



In 2022, the higher inflation is expected to increase the public debt burden.

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Note no. 2022 - 4

September 2022

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Executive Summary

Inflation has risen since end-2020. In July 2022, it stood at 6.1% year-on-year, on the back of 2.8% at end-2021 and 0.0% at end-2020.

Higher inflation is deemed to reduce the public debt burden as it increases the denominator of the public debt-to-GDP ratio in value terms, thereby making it easier to repay any debt inherited from the past.

However, aside from this positive “mechanical” effect, the impact of higher inflation on the public debt-to-GDP ratio is more complicated. The public debt trajectory is dependent on the extent to which interest rates and the primary balance adjust to higher inflation.

In the medium-term, the impact of higher inflation on the public debt-to-GDP ratio will be positive or negative depending on whether interest rates rise faster or slower than inflation, through changes to monetary policy and risk premiums.

Even in the short-term, the impact is not necessarily positive, as seen in 2022. A series of factors must be considered: the “mechanical” effect is clearly positive, but it has ultimately been fairly limited in 2022, particularly because of the largely imported nature of current inflation; the support measures put in place by the Government will increase the public deficit, as will the higher interest expenditure; finally, the growth shortfall from higher prices and interest rates will also have an adverse effect on public finances.

All in all, after accounting for the full impact of inflation on public debt, it appears that the excess inflation seen since the initial budget law for 2022 will increase, not decrease, the public debt ratio by around 1.2 GDP points in 2022.

1. Prices are rising, interest rates are picking up

Inflation has risen since end-2020. In July, it was 6.1% year-on-year, on the back of 2.8% in December 2021 and 0.0% in December 2020.

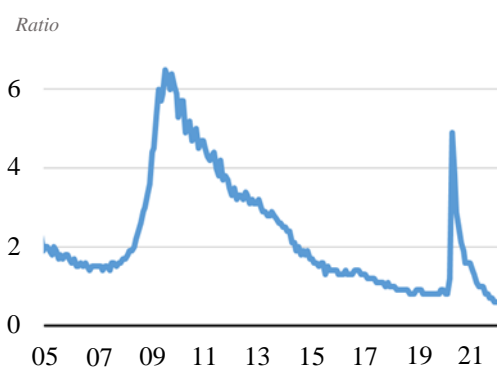
Inflationary pressures were caused by the Covid-19 pandemic, which led to major supply chain disruptions. The supply of goods was disrupted, even though household demand for goods was sustained, underpinned by steady household income and the shifting of the structure of consumption towards durable goods, with health restrictions weighing on service activities. This higher demand for goods has driven input demand, pushing up energy, food and industrial commodity prices.

While central bankers and a majority of economists were expecting these pressures to ease as supply chains returned to normal, they have persisted. The persistence of the pandemic has led to ongoing supply chain constraints, particularly in China, where the zero-Covid policy regularly cuts some regions or ports from the rest of the world. This took place again recently, with the city of Shanghai being locked down from April to June.

Furthermore, the war in Ukraine has exacerbated the price shock on many commodities (oil and gas along with aluminium and nickel), in light of the withdrawal of certain international players from Russia and shortages in the food production sector (Russia and Ukraine account for 30% of global wheat exports).

Price increases are also impacting wages. In the US, the economic recovery, underpinned by stimulus plans following the pandemic, saw significant labour market pressures. The labour force participation rate continues to be weak (at 62.1% in July, it is still over one point lower than pre-pandemic), due in particular to the early retirement of older workers during the pandemic. As a result, there have been significant difficulties hiring people and the ratio of unemployed to number of vacant positions is at a historic low (see Chart 1).

Chart 1: number of unemployed per vacancy in the US



Source: BLS

In Europe, up until the start of the year, the sharper rise in prices was mainly due to the imported inflation shock. There were no signs of the price-wages loop, with ongoing subdued growth in the latter, particularly thanks to the fact that employees were kept in the labour force during the pandemic, thanks to high take-up of the partial employment scheme. Nevertheless, the latest inflation figures are pointing to a progressive transformation in the nature of the price shock, as seen, for example, in France, with the strong rise in service prices in the spring, to +3.9% year-on-year in July.

The Fed and the ECB are adapting to this new price environment, which is radically different from what was seen up to 2020. Monetary policies have so far reflected the above economic divergences. While the Fed scaled back its net asset purchases as early as November 2021 and sharply raised its key rates (+225 basis points between March and July 2022), the ECB initially waited for the right balance between a too strong tightening that would have blighted growth and an overly accommodative stance that would have allowed inflation expectations to take off. However, in light of the persistent inflation and changes in its make-up, the ECB ended its asset purchase programme on 1 July 2022 and raised its key rates by 50 basis points in July. This was followed by a further 75 basis points in September.

This monetary policy tightening together with higher inflation expectations led to an increase in sovereign bond yields, both in the US and the Eurozone. Moreover, the flight to quality, usually seen during periods of high uncertainty, is less beneficial than in the past to German and French bonds in 2022, given the exposure of European economies to the consequences of the ongoing conflict in Ukraine. The yield on French 10-year government bonds, which bordered on 2.4% in mid-June, is well above the average levels seen in recent years, close to zero or negative, hitting its highest level since 2014.

