DIW Weekly Report

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AT A GLANCE

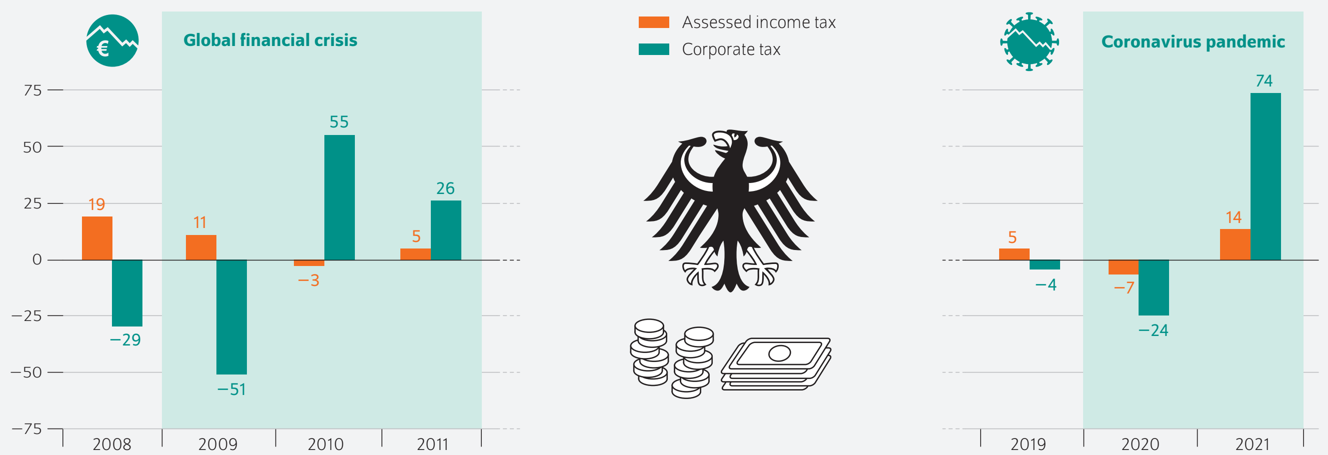
Tax revenue: swifter recovery during the coronavirus pandemic than during the global financial crisis

By Kristina van Deuverden

- Despite a weakening economy, tax revenue rallied above the pre-crisis level in 2021; during the global financial crisis, tax revenue recovery lagged behind economic recovery
- Noticeable increase of tax revenue is carried by almost all types of taxes; surprisingly dynamic growth in taxes on profits
- Differing reactions of tax revenue are due to the causes of both crises as well as economic policy measures
- Political reaction to the coronavirus was much quicker and greater in scale and stabilized incomes
- However, inflation also supports tax growth; revenues due to this should be returned to private households

Taxes on profits are recovering more swiftly and strongly during the coronavirus pandemic than during the global financial crisis

Year-on-year percent change in the assessed income tax and in the corporate tax



Source: Federal Statistical Office; author's own calculations.

FROM THE AUTHORS

"Businesses and the self-employed likely made it through the pandemic better than they expected; this is supported by how the assessed income tax and corporate tax are developing. The fact that they were already increasing dynamically in 2021 is likely due to the rapid economic policy aid."

— Kristina van Deuverden —

MEDIA

Audio Interview with Kristina van Deuverden (in German)
www.diw.de/mediathek

Tax revenue: swifter recovery during the coronavirus pandemic than during the global financial crisis

By Kristina van Deuverden

ABSTRACT

Although economic growth continued to be lukewarm in 2021, tax revenue increased significantly, even exceeding the pre-crisis level despite economic policy measures associated with revenue losses. During the 2008-2011 global financial crisis, tax revenue followed a different path: Its recovery lagged behind economic recovery, first reaching the pre-crisis level in 2011. In 2021, value-added tax (VAT) increased as expected following the temporary reduction of the VAT rates in 2020, as did the pay-as-you-earn tax due to the reduction of short-time work. In contrast, taxes on profits have experienced unexpectedly high growth. Clearly, economic policy has stabilized incomes more successfully via rapid and comprehensive measures during the coronavirus pandemic than it did during the global financial crisis. However, price developments are likely to be driving the strong increase in—nominal—profit income. This is one reason that the plans to provide households with relief to help them cope with skyrocketing energy prices and to increase the personal allowance are the right decisions.

