

Government revenue in the wake of the pandemic. Tax residuals and inflation

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Rationale

Following the COVID-19 pandemic, tax revenue has shown strong dynamism, increasing as a proportion of GDP by 3.7 percentage points since 2019. Understanding the nature of this dynamism is key to assessing Spanish fiscal policy.

Takeaways

- This article breaks down revenue growth into four explanatory factors: real economic activity, price growth, the effect of fiscal measures and an unexplained component or tax residual.
- The effect of prices (inflation) has been gaining weight and appears to account for somewhat more than half of the revenue growth observed in 2022, especially from VAT and personal income tax.
- It is estimated that 2.6 percentage points of the 3.7 percentage point increase in the revenue-to-GDP ratio cannot be explained by the changes in economic activity, prices or the fiscal measures approved. In the absence of an explanation about the permanent or temporary nature of this phenomenon, the principle of prudence would advise against considering this increase in revenue to be permanent.

Keywords

Taxes, government revenue, inflation, structural deficit, pandemic.

JEL classification

H20, E62, H30.

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Introduction

Since the onset of the COVID-19 pandemic, the performance of general government revenue in Spain has been exceptionally positive. As shown in Chart 1.a, tax revenue fell less than GDP in 2020 on account of the measures then applied to sustain household income. Subsequently, the recovery in revenue was very intense, exceeding in 2022 the level that would have been reached had the trend prior to the pandemic continued.¹ By contrast, nominal GDP has not yet recovered that level. As a result of these dynamics, tax revenue relative to GDP has increased notably since 2019, increasing by 3.7 percentage points (pp), from 35.2% to 38.9%. This marked increase in the revenue-to-GDP ratio has not been observed in the average for the European Union countries, which rose from 40.8% to 41.5% in the same period, leading to Spain converging towards that average (see Chart 1.b).

The buoyancy of government revenue in Spain is present in all the major taxes. Thus, from 2019, revenue from VAT as a percentage of GDP increased by 1 pp, from personal income tax by 1.3 pp, from social security contributions by 0.6 pp and from corporate income tax by 0.9 pp. These four taxes represent 82% of total tax revenue and their performance explains 3.8 pp of the 3.7 pp increase in the revenue-to-GDP ratio recorded between 2019 and 2022.

Understanding the nature of the drivers of the buoyant tax revenue is key to assessing Spain's public finances and their outlook. In particular, whether these higher revenues are temporary or permanent has an impact on the measurement of the economy's structural deficit, which is crucial for assessing spending decisions (on temporary or structural items) and public finance sustainability.

This article aims to quantify the factors underlying the recent changes in tax receipts in Spain. To this end, a conceptual framework is considered in which the performance of each tax is broken down into four factors: the changes in real economic activity, price growth, the fiscal measures adopted and an unexplained component that we denote "tax residual". The analysis focuses on the four major taxes mentioned above: VAT, personal income tax, social security contributions and corporate income tax.

Conceptual framework for breaking down the performance of tax revenue

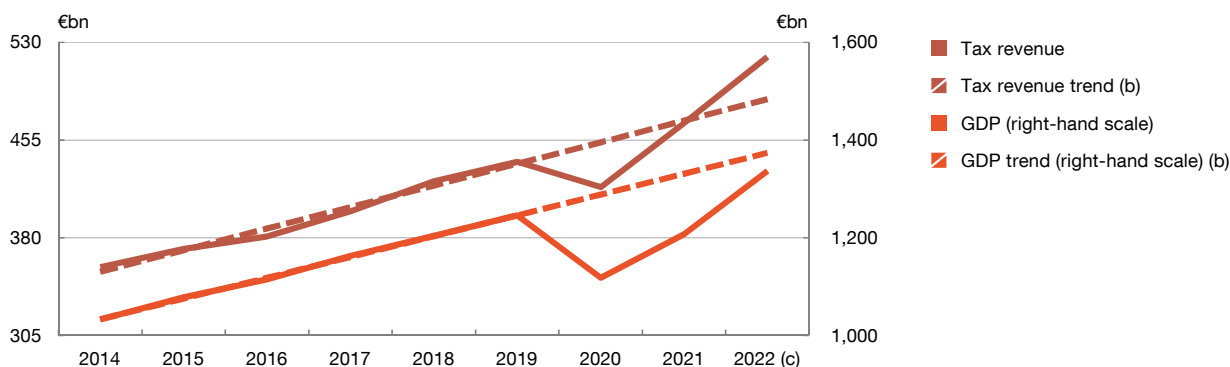
Tax revenues arise from applying the current tax rates and deductions to the tax bases as defined by law. This results in an effective tax rate for each tax, defined as the ratio of the revenue raised