The current environment is therefore one of higher inflation and higher nominal interest rates than before the pandemic. This will have significant consequences for public debt.

This note firstly sets out some theoretical perspectives around the link between inflation and public debt. Secondly, it estimates the expected positive “mechanical” effect of rising inflation on the public debt ratio in 2022. Finally, it highlights the other relevant factors in 2022, before concluding with an estimate of all these effects.

2. A few perspectives on the link between public debt and inflation

The dynamics of the public debt-to-GDP ratio can be summarised as follows:

$$d = d_{-1} + (r - g)d_{-1} - sp$$

(d) is the debt-to-GDP ratio, (r) the apparent interest rate on the public debt, (g) the GDP growth rate in value terms and (sp) the ratio of the primary balance to GDP.

The future public debt trajectory is therefore dependent on the combination, on the one hand, of the difference between the apparent interest rate on the debt (r) and GDP growth in value terms (g) and, on the other hand, the primary balance (sp):

- a. **The difference (r-g)** depends on inflation, as it influences both GDP growth in value terms and the apparent interest rate on the public debt¹ *via* inflation-linked bonds and market rates, which reflect, and sometimes anticipate, the monetary policy response.

In the short-term, higher inflation reduces the debt burden inherited from the past. Indeed, while the GDP growth rate in value terms (g) is rising due to its deflator, the apparent interest rate on the debt (r) has only moved slightly, mainly *via* inflation-linked bonds. It will gradually move more sharply, as old debt is replaced with new debt at higher rates. The gap between (r) and (g) is therefore becoming negative, resulting in a reduction in the public debt-to-GDP ratio². In other words, as a result of higher inflation the primary balance required to stabilise the debt is lower.

In the medium-term, the gap (r-g) will depend on the monetary policy response. The effect of the latter will be neutral if rates move in line with inflation. It could become temporarily negative if monetary authorities are forced to raise interest rates above inflation to dampen it, in line with the consequences, for example, of the application of a Taylor rule, or more permanently if risk premiums were to rise.

- b. **The primary balance (SP)** is dependent on the “mechanical” effect of rising inflation on the general government balance through elasticities in government revenues and

¹ The apparent interest rate on the public debt over a year is the ratio of interest expenditures in that year to the level of public debt at the end of the previous year.

² Currently, however, we need to consider the fact that inflation-linked bonds are dependent on consumer prices, while GDP growth in value terms is dependent on GDP prices, which have moved less over the recent period.

expenditures, any measures taken to limit the effect of inflation on the growth of household and corporate income, and the adverse effect on growth of higher prices and interest rates.

These various theoretical pointers show us how difficult it is to estimate the long-term effect of rising inflation and interest rates on public debt trends. In particular, we should have regard to how short-term rates react to inflation (and also potentially to the *output gap*) via monetary policy choices (given that short-term rates are now under what the Taylor rule would imply and that it is difficult to know whether they will converge towards it or indeed at what speed), to how long-term rates react to short-term rates (does the monetary policy tightening lead to a downward revision in inflation expectations? Are they affected by the loss of growth caused by the tightening?), to the effect of market rates on the apparent interest rate on the public debt. The number of assumptions required would significantly reduce the usefulness of such an analysis.

However, it is possible to estimate the short-term effects of the update in the first amending budget bill for 2022 of forecast increases in consumer prices, deflator of GDP prices, wages and interest rates on the public debt ratio in 2022.

3. Higher inflation certainly has a positive “mechanical” effect on the primary balance and on public debt, but is limited in 2022

a. “Mechanical” effect of higher inflation on the general government balance

In the short term, rising inflation should be quite positive for the general government balance as it increases revenues, while part of the expenditures remains fixed in value terms. The Permanent Secretariat of the High Council of Public Finances issued a note in July 2021³ detailing the impact of overly high inflation forecasts on the public finances. This note shows that:

- a one-percentage point negative inflation shock results in a 0.61 percentage point fall in government revenues in the current year, followed by 0.75 percentage points in the following year;
- the effects of inflation on the debt interest expenditure on indexed bonds and on social expenditures represent, in total, elasticity in public expenditures to an inflation gap of around 0.17 in the first year, and 0.45 from the following year.

A one-point fall in inflation would therefore have an adverse effect on the general government balance of 0.3 points in the year experiencing the shock and 0.2 points in subsequent years.

However, the effect on the general government balance of an inflation gap is not symmetrical and the positive impact of a gap of an additional point of inflation could be lower than 0.3 points in the first year, for two main reasons:

- Public expenditures are probably less immune to a positive inflation gap than a negative one.

A significant proportion of public expenditures is governed by spending standards that are fixed in value terms, based on expected inflation when they were set:

³ Redoulès O (2021), “Conséquences pour les finances publiques de prévisions d’inflation trop élevées”, HCPF, Study note no. 2021-2, July.