Germany has been in the grip of the coronavirus pandemic since 2020; economic growth is sluggish and brief recovery phases are continually interrupted. Tax revenue, however, has managed to disentangle itself from the effects of the pandemic and is again experiencing growth. In January 2022, the German tax authorities collected 22.4 percent more taxes (excluding municipal taxes) than in January 2021.[1] Although non-recurring effects overdraw the January 2022 cash revenue, tax revenue growth has been picking up speed since 2021. In autumn 2021, the Working Party on Tax Revenue Estimates, an advisory council at the Federal Ministry of Finance, increased its prediction for 2021 by 38.5 billion euros and forecasted growth of 9.4 percent on 2020,[2] which would have exceeded the pre-crisis level. In reality, tax revenue, excluding municipal taxes, for which statistical data are now available, increased by 11.5 percent in 2021.

Comparing the recovery paths of tax revenue during the 2008-2011 global financial crisis—when the economy and subsequently tax revenue took a steep plunge—and the coronavirus pandemic reveals significant differences between the two. Although it is too early to determine the causes conclusively, a preliminary review is possible. Above all, an analysis of the types of taxes and a comparison of different economic policy measures taken during the two crises can provide initial insight.

Collapse and recovery of tax revenue during the global financial crisis and the coronavirus pandemic

Tax revenue growth is partially influenced by economic growth. In economic analyses, political decisions, and public discourse, economic growth is measured using *real* economic growth, e.g., inflation-adjusted gross domestic product (GDP). However, nominal GDP, e.g., not adjusted for

1 Cf. Federal Ministry of Finance, *Monatsbericht Februar 2022* (2022) (available online. Accessed on March 14, 2021; this applies to all other online sources in this report unless stated otherwise). Tax revenue regularly reported by the Federal Ministry of Finance refers to cash in-flows excluding municipal taxes.

2 Cf. Federal Ministry of Finance, *Ergebnisse der 161. Sitzung des Arbeitskreises „Steuerschätzungen", Pressemitteilung 24, Anlage 2* (2021) (in German; available online).

DOI: https://doi.org/10.18723/diw_dwr:2022-11-1

inflation, is the crucial reference figure for (nominal) tax revenue. However, an analysis must consider further factors beyond GDP: For example, the change in the gross wages in total or in (nominal) consumption provides significant insight into how taxes are developing in Germany. At the same time, economic policy measures that support the economy are decisive for tax revenue growth, as they partially directly affect tax revenue as well as partially affect the corresponding relevant economic activities.

During the financial crisis in 2009, nominal GDP decreased by 4.0 percent (Box 1) and tax revenue by 5.3 percent (Figure 1).[3] In 2020 during the coronavirus pandemic, nominal GDP fell by 3.0 percent while tax revenue declined more sharply by 6.5 percent.

The developments in the first year of each crisis are comparable if the tax policy measures (Box 2) are considered. Compared to nominal GDP, the decline in tax revenue related to the discretionary measures was 0.2 percent in 2009 and 0.9 percent in 2020. Had tax cuts also been 0.2 percent, tax revenue would have only sunk by four percent in 2020. Compared to the decline in GDP, this is a development comparable to the reaction in 2009. In contrast, this does not apply to 2010 and 2021, the second year of each crisis: In relation to GDP, the decline in tax revenue associated with discretionary measures was the same in both years. While nominal GDP increased by 4.9 percent in 2010, tax revenue increased by 0.4 percent. In contrast, tax revenue increased by 12.9 percent while GDP increased comparatively “little,” by 6.0 percent, in 2021.

The diverging responses of tax revenue are more clearly illustrated by the development of the tax-to-GDP ratio (Table). Generally, the tax-to-GDP ratio decreases during a downturn and increases during an upswing. In 2009 and 2010, it declined by 0.3 percentage points and one percentage point, respectively. While the tax-to-GDP ratio then increased in 2011, it was still significantly lower than it was in 2008. In 2020, the tax-to-GDP ratio decreased (more) significantly by 0.8 percentage points.[4] In contrast, it increased to 24.4 percent in 2021, its highest value since the German reunification in 1990.