¹ All the figures for 2022 in this article correspond to the extrapolation to the year as a whole of the year-on-year rate observed up to Q3, as that is the latest date for which there are National Accounts data on general government revenue.

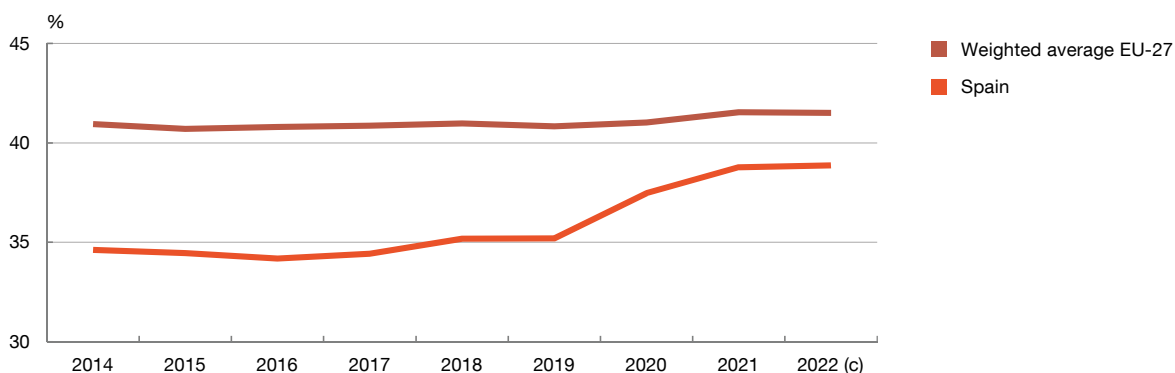
Chart 1

The performance of tax revenue in Spain has been remarkably positive since the onset of the pandemic (a)

1.a Tax revenue and GDP



1.b Tax revenue-to-GDP ratio



SOURCE: Banco de España, based on Eurostat and IGAE data.

a The chart depicts tax revenue, which includes all taxes and social security contributions.

b The trend is calculated as a linear extrapolation of the growth observed between 2014 and 2019.

c Calculated by extrapolating the year-on-year growth accumulated up to Q3 to the year as a whole.

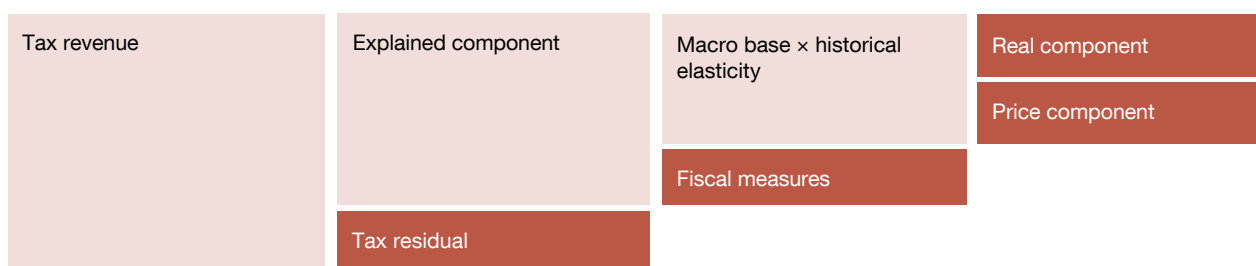


by a tax to its total tax base. The effective rate may change over time as a result of legislative changes (fiscal measures) or owing to composition effects.²

In its projections exercise, the Banco de España separates the impact of fiscal measures, whose effect is estimated independently, from the performance of tax revenue in the absence of legislative changes. The tax base for each tax is approximated with a macroeconomic base (hereafter, “macro base”) constructed with different National Accounts items. This is because economic projections are prepared in terms of National Accounts variables. For the purposes of this exercise, an advantage is that National Account items are often associated with their own deflator, enabling us to break down their performance into a real component and a price component. Lastly, it is assumed that any changes in the effective tax rate that are not due to

² For instance, this is the case with VAT, owing to a change in the composition of the consumption basket that raises the relative weight of spending on items subject to the standard tax rate (21%), compared with items subject to reduced rates (4% or 10%).

