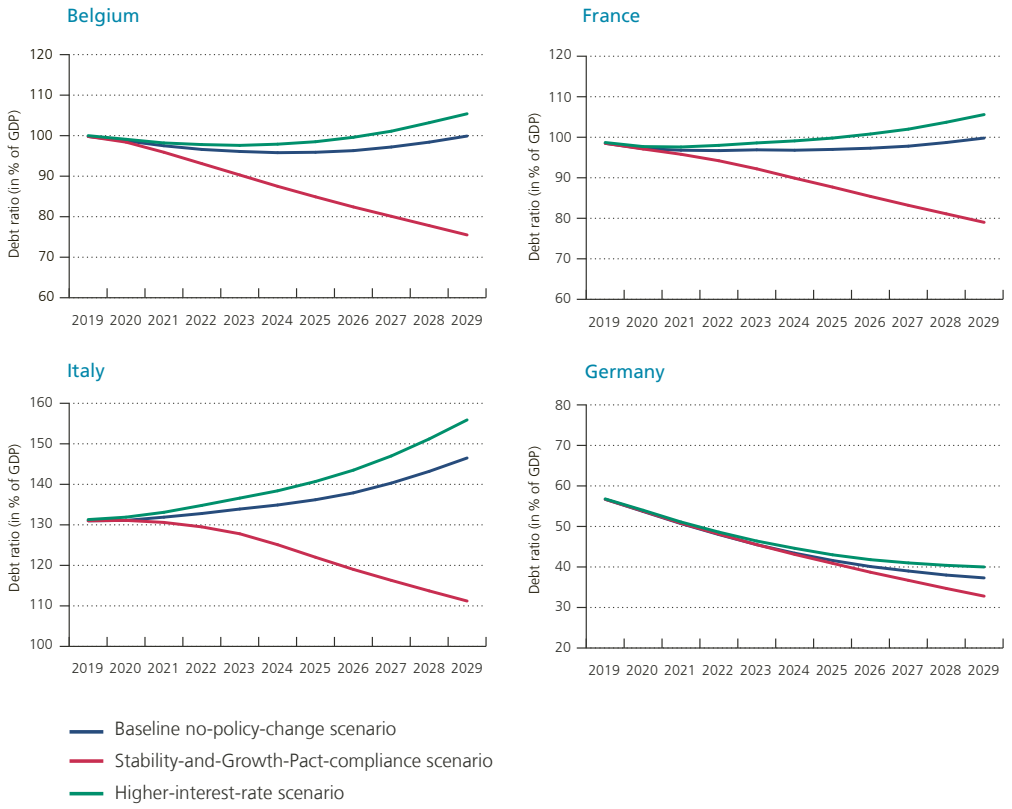
Three scenarios are presented here for Belgium, Germany, France and Italy : the baseline no-fiscal-policy-change scenario, the interest-rate-shock scenario, and the Stability and Growth Pact scenario.

The no-fiscal-policy-change scenario assumes that the government primary balance in structural terms and before ageing costs remains constant at its last forecast value (2020) for the remainder of the 10-year projection horizon. Changes in the structural primary balance are due to population ageing costs. For the other underlying macroeconomic variables (real GDP growth, inflation, real interest rate), the baseline scenario relies on the Economic Policy Committee agreed long-run convergence assumptions. According to this scenario, the debt ratio would be broadly stabilising in Belgium and France up to 2029, thanks to favourable interest rate growth differentials and despite primary deficits. In Italy, debt would remain on a rising path, as the interest rate growth differential is pushing the debt ratio up, and the primary balance is deteriorating. Germany, characterised by primary surpluses at unchanged policy and favourable interest rate growth dynamics, would see its debt ratio fall below 40% of GDP.

Chart 20

An increase in interest payments would further hamper compliance with the requirements of the Stability and Growth Pact

(Debt ratio in % of GDP)



Source : EC.

The interest rate shock scenario implies a standard permanent shock on short- and long-term interest rates on newly issued and rolled-over debt (+1 percentage point), compared to the baseline no-fiscal-policy-change scenario. The impact of this scenario on the debt ratio is rather limited, although the impact is visibly higher for high debt countries, which adds to their sustainability risks. This demonstrates that the high government debt makes Belgium vulnerable to an interest rate increase.