3 The analysis of the reactions of tax revenue and social security contributions to macroeconomic development and the economic policy measures is based on the classification of the national account systems (*Volkswirtschaftliche Gesamtrechnungen*, VGR). While the finance statistics report revenue when cashed, the VGR allocate taxes according to the time at which they accrue. Activities are also classified differently. This applies to, for example, the child benefit or child bonuses, which were granted during both crises. These expenditures reduce the pay-as-you-earn tax but resemble transfer payments to a large extent and are partially reported as tax revenue and partially as transfer payments in the VGR.

4 Not only in Germany are there signs that tax revenue has taken a markedly different path; the OECD found noticeable differences for many of its member countries based on preliminary data for 2020 in the current edition of Revenue Statistics. Cf. OECD, *Revenue Statistics 1965–2020. The Initial Impact of COVID-19 on OECD Tax Revenues* (2021) (available online). For international comparability reasons, the OECD study includes social security contributions. However, no marked differences can be observed in the development of social security contributions for Germany as they can be for tax revenue.

Box 1

Comparative overview of economic growth during the global financial crisis and the coronavirus pandemic

The origins of the financial crisis lie in the global financial sector.[1] The German economy was first impacted by the crisis in the fourth quarter of 2008, when real GDP decreased by 1.6 percent compared with the previous quarter and German exports dropped by 6.4 percent. In the first quarter of 2009, it declined by 12.9 percent on the fourth quarter of 2008 (Figure).

The economic development also weighed on the labor market. Although the number of employed persons increased by 52,000 in 2009, this was solely due to the massive use of short-time work (Box 2). At its height in May 2009, 1.69 million people were receiving a short-time work allowance.[2] Since short-time allowance only partially reimburses regular wages, gross wages and salaries increased by only 0.2 percent in 2009. As a result, private consumption followed a downward trend from the second quarter of 2009 until the end of the year. Property and entrepreneurial income, which had decreased by 5.2 percent in 2008, fell by 12.9 percent in 2009.

Inflation was minimal: While real GDP fell by 5.7 percent in 2009, nominal GDP decreased by four percent. In 2010, real GDP increased by 4.2 percent while nominal increased by 4.9 percent.

With the beginning of the first coronavirus-related lockdown on March 20, 2020, domestic demand in particular collapsed. Measures to stop the spread of the virus affected the personal service sector especially. Since many countries enacted similar measures simultaneously, foreign demand also fell and global supply chains were disrupted. This caused production to slump in the second quarter of 2020 and many companies put investment projects on hold.

To maintain employment, short-time work requirements, which played a much bigger role in the coronavirus pandemic than in the global financial crisis, were expanded. In April 2020, over six million people received a short-time work allowance, equal to over more than three million employment equivalents. Although a decline in employment could not be avoided, the number of employees in 2020 was still at the third-highest level in the long term since the foundation of the Federal Republic of Germany in 1949.

Gross wages per person employed declined by 0.2 percent in 2020 compared to the previous year; the gross wages and salaries in total decreased by 0.7 percent. However, this was offset by a number of income-supporting measures as well

1 Wissenschaftlicher Dienst des Deutscher Bundestags, *Verlauf der Finanzkrise, Entstehungsgründe, Verlauf und Gegenmaßnahmen* (2009) (in German; available online).

