The Quality of Economic Forecasts in Times of Extraordinary Crises
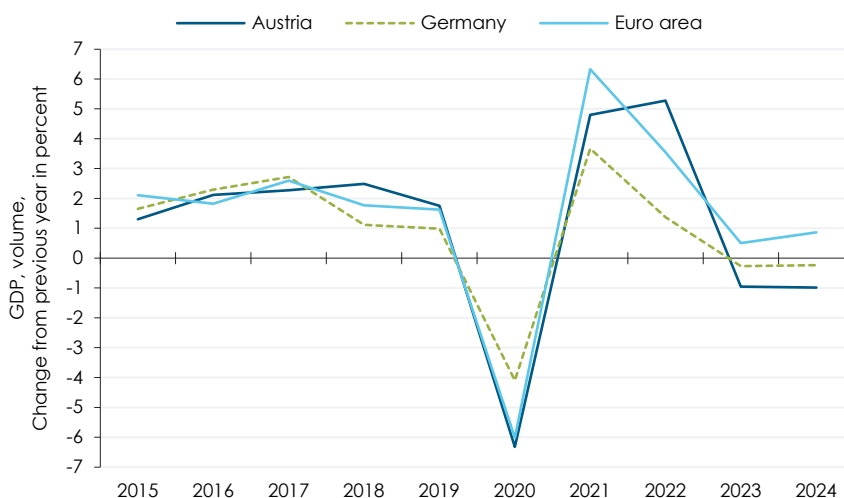
Marcus Scheiblecker

The Quality of Economic Forecasts in Times of Extraordinary Crises

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- The COVID-19 pandemic caused an international economic slump. For Austria, national and international institutions had to revise their forecasts for growth of real GDP downwards by up to 8¾ percentage points.

- The subsequent recovery was interrupted by Russia's invasion of Ukraine. Due to the sharp rise in prices triggered by the war, the forecasts had to be adjusted once again.

- The recession observed since the turn of the year 2022-23 has now lasted for an unusually long time. Signs of improvement have faded several times, necessitating further significant revisions.

- Measured by the mean absolute forecast error for Austrian real GDP growth in 2021 to 2024, WIFO performed best. The error was roughly in line with the average of the forecasts for Germany. However, the forecasts of international institutes for the euro area were better.

Actual economic growth

Economic growth has been subject to exceptionally high fluctuations in recent years due to the COVID-19 pandemic and the war in Ukraine (source: Statistics Austria, Eurostat).

"The COVID-19 pandemic and the war in Ukraine have caused sharp and unpredictable fluctuations in GDP. WIFO has also had to revise its forecasts significantly several times. However, the average forecast error was lower than that of other national and international institutes."

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The unpredictable onset of the COVID-19 pandemic led to significant downward revisions of economic forecasts for 2020 worldwide. During the pandemic, the health policy measures announced at short notice hampered the forecast ability. The following recovery was interrupted by Russia's invasion of the Ukraine, which led to sharp price increases in the EU and the implementation of economic sanctions. At the turn of 2022-23, Austria entered its longest recession since the foundation of the Second Republic. During this period, signs of improvement appeared several times, which turned out to be short-lived. This paper examines the extent of revisions to forecasts for Austrian GDP by national (WIFO, IHS, OeNB) and international forecasting institutions (European Commission, OECD, and IMF) for the period from 2020 to 2024. For comparison purposes, it examines the accuracy of forecasts for German economic growth by domestic forecasting institutes and international organisations, as well as the accuracy of forecasts for real GDP in the euro area by international organisations.

> "Prediction is very difficult, especially if it's about the future." Attributed to Niels Bohr (Nobel Prize in Physics 1922).

In recent years, economic activity both internationally and in Austria has been affected by multiple crises that originated outside the economic sphere. At the turn of 2019-20, the SARS-CoV-2 virus spread rapidly around the world. The extent of the health threat was unclear at first. Containment measures severely restricted personal contact and public life, causing economic activity to collapse worldwide.