Figure 1

Conceptual framework for the decomposition exercise of changes in tax revenue

SOURCE: Banco de España.

legislative changes are, in general, minor. Consequently, changes in the macro bases translate into changes in revenue through a fixed historical elasticity which depends on the characteristics of each tax. Based on this conceptual framework, changes in tax revenue can be broken down as follows:

$$\Delta \text{ revenues} = \varepsilon \times \Delta \text{ macrobase} + \text{measures} + \text{residuals} \quad [1]$$

where ε is the historical elasticity.³ Within this conceptual framework there is a residual component which captures the differences between observed and estimated revenues. These residuals may be due to differences between the macro and tax bases, to errors when estimating the impact of fiscal measures or to changes in the effective rates that make historical elasticities no longer an adequate approximation.

This exercise broadens the conceptual framework shown in equation [1], separating changes in the macro base into a real component and a price component. Figure 1 illustrates the complete decomposition exercise, which results in four explanatory factors for the performance of public revenues: real component, price component, measures and tax residual.

Figure 2 summarises the three steps needed to implement the decomposition exercise: constructing a macro base for each tax, defining a deflator for that base and making a series of specific calculations for each tax. Needless to say, this exercise is logically subject to some degree of uncertainty and discretionality; accordingly, the resulting estimations should be interpreted with caution.

The first step, detailed in column (1) of Figure 2, consists of constructing a macro base to approximate the tax base using National Accounts components. In the case of VAT, household consumption, general government intermediate consumption, general government gross fixed capital formation, gross fixed capital formation on dwellings and tourism exports are used. For

³ In particular, the elasticities estimated in Price, Dang and Guillemette (2014) are used in this article.

Figure 2

Steps for the practical implementation of the decomposition exercise

	Macro base (1)	Nominal component (2)	Adjustments (3)
VAT	<ul style="list-style-type: none"> – Household consumption and government intermediate consumption – General government investment – Housing investment – Tourism exports 	<ul style="list-style-type: none"> – Household consumption deflator – Fixed capital investment deflator – Housing investment deflator – Tourism exports deflator 	
Corporate income tax	<ul style="list-style-type: none"> – Firms' gross operating surplus 	<ul style="list-style-type: none"> – Gross operating surplus per unit of output 	<ul style="list-style-type: none"> – Elasticity greater than 1 ($\epsilon = 1,32$) is distributed equally between the real effect and the price effect – Inclusion of known rulings and extraordinary items as part of the explained component (measures)
Personal income tax	<ul style="list-style-type: none"> – Employee compensation minus effective contributions paid to general government – Pensions – Other benefits – Gross household surplus – Interest, dividends and other income received by households 	<ul style="list-style-type: none"> – Compensation per employee – Pension revaluation – Compensation per employee – Gross operating surplus per unit of output – Historical relationship between inflation and interest and dividend yields 	<ul style="list-style-type: none"> – Fiscal drag is allocated to the nominal component – Temporary reallocation of payments to pensioners to offset inflation
Social security contributions	<ul style="list-style-type: none"> – Employee compensation – Self-employed persons multiplied by compensation per employee in the market economy 	<ul style="list-style-type: none"> – Compensation per employee – Compensation per employee in the market economy 	<ul style="list-style-type: none"> – Unemployed persons' contributions are added separately, taking the observed figure and breaking it down into the real and nominal components

SOURCE: Banco de España.

corporate income tax, firms' gross operating surplus is used. For personal income tax, employee compensation (net of social security contributions), welfare benefits and other household income are used. Lastly, for social security contributions, employee compensation and an estimate of the compensation received by the self-employed are used.