2 Calculated in employment equivalents, the peak was reached in April 2009 with 407,933 persons.

Continued Box 1

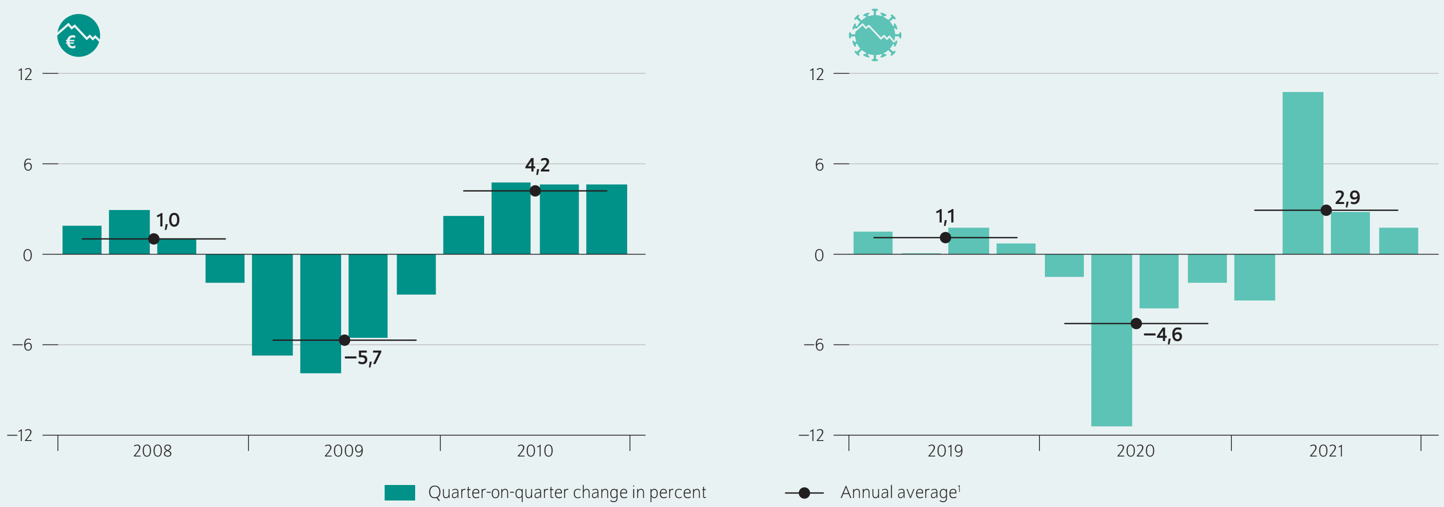
as companies receiving financial aid. Despite this, their profits declined sharply in 2020 by 10.2 percent; in 2021, in contrast, profits had already experienced a strong 15-percent increase again.

This growth indicates there are hardly any restrictions on private consumption on the income side. Private consumption is also likely to benefit from the temporary decrease of the VAT rates in the second half of 2020. However, opportunities for spending were limited during the lockdown: the real consumer spending of private households declined by 5.8 percent in 2020. As a result, households were able to save large amounts, albeit unwillingly. These savings could not be fully spent during the temporary phases of eased restrictions.

All in all, real GDP decreased by 4.6 percent in 2020 and by 2.9 percent in 2021, still significantly below the 2019 pre-crisis level. This is also the case for nominal GDP, which grew twice as fast in 2021 as real GDP. The renewed increase in VAT rates is partially driving price developments. Because many companies are operating below their production capabilities due to increasing supply bottlenecks, private household demand is above supply in many sections, partially due to the high amount of savings households have accumulated. Some companies thus have extra breathing room in pricing, which is likely to contribute to the dynamic profit trend. In the second half of 2021, energy prices increased significantly. As a result, the GDP deflator was three percent in 2021.

Figure

Real GDP in Germany
Seasonally and calendar-adjusted



1 Figures: Year-on-year percentage change in original values.

Source: Federal Statistical Office; author's own calculations.

Deep slumps in GDP characterize both crises.

Three factors are most decisive for the growth of the tax-to-GDP ratio. First, the nominal GDP is the reference variable; a six-percent increase in GDP would have caused the ratio to decline. Second, tax policy measures are reflected in tax revenue. However, these measures resulted in a revenue shortfall compared to 2021, which should have reduced the ratio. Third, there is the momentum resulting from the development of the tax base.

Tax revenue experiencing dynamic growth since mid-2021

The development of tax revenue is primarily determined by economic growth and legislative changes. However, other factors such as the tax system, tax collection, or the reactions of tax payers also play a role. In the following section, the main factors are briefly highlighted for selected high-revenue taxes.[5]

Unsurprising increases in pay-as-you-earn tax and value-added tax

The *pay-as-you-earn tax* generates the greatest amount of revenue in Germany. It is levied on the income of employees (summarized in macroeconomic terms as the gross wages and salaries) at the time of income generation. As a special form of income tax collection, the pay-as-you-earn tax is a progressive tax. Decisive for its development is thus not

5 The analysis of the selected tax revenues is based on revenue statistics.

gross wages in total but rather the development of wages per employee.