- In terms of state expenditures, this is the “controllable expenditure standard” (*norme de dépenses pilotables*), which includes expenditures over which the state has room for manoeuvre (ministerial appropriations, ancillary budgets, taxes allocated to third parties other than local authorities and social security when capped, certain special allocation accounts and financial subsidy account “Public Service Broadcasting Advances”). The “controllable expenditure standard” excludes expenditures that are not controlled by the state: repayments and rebates, “future investments” plan, state financial holdings, interest expenditures, deleveraging and pensions. Similarly, levy on revenues for the benefit of the European Union is part of France’s international commitments and is therefore not included in the standard. The revenue levy for the benefit of local authorities is also excluded. The total state expenditure objective (ODETE) comprises a broader set, including other special purpose accounts such as CAS “pension” spending, the interest expenditures, levies on revenues and the “future investments” plan;
- For social security spending (expenditures on non-hospital care, spending on healthcare facilities, expenditures on institutions and services for the elderly, spending on institutions and services for persons with disabilities, expenditures related to the regional support fund, other coverage), this is the national health insurance spending objective (ONDAM).

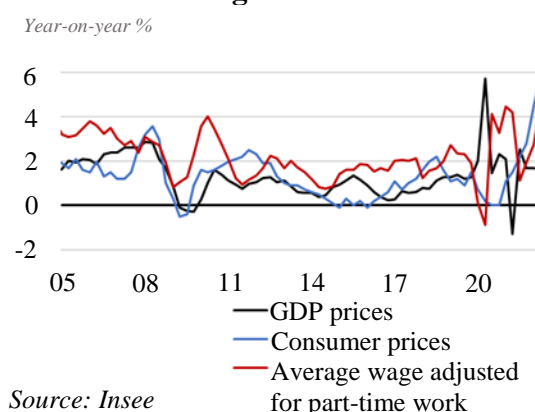
If inflation proves higher than expected, savings must be made to meet the specified fixed ceiling. However, budgetary appropriations can be increased during the year, if the upside price shock is very significant and occurs early enough for an increase in appropriations to be approved. The national health insurance spending objective can also be adjusted upwards. Thus, while expenditures covered by a fixed spending norm is generally not affected by lower-than-expected inflation, it can be affected by a marked upside inflation shock, reducing the positive effect on the general government balance of an increase in inflation.

- Price and wage indicators are not moving in the same way.

The note analysing the consequences of lower-than-expected inflation also assumed that all price and wage indicators were moving at the similar rate. However, over the recent period, and as highlighted by the Observatoire Français des Conjonctures Economiques (*OFCE, a French economic research institute*)⁴, the trends have been quite different, particularly in consumer prices and GDP prices (see Chart 2).

In 2020, GDP prices rose much faster than consumer prices (an annual average of +2.9% and +0.5%, respectively), due in particular to a specific effect on non-market services. The supply of non-market services, valued in national accounts at their cost of production, was affected during the pandemic. Institut National de la Statistique et des Etudes Economiques (*Insee, the French National Institute of Statistics and Economic Studies*) chose to account for interruptions in the provision of certain public services (education) as a reduction in the level of the corresponding activity, while the value of such services, measured on a cost basis, and in particular the wages of public servants assigned to these services, was not. The result is a temporary increase in the level of the GDP deflator.

Chart 2: consumer prices, GDP prices and wages in France



⁴ Heyer E., X. Timbeau (2022), “L’économie mondiale sous le(s) choc(s)”, OFCE, May.

Conversely, in 2021 consumer prices rose faster than the GDP deflator (an annual average of +1.6% and +1.2%, respectively), on the back of the sharp increase in the prices of imported products, particularly energy and food. In early 2022, the gap widened once again, following the sharp increase in consumer prices, particularly in the wake of the price of imported products, due to the war in Ukraine. In the second quarter of 2022, the GDP deflator was up 1.6% year-on-year, compared to a 5.8% year-on-year increase in consumer prices in June.

To understand the asymmetry of the response of the general government balance to an inflation shock and its heterogeneity, the analytical framework must be altered:

- breaking down the indexation of revenues and expenditures covered by price or wage indexes;
- and by listing the expenditures, governed by a norm, that might be affected by further price increases.

i. Government revenues seem more sensitive to wages than to consumer prices and to value-added prices.

Government revenues (€1,314.9bn in 2021, compared with €1,213.6bn in 2020) primarily consists of revenues from taxes and mandatory contributions.

Table 1: breakdown of public revenues (2021, as a %)

Production revenues	7.2
Property revenues	1.1
Interest (D41)	0.2
Property revenues other than interest (D4 excluding D41)	0.9
Taxes and social security contributions	88.9
Taxes on production and imports (D2)	31.6
VAT-type taxes (D211)	14.1
Import taxes and duties, excluding VAT (D212)	0.2
Income taxes, excluding VAT and import taxes (D214)	9.1
Payroll and labour taxes (D291)	3.6
Miscellaneous taxes on production (D292)	5.0
Current taxes on income and wealth (D5)	24.6
Capital taxes receivable (D91r)	1.4
Tax revenue transfers (D733)	0.0
Net social security contributions (D61)	31.9
Net non-recoverable unpaid taxes and contributions (D995r)	-0.6
Other transfers	2.8

Source: Insee

Proceeds from taxes and mandatory contributions do not track consumer price trends⁵.