The second step, detailed in column (2) of Figure 2, consists of defining a deflator for each of the macro bases. In cases where the National Accounts component has its own deflator, this is the one used. Otherwise, the available information that best reflects the changes in the prices of each component is used. For example, in the case of pensions, the increase approved by the Government is used and, for the rest of welfare benefits, the increase in the average compensation per employee is used. The latter is an approximation to the changes in the Social Security's

regulatory bases, which determine the amount of such benefits. Of note is the specific case of interest income and capital gains in personal income tax. In this case, as the impact of inflation on the capital income taxed occurs through its effect on financial asset yields, the relationship between yields and inflation is modelled on the basis of historical evidence.

The third step, detailed in column (3) of Figure 2, incorporates certain characteristics that are specific to each tax. For instance, both in personal income tax and in corporate income tax, the elasticities of revenue to changes in the base are higher than 1. In the case of personal income tax, this is due to its progressivity and to the existence of parameters (such as tax deductions or the thresholds determining the marginal rate) that are set in nominal terms (i.e. in euro). Thus, an increase in average nominal income (owing to inflation) triggers a higher tax rate, disproportionately increasing the tax revenue raised.⁴ This effect, sometimes known as “fiscal drag”, only affects changes in the nominal component of the base. Corporate income tax, however, is not progressive but rather proportional. Still, an elasticity greater than 1 is used, owing to the available evidence that firms’ profits – and, by extension, corporate income tax revenue – fluctuate more than the macro base (i.e. firms’ gross operating surplus).⁵ Therefore, based on equation [1], when the base is broken down into the real and the nominal components, in the case of personal income tax, the elasticity applied to the nominal component is greater than 1 and that applied to the real component is equal to 1. However, in the case of corporate income tax, the same elasticity (greater than 1) is applied to both components of the base. Thus, the contribution of the nominal component to personal income tax growth is amplified and is greater than mere growth in average income.^{6, 7}

Lastly, the effect of the main fiscal measures adopted in recent years is calculated and distributed by quarter. This is done based on the information provided by the Central Government Tax Authority (AEAT) and the National Audit Office (IGAE), and processed by the Banco de España as part of its monitoring of the Spanish economy.

Thus, the year-on-year quarterly growth rate of each tax can be broken down into four components, corresponding to the contribution made by each of the factors referred to above: the real economic activity component, price growth, the effect of the fiscal measures and the unexplained component or tax residual.

4 The response of the effective average personal income tax rate to income increases is shown in detail in García-Miralles, Ramos and Guner (2019).

5 Thus, during recessions profits and corporate income tax revenue tend to fall more than gross surplus according to National Accounts data, while the opposite occurs during recovery periods. See Price, Dang and Guillemette (2014).

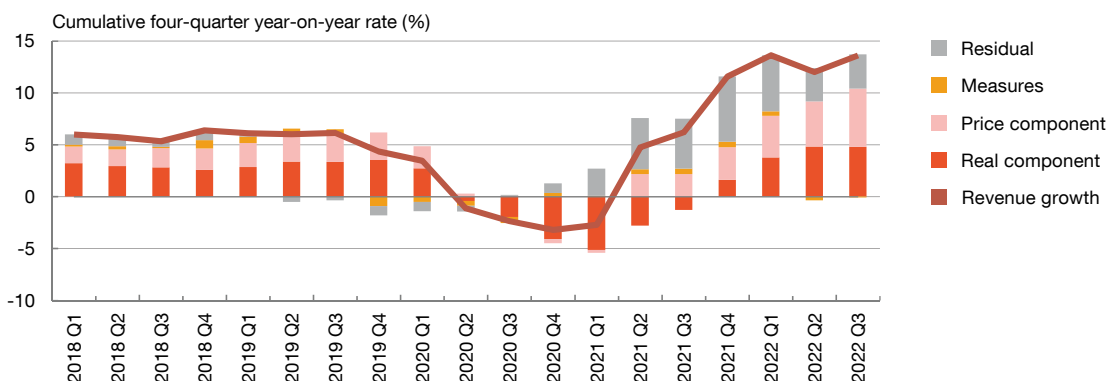
6 The macro bases used in the personal income tax analysis are also corrected to account for the differences in the timing of recognition of the inflation compensation payments to pensioners. For instance, inflation compensation for 2021 was paid in 2022, therefore affecting the income reported and the personal income tax revenue in 2022. However, in the National Accounts, it is included as an addition to welfare benefits in 2021. The measures estimated for corporate income tax include extraordinary items recorded in tax revenue (stemming from extraordinary profit or loss or rulings) identified by the tax authorities and with a quantitatively significant impact.