Possibilities for using short-time work were expanded during both the global financial crisis and the coronavirus pandemic. As short-time work does not completely compensate employees' income losses, gross wages and salaries grew little or declined. Simultaneously, these measures kept the number of employed persons high. The wage increases per employee (measured in macroeconomic terms) were correspondingly low or negative. In addition to tax cuts, this explains the decline in the pay-as-you-earn tax in 2009 and 2020 (Figure 2). Labor market development was still weak in 2010, but the decrease in the pay-as-you-earn tax is explained by tax policy interventions. In 2021, these interventions played a smaller role. Instead, a high employment rate and the significant reduction of short-time work in 2021 led to a 3.7 percent increase in the pay-as-you-earn tax (before the deduction of the child benefit). Thus, the increase can be explained by legislative changes and macroeconomic growth.

The *value-added tax* (VAT) generates the second-highest amount of revenue. In 2009, it increased by only 0.6 percent as a result of stagnating nominal private consumption. While consumer demand experienced a powerful increase in 2010, the VAT increased comparatively little, by only 1.7 percent. This may be due to the fact that the share of final consumption liable to the standard rate declined.

In 2020, measures to contain the spread of the coronavirus caused consumption to slump. However, the temporary reduction in VAT rates in the second half of 2020 likely caused the sharp decline in VAT revenue to a greater extent. The temporary reduction is also the main reason for the noticeable 14.4 percent increase in 2021. In addition, as a result of inflation, consumer spending—but not real consumption—increased significantly beginning in mid-2021.

Unexpectedly high gains for taxes on profits

While legislative changes or the underlying economic growth can explain the development of the pay-as-you-earn and value-added taxes, the situation is different for the taxes on profits. After declining by 10.2 percent in 2020, property and entrepreneurial income increased by 15 percent in 2021. The *assessed income tax* increased by only 13.7 percent, while the corporate tax revenue rose by 73.6 percent.[6] Thus, this shows that revenue from taxes on profits have decoupled from GDP.

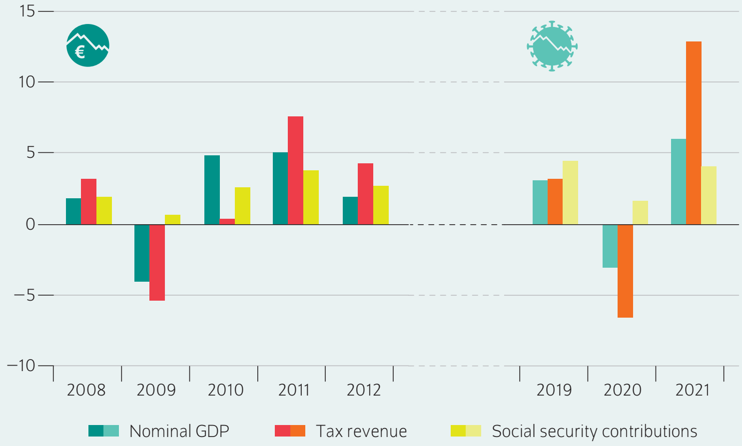
The assessed income tax and the corporate tax are types of taxes for which taxpayers make advance payments at the end of each quarter on their expected profit for the current year. These advance payments can be adjusted during a year if the actual development of profits deviates from what was originally expected. Advance payments for previous years may be adjusted as well. Thus, the development of advance payments can provide certain insight into the development of firms' and self-employed persons' expected profits. When the tax assessment is made by the tax office, in most cases one or two years after the end of the fiscal year, taxpayers receive either tax refunds or must pay additional taxes.

6 The local business tax, too, increased. However, only data up to the third quarter of 2021 is currently available. Following a weak first quarter in 2021, revenue experienced surprisingly dynamic growth. Altogether, the revenue in the first three quarters of 2021 is 28.3 percent higher than in 2020.

Figure 1

Development of nominal GDP, tax revenue, and social security contributions

Year-on-year change in percent



Source: Federal Statistical Office.

While GDP growth was comparable during both crises, tax revenue followed strikingly different trends.

Table

Selected public revenue/expenditure[1]

As a share of nominal GDP in percent

	Total public expenditure	of which: Taxes	Social security contributions	Total public expenditure	Public budget balance In percentage points (rounded)
2008	44.1	23.1	16.2	44.2	−0.1
2009	45.0	22.8	17.0	48.2	−3.2
2010	43.8	21.8	16.6	48.3	−4.6
2011	44.4	22.3	16.4	45.2	−0.9
2012	44.9	22.9	16.6	44.9	0.0
2019	46.5	23.8	17.2	45.0	1.5
2020	46.5	23.0	18.1	50.8	−4.3
2021	47.8	24.4	17.7	51.5	−3.7

1 According to the national accounts classifications.

Sources: Federal Statistical Office; author's own calculations.