They may track wage trends. This is primarily the case for:

- the bulk of proceeds from payroll and labour taxes (payroll taxes, transport contributions, levy for the national housing support fund, national autonomy solidarity fund, employer contributions to the wage guarantee fund, contribution to the development of apprenticeships,

⁵ To see the list of proceeds from statutory taxes and levies in light of consumer price trends, see Redoulès O (2021), « Conséquences pour les finances publiques de prévisions d'inflation trop élevées », HCFP, Study note no. 2021-2, July.

participation of companies in the development of ongoing vocational training), which track current wage trends;

- a significant proportion of income taxes (income tax, Generalized Social Contribution - CSG, Contribution for the Reimbursement of the Social Debt - CRDS, and other social security contributions). The proceeds of income tax paid by individuals tracks wage trends, with a shock having a 65% impact on current year proceeds and 135% the following year. The CSG-CRDS tracks wages in the current year, except for those relating to public service wages (elasticity of the latter of 0.5 for all wages is contractually retained over the medium-term, see below for the discussion on public service payroll) and those on capital income (11% of the total CSG in 2020);
- a portion of the actual social security contributions, those linked to salaried employment (85% of the total), which are affected by current wage trends.

In principle, proceeds from various corporate taxes can be linked to value-added prices rather than to consumer prices. This is primarily the case for:

- the CVAE⁶ (which is, however, down sharply due to the ongoing reform), which is linked to the change in value-added prices in the previous year;
- corporate tax, which is affected by the value-added prices in the previous year and value-added prices for the current year *via* the fifth instalment, as well as the social security contribution on corporate profits⁷;
- the CSG on capital income, indirectly (11% of total CSG proceeds⁸);
- social security contributions of self-employed persons (6% of total actual social security contributions).

Finally, other taxes and mandatory contributions⁹ are, at least in the short term, largely independent of consumer prices, value-added prices and wages:

- the domestic consumption tax on energy products (TICFE) is calculated in proportion to the weight or volume of the petroleum product;
- tobacco taxes are solely linked to tobacco prices;
- the tax on built land (excluding households) is not linked to consumer prices. Since 2017, the business premises contribution has been calculated on a new basis with a new rental value, equal to the product of its surface area weighted by a tariff per square metre, potentially adjusted by a location coefficient;
- duties on the transfer of assets for consideration (DMTO) and duties on the transfer of assets without consideration (DMTG) are linked to asset prices, largely independent of consumer or value-added prices.

⁶ Business value-added contribution.

⁷ Corporate tax and social security contribution on corporate profits (CSB) also have an inverse relationship with wages. This effect is not analysed in the note.

⁸ Social security accounts report published in September 2021.

⁹ Only taxes and mandatory contributions with proceeds of over €10bn are listed in this section.

Table 2: elasticity of taxes and mandatory contributions to consumer prices, value-added prices and wages included in this report

	12a. Taxes on production and imports	12b. Current taxes on income and wealth	12c. Capital taxes	13. Social security contributions
Elasticity to consumer prices in the year of the shock	54%			
Elasticity to consumer prices in the year following the shock	6%			
Total elasticity to consumer prices	61%			
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Elasticity to wages in the year of the shock	11%	51%		85%
Elasticity to wages in the year following the shock	0%	38%		
Total elasticity to wages	11%	89%		85%
<hr/>				
Elasticity to value-added prices in the year of the shock	0%	14%		6%
Elasticity to value-added prices in the year following the shock	2%	11%		
Total elasticity to value-added prices	2%	26%		6%

Source: authors' calculations.

Government revenues excluding taxes and mandatory contributions accounted for 15.8% of total government revenues in 2021:

- it is possible to argue that the production of market and residual sales sectors, given their nature, track consumer price trends;
- property revenues, other than interest, may be roughly estimated as being dependent on value-added prices.

It should be noted that if the imputed contributions track wage trends, they are offset in spending and are thereby ultimately neutral on a net basis.

The elasticity of government revenues to an inflation shock can thus be calculated by applying inflation elasticities for each item, having regard to the year in question. This calculation is done for 2022, using the breakdown of taxes and mandatory contributions published by Insee for 2021, updated to reflect structural changes resulting from ongoing reforms (new phase in the abolition of the housing tax on principal residences in particular).

Overall, across all government revenues:

- a one-percentage point consumer price shock in 2022 would, all other things being equal, result in a 0.21 percentage point increase in government revenues in the current year, followed by 0.23 percentage points from the following year;
- a one-percentage point wage shock in 2022 would, all other things being equal, result in a 0.44 percentage point increase in government revenues in the current year, followed by 0.53 percentage points from the following year;
- a one-percentage point value-added price shock in 2022 would, all other things being equal, result in a 0.06 percentage point increase in government revenues in the current year, followed by 0.1 percentage points from the following year.

The elasticity of government revenues to wages would therefore, at first sight, exceed that of value-added prices or consumer prices, due in particular to the weight of taxes and levies on wages across all taxes and mandatory contributions. This results from the distinction made, for the purposes of the analysis, between value-added prices and wages, because recent trends in these variables differ, but wages and value-added prices are of course not independent.

Furthermore, any interpretation of the above elasticities must be treated with caution. Indeed, indexation of revenues remains very challenging to determine. For example, the indexation of wealth taxes is uncertain. The assumption in this analysis is that it remains unresponsive to changes in consumer prices, wages or even value-added prices, but in practice it is more complex than this. The indexation of corporate tax may also raise questions: the indexing used for value-added prices is inevitably reductive in nature.

ii. Government expenditures seem more sensitive to consumer prices than to wages and value-added prices.