7 In the case of both corporate and personal income tax, part of the tax revenue for the year relates to the final tax payable in the annual return, which refers to income generated in the previous year. In principle, such income should relate to the macro bases of the preceding (not current) year. However, this correction is not made in this exercise owing to the complexity resulting from the difference in the composition of the income determining the final annual tax payable and the total tax revenue, and from the important regulatory changes made over time (for example, regarding corporate income tax prepayments). In any event, it should be borne in mind that the weight of annual returns in total tax revenue is small (in recent years, around 1% in personal income tax and 12% in corporate income tax).

Chart 2

Tax revenue showed strong growth after the pandemic, mainly owing to tax residuals and, more recently, inflation

2.a Changes in revenue from VAT, corporate income tax, personal income tax and social security contributions



SOURCE: Banco de España, based on IGAE, AEAT and INE data.

Results of the decomposition exercise

Analysis of recent developments

Chart 2 depicts the recent behaviour of total revenues from the four taxes considered (VAT, corporate income tax, personal income tax and social security contributions), while also breaking them down into the four components referred to above. The years leading up to the COVID-19 crisis saw a steady rise in receipts of around 5%, in part due to a real increase in tax bases and in part to rising prices. In 2020, as a result of the pandemic, tax revenue declined, largely owing to the fall in the real component. However, revenue recovered strongly in 2021, posting year-on-year growth of 11.6%. This increase was much larger than might be explained by changes in the underlying macroeconomic determinants, resulting in a very sizeable unexplained component (tax residual). More recently, in the period of 2022 for which data are available (the first three quarters), revenue growth remained strong, with a cumulative four-quarter rate of 13.6%. Here, while the unexplained component remains positive, much of the revenue increase can be explained by the growth in economic activity and prices.

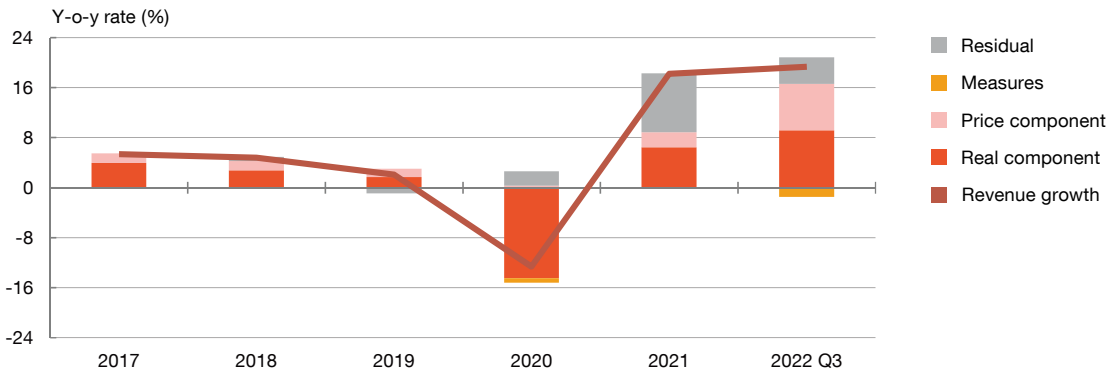
Overall, in the last two years (2021-2022) and with all of the caveats inherent in an analysis of this nature, the macro bases plus the fiscal measures would account for two-thirds (66%) of the strong post-pandemic recovery in government receipts. The rest (34%) can be attributed to the unexplained component or residual. Roughly 65% of the explained growth can be attributed to the nominal component of the tax bases, and 35% to the recovery in real economic activity, given that fiscal measures barely had an impact in the two years.⁸

⁸ It should be noted that many of the tax cuts implemented in response to rising energy prices affect taxes not included in the analysis (e.g. the excise duty on electricity or the tax on electricity generation).