Box 2

Economic policy measures during the global financial crisis and the coronavirus pandemic

When trust in the financial markets collapsed in September 2008 following the bankruptcy of the Lehman Brothers, German policymakers underestimated the possible impact on the real economy for a long time. The economic policy measures taken initially, such as establishing the financial market stabilization fund, were primarily aimed towards maintaining the liquidity in the banking sector.

It was not until November 5, 2008, that policymakers in Germany responded to the effects of the crisis on the real economy with an economic stimulus package of 11.8 billion euros, or around half a percent of nominal GDP. However, it became apparent that this package was insufficient. On February 13, 2009, a second, 50-billion-euro stimulus package, equaling two percent of nominal GDP, was passed. It included another significant funding increase for public investment, further tax and levy cuts, and labor market policy measures. The regulations governing the use of short-time work were improved. In addition, further aid such as the *Abwrackprämie* was adopted to boost consumption.

Table

Fiscal policy measures during the global financial crisis and the coronavirus pandemic[1]

Relief (+) and burdens (-) on budget in billions of euros compared to the previous year

	2008	2009	2010	…	2020	2021
Tax revenue[2]	−2.2	−5.8	−5.0		−29.0	−8.4
of which:						
Private households	4.3	−8.3	−3.8		−23.6	7.5
Companies	−6.5	−2.9	−3.9		−5.5	−6.6
Social security contributions		0.0	−8.8		−8.0	1.8
Other revenue	1.0	0.0	0.0		0.0	7.8
Total revenue	**−6.1**	**−11.3**	**−16.5**		**−37.0**	**10.5**
Government expenditure[3]	−11.2	−24.2	−5.5		−100.2	−76.6
Social security expenditure	−1.2	−4.5	−2.3		−16.4	−2.8
Total expenditure	**−12.4**	**−28.7**	**−7.8**		**−116.6**	**−79.4**
of which:						
Transfers to private households[4]	−6.0	−0.9	0.0		−41.0	−13.9
Aid to firms[4]	−3.5	−9.3	−5.0		−48.1	−29.4
Total		−40.0	−24.3		−153.6	−68.9
As a share of nominal GDP	−0.7	−1.4	−0.8		−4.6	−2.2
For information only:						
of which: investments	−2.2	−5.1	−5.0		−9.4	−7.8

1 Sum of all fiscal stimuli, excluding macroeconomic repercussions.
2 The effects of the changes to the tax law relate to the fiscal year.
3 Including fiscal expenditure such as the child benefit, child bonus, or commuter allowance.
4 These are not only traditional transfers or financial aid. Rather, all measures that directly affect income are included.

Sources: Projektgruppe Gemeinschaftsdiagnose, autumn of the respective years; author's own calculations and estimations.

However, many measures could no longer have an effect in 2009; they could only have an initial effect in 2010. However, this effect delay did not only apply to investment projects with a longer planning period. For example, employees do not benefit from the increase in the commuter allowance until one year later when filing their income tax return.

The economic stimulus packages adopted relieved private households and companies by 40 billion euros or 1.4 percent of GDP in 2009 (Table). In 2010, fiscal stimulus was 24.3 billion euros or 0.8 percent of GDP. Private household incomes benefited from the adopted measures in 2009 and 2010 by about a quarter of a percent of nominal GDP, while businesses benefited by about half a percent in each year.

When economic life slowed to a halt after the first coronavirus pandemic-related lockdown began on March 20, 2020, policymakers reacted swiftly. Already by March 30, emergency aid had been provided—April 9, 2020, already 7.3 billion euros had been granted—and it was clear that further measures would follow. One larger-scale measure involved increasing the credit lines of national development banks. On June 3, 2020, a further 130 billion euros were provided, with a significant part directed at supporting businesses, small businesses, and the self-employed. Further aid was launched in several subsequent stages.

On the income side, private households and companies were unburdened by of 37 billion euros in 2020, 29 billion of which was in tax revenue. The largest revenue shortfall was due to the temporary VAT cut in the second half of 2020. Relief for companies, such as improving depreciation options or expanding loss carryback options, also played an important role. In addition to direct interim payments to companies and transfer payments such as the child bonus, the short-time work scheme was extended again. In addition, the government prevented an increase in the social security contributions and state consumption experienced strong growth.