In terms of public spending (€1,475.6bn in 2021, up from €1,418.6bn in 2020), and as mentioned above, expenditures covered by fixed spending norms is generally not affected by an inflation shock, except where it is so large as to require an upward revision in the expenditure's norm, when it comes to respond to an increase in intermediate consumption prices and maintaining the purchasing power of public servants. This is currently the case.

Instead of focusing on whether spending is covered by a norm, it is preferable in this context, in order to analyse the effect of higher-than-expected inflation, to break down public expenditures by type¹⁰.

Table 3: breakdown of public expenditures (2021, as a %)

Operating expenditure	30.7
Intermediate consumption (P2)	8.7
Employee compensation (D1)	21.2
Other taxes on production (D29)	0.8
Property income other than interest (D4 excluding D41)	0.0
Current taxes on income and wealth (D5)	0.0
Interest (D41)	2.4
Benefits and other transfers	60.7
Social security benefits other than social transfers in kind (D62)	34.5
Social transfers in the form of tradable commodities (D632)	11.1
Grants (D3)	5.7
Current transfers between public agencies (D73)	0.0
Other current transfers (D7 excl. D73)	6.8
Capital transfers payable (D9p excl. D995p)	2.7
Acquisitions net of disposals of non-financial assets	6.3
Gross fixed capital formation (P51g)	6.1
Other acquisitions net of disposals of non-financial assets (P52, P53, NP)	0.2

Source: Insee

Public servant pay is initially excluded from the analysis. There is indeed significant uncertainty regarding the impact of higher inflation on public sector pay. Inflation has a knock-on effect on the wages of some public servants, *via* the minimum wage index for public officials. It tracks the SMIC (growth-indexed minimum wage) to prevent certain employees from falling below the minimum wage,

¹⁰ The analysis focuses on expenditures items accounting for over 10% of total government spending.

with the SMIC itself being automatically adjusted at least once a year based on the increase, since the previous review date, in the price index (excluding tobacco) for the lowest 20% of households and half of the purchasing power increase in the basic hourly wage of workers and employees (SHBOE). A general increase for public servants is also possible through an increase in the civil service index point. It may be decided to prevent a gap with pay in the private sector and keep the public service attractive, but it isn't automatic and any change and the level of any such change ultimately depend on government decisions. To limit the impact of an erroneous assumption regarding this item, the analysis of the effect of inflation on the general government balance is limited to the general government balance excluding public sector wage bill.

Furthermore, the effect of higher inflation on interest expenditures affects the general government balance, but not, by definition, the primary balance and will therefore be considered later.

For other areas of expenditures:

- There are challenges predicting the extent of the effect of higher prices on intermediate consumption. Adjustments may ultimately be made to volumes, particularly for appropriations within budget lines but also outside budget lines, to prevent the general government balance deteriorating. Conversely, intermediate consumption may be subject to “enforced” spending, which is difficult to adjust significantly in volume terms. A quick analysis of previous periods of rising inflation does not show any clear link between rising consumer prices and changes in intermediate consumption. To overcome this difficulty, three alternative assumptions are tested: full indexing to consumer prices (H1), 50% partial indexation (H2) and zero indexing (H3);
- Some social expenditures will also be affected by higher inflation. The bulk of healthcare spending, subject to the national health insurance spending objective, is immune to inflation in the short term. On the contrary, social expenditures outside the national health insurance spending objective may be sensitive to consumer prices or wages depending on what it is. The same assumptions were used as in the note published in July 2021, except for supplementary schemes and Unédic, dependent on both wages and consumer prices:
 - o With respect to mandatory supplementary pension schemes: the ANI (Accord National Interprofessionnel - national cross-industry agreement) agreed in May 2019 for the 2019-2022 period provided for an increase in Agirc-Arrco benefits that accounted for consumer price inflation excluding tobacco and wage increases. The social partners cooperating within Agirc-Arrco are expected to meet on 6 October 2022 to discuss the increase that will take place on 1 November;
 - o With regard to unemployment benefits paid by Unédic: the benefits paid to new beneficiaries are tied to their wage prior to becoming unemployed, and the benefits paid to beneficiaries who have been unemployed for over 6 months are adjusted using processes decided annually by the social partners. A 2.9% increase took effect on 1st July.

Table 4: effect of an upward inflation forecast gap per social security benefit spending item covered by this report

	€bn, 2022	Price effect in the year of the forecast gap	Additional effect in the year following the forecast gap	Effect of wages in the year of the forecast gap	Additional effect in the year following the forecast gap
Basic pension scheme	537				
O/w sickness	200.5		7%		
O/w old age	247.2		100%		
O/w family	27.9	75%	25%		
O/w occupational accidents and illnesses	11		50%		
O/w other benefits	50.5		0%		
Supplementary pension schemes	95.6		50%		50%
Unédic	41.7		50%	50%	
Total	674.3	3%	51%	3%	7%

Source: authors' calculations.

- Finally, gross fixed capital formation is supposed to track changes in value-added prices and consumer prices.

Overall, elasticities in government revenues and spending excluding public sector wage bill and interest expenditures to consumer prices, value-added prices and wages are shown in Tables 5 to 7.