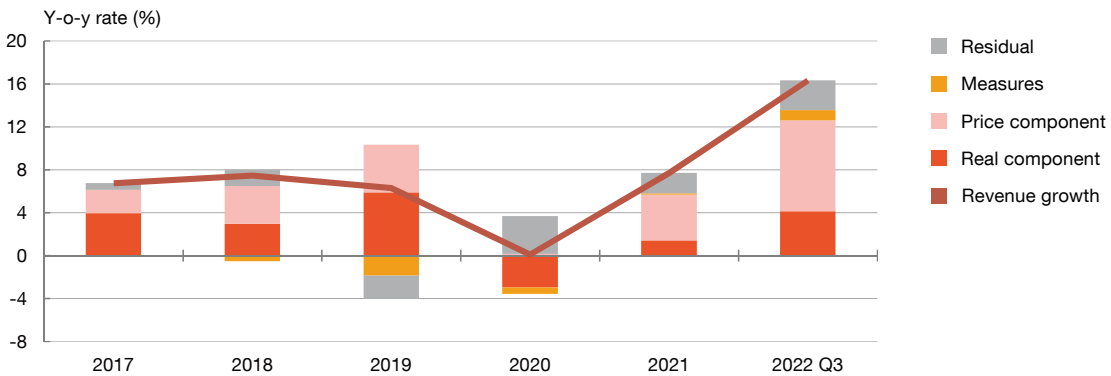
Chart 3

All of the taxes posted positive residuals following the pandemic, with the price component gaining weight in 2022, especially in VAT and personal income tax

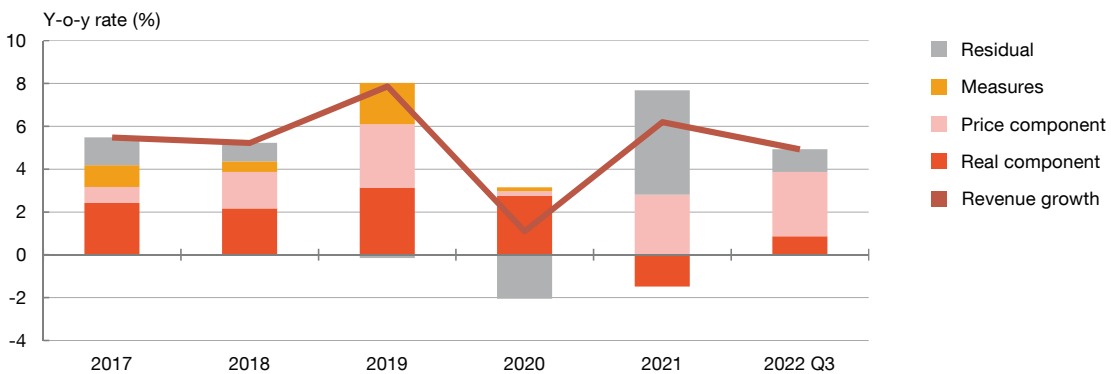
3.a Changes in revenue from VAT



3.b Changes in revenue from personal income tax



3.c Changes in revenue from social security contributions

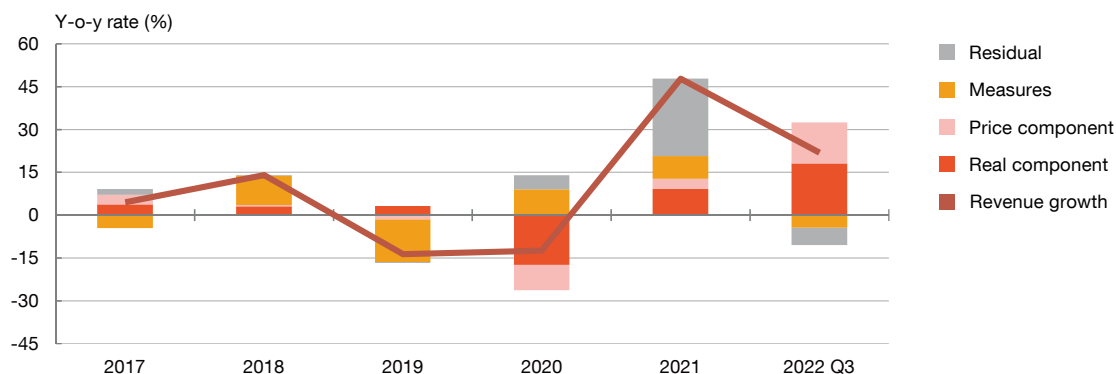


SOURCE: Banco de España, based on IGAE, AEAT and INE data.