Under the Stability and Growth Pact scenario (a scenario which is not used for determining the DSA risk classification), countries are assumed to comply with the main provisions of European fiscal rules. The scenario assumes strict compliance with respectively preventive arm provisions and EDP (excessive deficit procedure) recommendations for countries under the corrective arm of the SGP. Regarding the former, the structural balance is supposed to converge to its medium-term objective (MTO), following the adjustment path required by the "matrix of requirements of the preventive arm" as defined in the European Commission 2015 Communication and in the Commonly Agreed Position on Flexibility within the Stability and Growth Pact endorsed by the Ecofin Council. Moreover, this scenario is run by taking into account a feedback effect of fiscal consolidation on GDP growth.

Following the SGP requirements would put the debt ratio of the high-debt countries on a steady declining path. It would make them more resilient to positive interest rate shocks and significantly reduce debt sustainability risks.

Conclusion

Belgium has a persistently high government debt, something that has traditionally been branded as one of the country's big weaknesses. This debt rose sharply in the aftermath of the financial and economic crisis, which was also the case in many other countries. Although the debt is coming down again now, the pace is slow and, according to the Bank's latest macroeconomic projections at unchanged policy, the debt ratio in the coming years should remain above 100 % of GDP.

As for interest rates, they are at an all-time low at the moment, after having fallen systematically in the last few years. As a result, government debt financing conditions are currently very favourable. However, it is highly unlikely that interest rates will stay at today's low level for a very long time.

The Belgian Debt Agency has reacted to this situation by extending the average maturity of debt securities issued by the federal government substantially from 6 years in 2009, to around 10 years at present. This debt maturity extension does of course come at a price in the short term, but it offers good protection against a possible rate rise in the future.

Reducing the government debt must remain the key objective of fiscal policy in Belgium. This debt burden certainly makes Belgium vulnerable to a rate rise that may be expected at a later stage. Also, the financial markets seem to be paying more attention to the risks of a slippage in budget discipline or of unsustainable public finances than they did in the period preceding the financial crisis, which is reflected in interest rates. A steady decline in the debt ratio can help avert upward pressure on the spreads between Belgian and German government bonds and those of other euro area countries regarded as low-risk.

It is therefore advisable to build up a sufficiently high primary balance in order to reduce the deficit and the debt ratio and to use the budget margins resulting from low interest rates for supporting sound public finances.

Annex – Relationship between the debt ratio and the interest rate, nominal GDP growth and the primary balance

The debt at the end of a given period (D_t) is the outcome of the sum of the debt at the end of previous period (D_{t-1}) and the difference between the interest charges on the outstanding debt ($r.D_{t-1}$) and the primary budget balance (PB_t [1]).

$$D_t = D_{t-1} + r.D_{t-1} - PB_t$$

This equation can be rewritten by dividing the variables by GDP, nominal GDP growth in year t being expressed as g_t. The lower-case letters d and pb respectively represent the public debt and the primary budget balance as percentages of GDP.

$$d_t = \frac{(1+r_t)}{(1+g_t)}.d_{t-1} - pb_t$$

So, the evolution of the debt ratio can be written as:

$$d_t - d_{t-1} = \frac{(1+r_t)}{(1+g_t)}.d_{t-1} - d_{t-1} - pb_t$$

$$d_t - d_{t-1} = \frac{(1+r_t)-(1+g_t)}{(1+g_t)}.d_{t-1} - pb_t$$

$$d_t - d_{t-1} = \frac{(r_t-g_t)}{(1+g_t)}.d_{t-1} - pb_t$$

The primary surplus that stabilises the debt ratio (pb_t^* where $d_t - d_{t-1} = 0$) is thus given by:

$$pb_t^* = \frac{(r_t-g_t)}{(1+g_t)}.d_{t-1}$$

1 This is a simplification of the real movement in the public debt, as interest payments relate to the debt outstanding during the year. The debt pattern is also influenced by so-called deficit/debt adjustments, e.g. as a result of financial transactions or the impact of exchange rate fluctuations.

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