Tables 5 to 7: summary of results - 2022

Table 5: elasticity to consumer prices

	Revenues	Spending excluding compensation of employees and interest expenditure		
As % of GDP	44.3%	43.1%		
		Assumption used for intermediate consumption		
		H1	H2	H3
Elasticity to an inflation shock in the first year	0.21	0.18	0.12	0.07
Elasticity to an inflation shock from the second year	0.23	0.49	0.43	0.37

Source: authors' calculations.

Table 6: elasticity to wages

	Revenues	Spending excluding compensation of employees and interest expenditure
As % of GDP	44.3%	43.1%
Elasticity to a wage shock in the first year	0.44	0.02
Elasticity to a wage shock from the second year	0.53	0.06

Source: authors' calculations.

Table 7: elasticity to value-added prices

	Revenues	Spending excluding compensation of employees and interest expenditure
As % of GDP	44.3%	43.1%
Elasticity to a value-added price shock in the first year	0.06	0.05
Elasticity to a value-added price shock from the second year	0.10	0.05

Source: authors' calculations.

The first year, regardless of the set of assumptions used:

- government revenues seem more sensitive to wages than to consumer prices. It is partly exposed to value-added prices;
- conversely, public spending is more sensitive to consumer prices than to wages. It is also partly exposed to value-added prices.

In 2022, with wages and value-added prices rising less than consumer prices, a scissor effect will thus reduce the expected positive effect of higher inflation on the general government balance.

It should be noted that as from the second year, the elasticity of spending to consumer prices is higher than that of revenues. The effect of higher inflation then becomes negative on the general government balance. Looking only at the impact of a one-point increase in consumer prices, the effect on the general government balance, positive or zero in the first year (estimated at 0.00 points under H1, 0.03 points under H2 and 0.05 points under H3), becomes negative as from the second year (estimated at -0.07 points under H3, -0.10 points under H2 and -0.12 points under H1).

Based on data in tables 5 to 7, it is possible to estimate the “mechanical” effect of the upward revision of inflation (+3.5 points), GDP prices (+0.9 points) and wages (+1.2 points) in the first amending budget bill for 2022 as compared with the initial budget act for 2022 on the general government balance: it is positive, estimated at 0.4 points.

b. “Mechanical” effect of higher inflation on the public debt ratio

A “mechanical” effect of higher inflation is an improved public debt burden as a result of:

- the effect on the general government balance, estimated at 0.4 points above;
- the effect on the debt ratio from the previous year, stemming in the year in which the shock occurs from a denominator effect on GDP. However, and as explained above, inflation is currently not homogeneous. This is where the revised growth in the GDP deflator, which is significantly lower (0.9 points) than consumer prices, comes into play: it automatically reduces the public debt-to-GDP ratio by 1.0 points in 2022.

The total “mechanical” effect on the public debt ratio can therefore be estimated at 1.4 points. However, other factors need to be taken into account.

4. Other factors need to be considered in 2022 and have an adverse impact on the public debt ratio

To fully consider the effect of changes in inflation and interest rate assumptions on the public debt-to-GDP ratio in 2022, several factors must be considered in 2022:

- the effect of measures taken by the Government to limit the impact of inflation on household and business income;
- the increase in interest expenditures;
- the estimated negative effect of higher inflation and interest rates on growth and hence on the public debt ratio.

a. Impact on the public debt ratio of the measures taken by the Government

Table 8 summarizes the main measures taken by the Government to limit the negative effects of higher inflation on household and business income, with the associated cost. Of the €40.8bn total measures taken in 2022, the public debt impact was over €27bn, i.e. 1.1 points of GDP, with some measures (compensation for gas and electricity suppliers) not resulting in a disbursement (they therefore increase the deficit, but do not lead to higher public debt). The increase in the “civil service index point” (+3.5 points) is also worth noting, as this increased the public deficit by 0.1 points. All in all, measures with an effect on public debt combined with the increase in the “civil service index point” raised the public debt ratio by 1.2 points of GDP in 2022.

Table 8: cost of support measures / cost of the energy price cap on electricity and gas (€bn) in the national accounts (estimate as at 29 June 2022)

	Cost for 2021	Cost for 2022	Comments
Compensation for gas suppliers	0.4	4.7	Cost of a tariff freeze at October 2021 levels up to 31 December 2022 (including the expansion to co-ownerships and new contracts tendering).
Electricity freeze: Reduction in the TICFE (end-user electricity consumption levy)	-	7.4	The increase in regulated electricity tariffs was limited to 4% in February 2022 thanks to a series of measures. This included reducing the TICFE to its minimum, representing a full-year cost of €8.1bn (from February 2022 to February 2023).
Compensation for electricity suppliers	-	8.9	Compensation for electricity suppliers (incl. EDF) for their losses beyond the reduction in the TICFE (including the cost of raising the ARENH ceiling).
Inflation compensation	3.8	-	Payment of inflation compensation of €100 to 38 million French people in response to the higher fuel prices, recognised in the national accounts in 2021.
Once-off energy subsidy	0.5	-	A once-off energy subsidy of €100 was paid to 5.8 million low-income households in December 2021.
15 cent fuel rebate and targeted and increased support for long distance drivers	-	7.6	Rebate of 15 cents (excluding tax) per litre of fuel from 1 April to 31 July, for all households and businesses. Includes an extension of the measure in August and September, followed by a gradual phasing out by December 2022.
Once-off back-to-school support	-	1.0	
Early increase of pensions and benefits	-	6.7	Early increase of pensions and benefits of +4% on 1 July 2022 (+3.5% for housing subsidies).
Mileage flat rates	-	0.4	10% increase in mileage flat rates used to calculate business expenses deductible from the income tax base in 2022.
Subsidy for intensive energy users	-	3.0	
Sectoral support	-	1.1	
Total	4.7	40.8	