The measures provided relief of 153.6 billion euros, or 4.6 percent of GDP, to the German economy in 2020. Private household incomes, as a share of nominal GDP, was two percent in 2020 and, following another increase in VAT rates, 0.2 percent in 2021. For companies, the direct stimulus from the economic policy measures as a share of GDP was 1.6 percent in 2020. In 2021, additional measures in the amount of 1.1 percent of GDP were added.

Figure 2

Growth of quantitatively important taxes during the global financial crisis and the coronavirus pandemic
Year-on-year change in percent

Notes: Assessed income tax and corporate tax before deduction of the home owner allowance and investment allowance. Pay-as-you-earn tax before deduction of the child benefit. The respective pre-crisis years are 2008 and 2019.

Sources: Federal Ministry of Finance; author's own calculations.

The corporate tax experienced surprising growth in 2021.

When the financial crisis spilled over into the real economy in autumn 2008, there were no adjustments to advance income tax payments paid by, for example, partnerships and the self-employed. The situation was different for corporate tax: In the fourth quarter of 2008, the advance payments for the current year and also the adjusted payments for the previous year declined significantly. In 2009, the advance payments for the corporate tax were again significantly below the pre-crisis level. In this year, the advance payments for the assessed income tax also declined, but not as sharply, and in 2010, they continued to decline in some months. As there were neither particularly high levels of additional payments nor refunds in the subsequent years, companies seem to have assessed their profit situation during the global financial crisis as "accurately poor."

Likewise, companies reacted quickly and adjusted their advance payments in 2020. The decline in corporate tax was again significantly higher than the decrease in the assessed income tax. Compared to the financial crisis, advance payments for previous years were adjusted to a much greater extent, likely due to the expansion of the loss carryback and carryforward options. From the second quarter of 2021, the situation changed fundamentally. The advance payments for income tax for 2021, and beginning in the second half of 2021, the adjusted advance payments for 2020, increased, partly significantly. Advance payments for the corporate tax for 2022 and 2021 picked up very strongly from the second quarter of 2021 onward.

This development suggests that companies have revised their 2021 profit expectations upward.[7] The later correction of advance payments for the previous year reflects the use of the existing options for loss carryback on the one hand, but on the other indicates that the profit expectations were scaled back too far and that economic growth has turned out to be better than companies had expected.

Conclusion: Fiscal policy measures cushioned distortions during the coronavirus pandemic more effectively than during the global financial crisis

In March 2022, two years after the first coronavirus pandemic-related lockdown began in Germany, an initial, preliminary analysis can be made of the surprisingly dynamic development of tax revenue in 2021. The differences in tax revenue growth during the two crises is partially due to their different causes: The global financial crisis was the result of many years of undesirable trends in the financial sector, which took a considerable amount of time to overcome.

The coronavirus pandemic, on the other hand, hit the economy as sudden, exogenous shock. As the cause (the pandemic) subsides, economic growth can immediately resume; this is confirmed by the economic recovery phases that begin as soon as the pandemic containment measures are relaxed. Although supply chain difficulties are now creating real economic problems, much suggests that they will dissipate relatively quickly once containment measures only play a minor role, provided the war in Ukraine does not escalate.

Different economic policy reactions also contributed to the divergent development of tax revenue during both crises. During the coronavirus pandemic, policymakers were more successful in stabilizing private household and corporate income, which was likely underestimated by business owners and the self-employed. This prompted many to adjust their tax payments in 2021 for the assessed income tax and corporate tax. Whereas aid measures were taken relatively late in the financial crisis and had to be reinforced quickly, the response in 2020 was swift and substantial. Although this meant not all funds were used in a targeted manner, the economic slump was cushioned massively.

Currently, however, the government is benefiting from rising inflation, which is reflected in nominal profit income and private household consumption expenditure. This will also support tax revenue in 2022. For this reason, too, the current considerations to provide energy price-related relief to private households are correct, especially as inflation is accelerating significantly as a result of the war in Ukraine. The retroactive increase in the personal exemption will also mitigate the effects of cold progression, which will be inadequately offset by shifts in income tax benchmarks in 2022.

7 To some extent, other reasons may also play a role in the adjustments, such as the interest rate on tax credits or, in the case of large corporations, the international allocation of tax liability.

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