Chart 3

All of the taxes posted positive residuals following the pandemic, with the price component gaining weight in 2022, especially in VAT and personal income tax (cont'd)

3.d Changes in revenue from corporate income tax



SOURCE: Banco de España, based on IGAE, AEAT and INE data.



Moving on to an analysis by tax, Chart 3 shows the results broken down for each of the taxes considered. VAT and corporate income tax receipts were particularly affected during the pandemic, with negative growth rates of around -12% in 2020. Conversely, thanks to the income-support policies, revenue from personal income tax and social security contributions did not fall. All of these taxes subsequently rallied, with revenue in 2022 Q3 exceeding the 2019 figure by between 13% (social security contributions) and 32% (corporate income tax). In 2022 inflation had a particularly large impact on VAT, due to the increase in consumer prices, and on personal income tax, due to the fiscal drag. As for the unexplained component, all of the taxes have had positive residuals in the last two years.

Residuals and inflation: a historical perspective

The estimated impact of inflation on the recent performance of tax revenue is notable and has gained weight in recent quarters. Thus, in the first three quarters of 2022, price growth appears to have accounted for 6.2 pp of the 12.3 pp increase observed in this period. In other words, just above half, although the figure is expected to be even higher in the final months of last year.

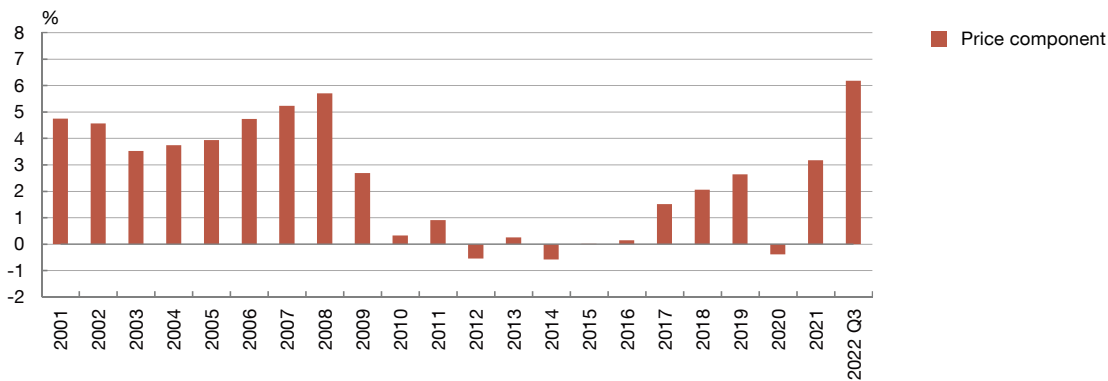
From a broader historical perspective (see Chart 4), the weight of inflation in the recent period exceeds that observed in the years leading up to the pandemic, when it accounted for 2.1 pp on average (between 2017 and 2019). These were, however, years of particularly moderate price growth. In the 2000s, inflation contributed around 4 pp to revenue growth.

Meanwhile, as shown in Chart 5, in 2021 tax residuals (i.e. the unexplained portion of the increased revenue) were very large by historical standards. They were also positive and significant in 2022.