Source: French Government

b. Effect on the public debt ratio of the higher interest expenditure

In 2021, public interest expenditures totalled €38.1 billion (including banking fees), a bounce-back compared with 2020 (+€5bn, i.e. +15.0% following -14.7%). Whilst medium- and long-term interest rates remained very low, the higher inflation excluding tobacco in France and the Eurozone drove up the debt interest expenditure on indexed bonds (+€8.8bn).¹¹¹² Interest expenditures are expected to further rise in 2022. It may be helpful to put all this into context:

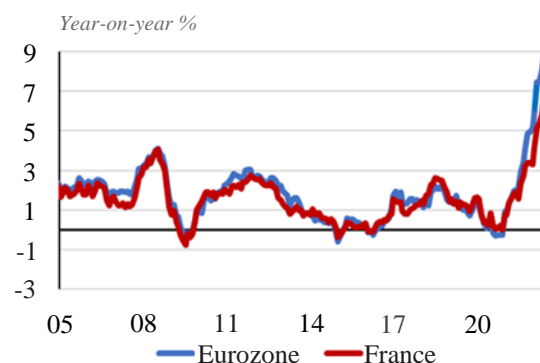
¹¹ French National Accounts of Public Agencies, 2021, Supplement to Rapid Information No. 081 of 29 March 2022.

¹² At end-2021, outstanding state-issued inflation-linked bonds amounted to €236.4 billion (including €167.6 billion indexed to Eurozone inflation), out of a total of €2,145.1 billion in outstanding negotiable state bonds.

- In terms of the indexing expense, a +/-0.1% change in consumer price indices excluding tobacco in France and the Eurozone results in a change of just over €0.2 billion in state's interest expenditures¹³.

Chart 3: inflation in France and the Eurozone (HICP index)

The impact for public debt is expected to be higher. Firstly, state debt only accounts for 76% of all public debt. Secondly, inflation-linked bonds are primarily (72%) linked to the Eurozone's consumer price index, which rose faster than prices in France over the recent period.



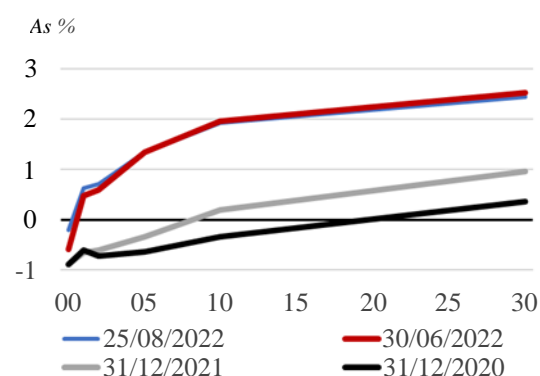
Source: Eurostat

- With respect to interest rate hikes:

Year to date:

- short-term rates recovered, with the 1-month treasury bond rate going from -0.9% at end-2021 to -0.6% at end-June and -0.2% at end-August, as a result of the ECB's monetary tightening in light of the very sharp rise in Eurozone prices (+8.9% year-on-year in July);
- long-term rates also increased, more abruptly, due in particular to the upward revision in inflation expectations. The yield on French 10-year bonds rose from 0.2% at end-2021 to over 2% in June, a level not seen since 2014.

Chart 4: French sovereign yield curve



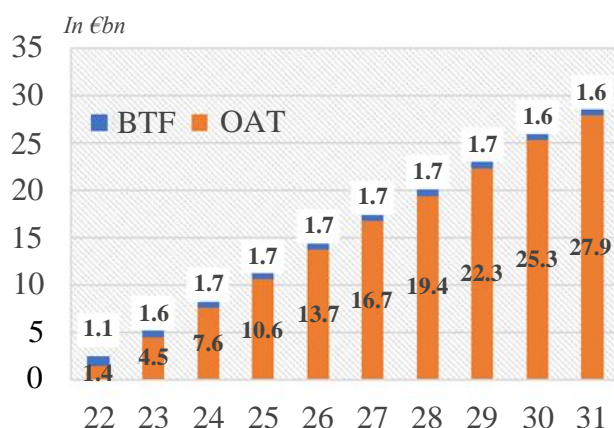
Source: Banque de France

As a result, the Government revised up its interest rate assumptions in the first amending budget bill for 2022 to a 2022 average of -0.1% for the 3-month French BTF yield and 1.7% for the 10-year French OAT, compared with -0.5% and 0.5% respectively in the initial budget bill for 2022.

The impact on interest expenditures in the national accounts of a 100-basis point shock as compared with the baseline scenario, across the entire yield curve throughout the projection period, is estimated in the 2022 RESF (see Chart 5). The effect of higher interest rates on interest expenditures would be gradual due to the gradual refinancing of the debt. However, from 2030, interest expenditures would be close to €30bn per annum.

¹³ Source: Economic, Social and Financial Report appended to the Budget Bill for 2022.

Chart 5: impact of a 1% interest rate shock on the “Maastricht” interest expenditure associated to French Government bonds (OATs and BTFs)



Source: 2022 RESF

Assuming that the effect on interest expenditures out of state is proportional to that seen for the state¹⁴, the upward revision of the Government’s short and long-term interest rate assumptions would result in an increase of €2.7bn in interest expenditures in 2022. However, it is difficult to accurately assess the effect of a upswing in interest rates on interest expenditures, which remains dependent on the issue programme put in place by Agence France Trésor (AFT - French Treasury Agency).

Table 9: state negotiable debt since end-2019

	End-2019	End-2020	End-2021	End-June 2022
Outstanding negotiable debt	1823	2001	2145	2220
Medium and long-term	1716	1839	1990	2076
Short-term	107	162	155	144
Average maturity of negotiable debt	8 years and 63 days	8 years and 73 days	8 years and 153 days	8 years and 196 days

Source: AFT

Overall, in the first amending budget bill for 2022, the Government revised interest expenditures upwards in light of the most recent available forecasts of €12bn, i.e. an upward effect on the public debt ratio of around 0.5 points.

c. Effect of lower growth on the public debt ratio

The current rise in inflation, which is mainly the result of a negative supply shock and not an increase in demand and which therefore reduces real household income, alongside the rise in interest rates, negatively impacts growth. The OFCE has estimated at -0.6 points¹⁵ the impact on growth of the rise in interest rates, the increase in oil prices beyond the 15-cent rebate, the rise in gas and electricity prices outside of the energy price cap on electricity and gas and the measures in the resilience plan and the purchasing power act. This loss of growth unfavourably impacts the public debt ratio *via*:

¹⁴ For reference, the weight of the interest expenditure is much lower for the latter. In 2021, the interest expenditures totalled €38.1 billion, €30.0 billion of which was attributable to the state.

¹⁵ Heyer E., X. Timbeau (op. cit.).

- the “denominator” effect on the public debt ratio. The public debt-to-GDP ratio has risen 0.7 points;
- the negative effect on the general government balance, which can be roughly estimated by applying a unitary elasticity of statutory taxes and levies to GDP growth. The public debt-to-GDP ratio has risen 0.3 points.

Overall, the loss of growth from higher-than-expected inflation and interest rates has an upward effect on the public debt-to-GDP ratio estimated at 1.0 points.

5. Summary: the rise in inflation increases the public debt ratio in 2022, by around 1.2 points

The rise in inflation is expected to have the following effect on the public debt ratio in 2022:

1. **A favourable “mechanical” effect, estimated at -1.4 points:**
 - a. -0.4 points *via* the impact of wage and price increases on the primary general government balance excluding compensation of employees and measures implemented by the Government;
 - b. -1 points *via* the effect, on the public debt-to-GDP ratio in value terms, of the revised GDP deflator assumption.
2. **An unfavourable effect, estimated at +2.6 points:**
 - a. Widening of the public deficit by 1.2 points of GDP in the first amending budget bill for 2022 due to the discretionary measures implemented by the Government to limit the impact of inflation on household and business income (3.5 point increase in the civil service index point, reduction in the TICFE, 15 cent fuel rebate, and targeted and increased support for long distance drivers, once-off back-to-school support, early increase in pensions and benefits, mileage flat rates, subsidies for intensive energy users and sectoral support¹⁶);
 - b. Widening of the public deficit by 0.5 points of GDP as a result of interest expenditures¹⁷, on the back of the increase in nominal rates and the higher inflation (impact *via* the debt interest expenditure on indexed bonds).
 - c. 1-point increase in the public debt ratio, due to lower growth (-0.6 points) due to the imported nature of inflation in 2022, *via* the “denominator” effect on the public debt ratio (estimated at +0.7 points) and the negative effect on the general government balance (estimated at +0.3 points).

All in all, once all the impacts of inflation on public debt have been factored in, including the measures taken to deal with it and its impact on growth, it appears that the excess inflation seen since the initial budget law for 2022 would push the public debt ratio upwards, not downwards, by around 1.2 points of GDP in 2022.

¹⁶ Excluding compensation for gas and electricity suppliers that deteriorate the balance in the national accounts, but are non-cash in nature and hence do not require additional debt (no effect in cash accounting terms).

¹⁷ Measured here in cash and non-national accounting, because it is the disbursements made in 2022 that affect the debt that year.

**Summary table: effect of the revised forecasts for consumer prices, GDP prices, wages
on the public debt-to-GDP ratio**

“Mechanical” effect on the public debt-to-GDP ratio	-1.4
O/w impact on the primary general government balance excluding compensation of employees and measures implemented by the Government	-0.4
O/w impact of the deflator on the public debt-to-GDP ratio	-1.0
Other effect on the public debt-to-GDP ratio	+2.6
O/w measures implemented by the Government	+1.2
O/w interest expenditures	+0.5
O/w “growth” effect	+1.0
<i>O/w “denominator” effect</i>	<i>+0.7</i>
<i>O/w “general government balance” effect</i>	<i>+0.3</i>
Total effect	+1.2

Source: authors’ calculations

These calculations are based on simplified assumptions and should therefore be treated with caution. They nevertheless put into perspective the favourable effect of higher inflation on the public debt ratio.