Chart 4

The contribution of inflation to revenue growth has accelerated recently

4.a Contribution of the price component to tax revenue growth

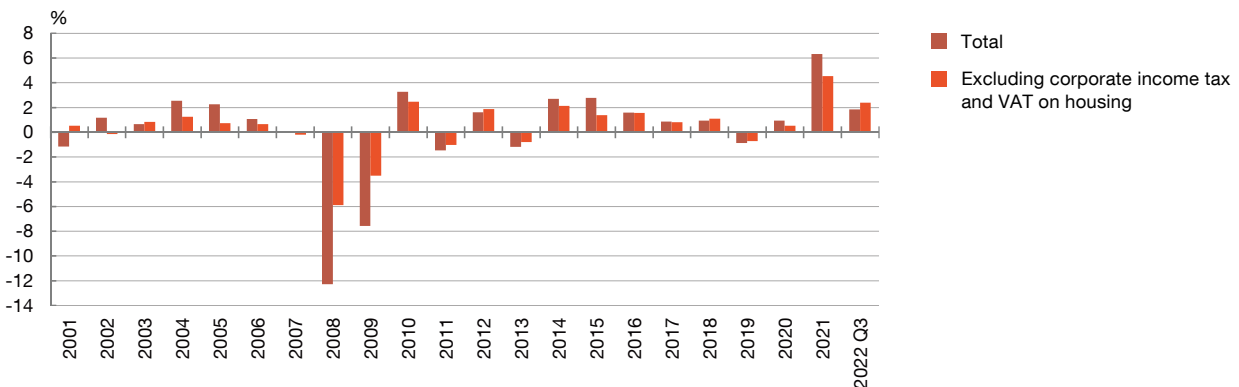


SOURCE: Banco de España, based on IGAE, AEAT and INE data.

Chart 5

The positive tax residuals observed following the pandemic are historically high

5.a Contribution of tax residuals to tax revenue growth



SOURCE: Banco de España, based on IGAE, AEAT and INE data.

These residuals would account for a third of the observed growth in revenues since 2019, corresponding to more than two-thirds of the revenue growth above GDP growth. In other words, 2.6 pp of the 3.7 pp increase in the total tax revenue-to-GDP ratio. Tax residuals on a comparable scale have only been seen in the 2008-2009 real estate crisis, though in that case they were negative, rather than positive.

Chart 5 also shows the tax residuals obtained after subtracting the portion attributable to corporate income tax and to VAT on new housing. For these two components, the macro bases (firms' gross operating surplus and housing investment, respectively) offer a less accurate

approximation to the real tax base,⁹ and the modelling errors therefore tend to be bigger. As can be seen in the chart, while corporate income tax and VAT on housing were responsible for a large portion of the negative tax residuals during the 2008-2009 crisis, they are behind only a small portion of the last two years' positive tax residuals. Adjusting for these two components, the unexplained increase in tax revenues in 2021 and 2022 remains very large by historical standards.

Conclusions

From the analysis conducted, it can be concluded that the two most significant factors behind the strong post-COVID-19 growth in Spanish government revenue are inflation and the unexplained component or residual.

In terms of inflation, it is estimated that rising prices could explain around 43% of the post-pandemic increase in tax revenue, although it is worth noting that the effects of prices on public revenue are not always immediate. While the impact of inflation is immediate in the case of indirect taxes, which are automatically affected by the evolution of consumer prices, this is not true of other taxes, whose bases may be affected by inflation to varying degrees over time. In this regard, and in terms of the year in progress, inflation looks likely to contribute less to VAT, as a result of the expected deceleration in prices. However, its impact on personal income tax and social security contributions is likely to increase to the extent that wage growth starts to accelerate somewhat and as pensions are indexed to the previous year's inflation. Moreover, inflation has an impact not only on government receipts, but also on expenditure. This impact also emerges over time and depends, for instance, on the existence of automatic indexation mechanisms. Hernández de Cos (2022) includes a detailed discussion of the impact of inflation on public finances.¹⁰

As regards the unobserved component or residual, it is estimated that around a third of the increase in revenue recorded over the past two years cannot be explained by the performance of its macroeconomic bases, historical elasticities or the fiscal measures taken. Given the quantitative importance of these tax residuals, a reliable explanation should be sought to determine the extent to which this extraordinary increase in revenue is of a structural (permanent) nature or is transitory, in which case the sharp rise in tax revenue would be reversed in the coming years.

The difficulties in estimating and interpreting an unobservable factor such as tax residuals, as well as the uncertainty that naturally surrounds this estimation exercise, mean that these conclusions should be interpreted with due caution. Nonetheless, the principle of prudence would advise against considering the unexplained component of the recent rise in tax revenue to be permanent.

⁹ This is because they measure different concepts and apply different accounting rules, although they remain the best possible approximation of the tax base available in the National Accounts.

¹⁰ See also Bankowski, Bouabdallah, Checherita-Westphal, Freier, Jacquinet and Muggenthaler (2023).

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