Lockdowns, restrictions and reopening measures were often decided and announced only days before they came into force. The economic forecasts for 2020, compiled first-time two years earlier, had to be revised downwards drastically. The forecasts made during the pandemic were also marked by uncertainty about the duration of the crisis and the effectiveness of the measures. Even if there had been certainty on this, it would have remained unclear how quickly the economy would recover once the pandemic had been overcome.
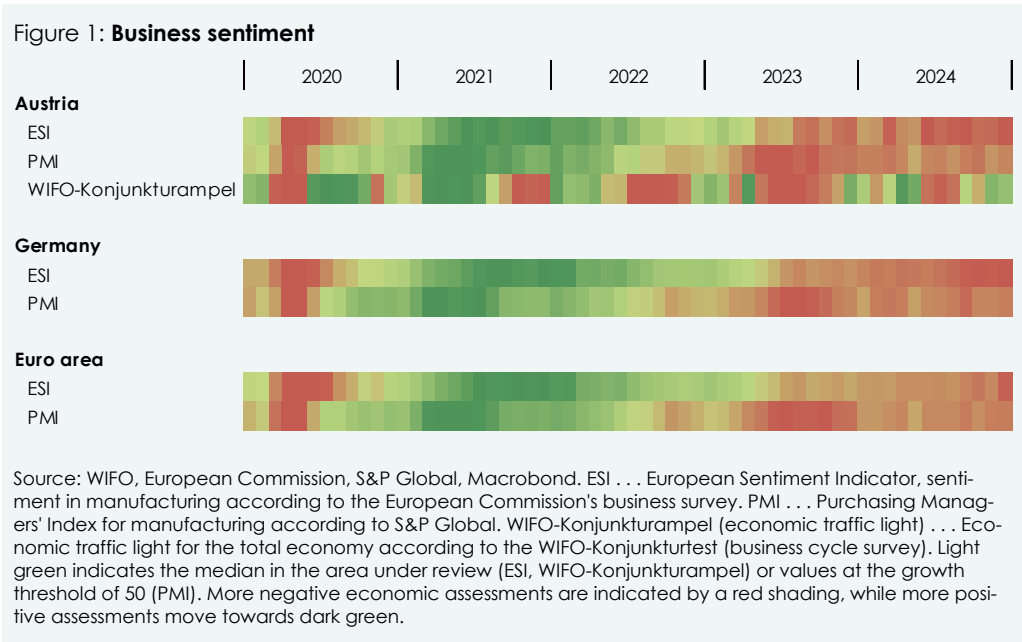
The recovery in 2021 and 2022 was interrupted by a further shock, this time a geopolitical one. Russia's invasion of Ukraine in February 2022 was followed by a sharp rise in energy prices, which drove inflation rates to historic highs internationally. In this case, too, fiscal policy responded to the crisis with a variety of short-term measures. Neither the rise in inflation nor the measures taken were foreseeable in the economic forecasts made before, which meant that further substantial revisions were necessary.

The subsequent economic downturn in the euro area hit countries with a large industrial share, like Germany and Austria, particularly hard. They experienced their longest recession since the Second World War. Hopes for an economic recovery emerged several times in business surveys, but quickly faded again (Figure 1). For example, both the European Commission's Economic Sentiment Indicator and the S&P Global Purchasing Managers' Index had pointed to an improvement at the turn of 2023-24, but fell again in 2024. Accordingly, growth forecasts had to be revised back downwards.

This article provides an overview of the revisions to economic forecasts for the Austrian economy during the recent crises and compares the adjustments made by national and international institutions between 2020

and 2024. As the crises described were international in nature, the forecast errors of foreign institutions for Germany and the euro area are also examined for comparison purposes.

Figure 1: **Business sentiment**

Source: WIFO, European Commission, S&P Global, Macrobond. ESI . . . European Sentiment Indicator, sentiment in manufacturing according to the European Commission's business survey. PMI . . . Purchasing Managers' Index for manufacturing according to S&P Global. WIFO-Konjunkturampel (economic traffic light) . . . Economic traffic light for the total economy according to the WIFO-Konjunkturtest (business cycle survey). Light green indicates the median in the area under review (ESI, WIFO-Konjunkturampel) or values at the growth threshold of 50 (PMI). More negative economic assessments are indicated by a red shading, while more positive assessments move towards dark green.

1. The target function

The main objective of forecasts is to correctly predict the future value of a reference variable in a timely manner. Various aggregates of different relevance can be used as macroeconomic reference variables. For the sake of brevity, we will take a closer look at the most widely used indicator, namely economic growth, i.e., the percentage change in price-adjusted GDP[1]. When analysing, the chosen observation time for the reference variable that is later realised is also important. This is because economic output data is subject to ongoing revisions by statistical offices, which also affect previous years. The values are only considered final after they have been published three times[2]. In line with standard practice, here, the comprehensive initial publication of the official statistics in the autumn of the following year is used as the reference value for target achievement. However, it should be noted that at this point in time, the statistical offices do not yet have all the data required to calculate GDP[3].

With regard to the timing of forecast revisions, it should be noted that some forecasting institutes only publish their results twice a year. If significant changes in the macroeconomic environment occur in the meantime, their revisions will lag behind. On the other hand, they benefit if some economic conditions become clearer over time. Depending on when a shock occurs, semi-annual forecasts can either be an advantage or a disadvantage in terms of the average forecast error. Figure 2 provides an overview of the timing of revisions for Austria, Germany and the euro area and the respective quarterly comparison windows. While the IMF could benefit from its late forecast, as it has more recent economic data at its disposal, the European Commission and the OECD could be at a disadvantage due to their mostly early deadlines. However, the following analysis does not take into account the possible effects of this timing.

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[1] For budget planning, however, the focus is on nominal GDP, nominal consumption (as the basis for VAT revenue) and nominal wages (as the basis for income tax revenue).
[2] However, revisions may still be made in the course of general revisions or methodological changes.
[3] Apart from the provisional and incomplete annual figures resulting from the Quarterly National Accounts, the first comprehensive annual accounts for the EU countries are published in the autumn of the following year. At this point in time, no data are yet available for important economic sectors regarding the

intermediate inputs used in the production process; only their output is known. It is not until two years later that the structural business statistics become available, which allows a more accurate calculation of value added and thus of GDP. Until then, official statistics have to rely on assumptions regarding the share of value added in production. It is therefore possible that the models used for the forecasts will predict the third publication more accurately, as they could be more able to reflect economic relationships than simple assumptions.

Figure 2: **Usual publication dates of forecasts by national and international institutions**
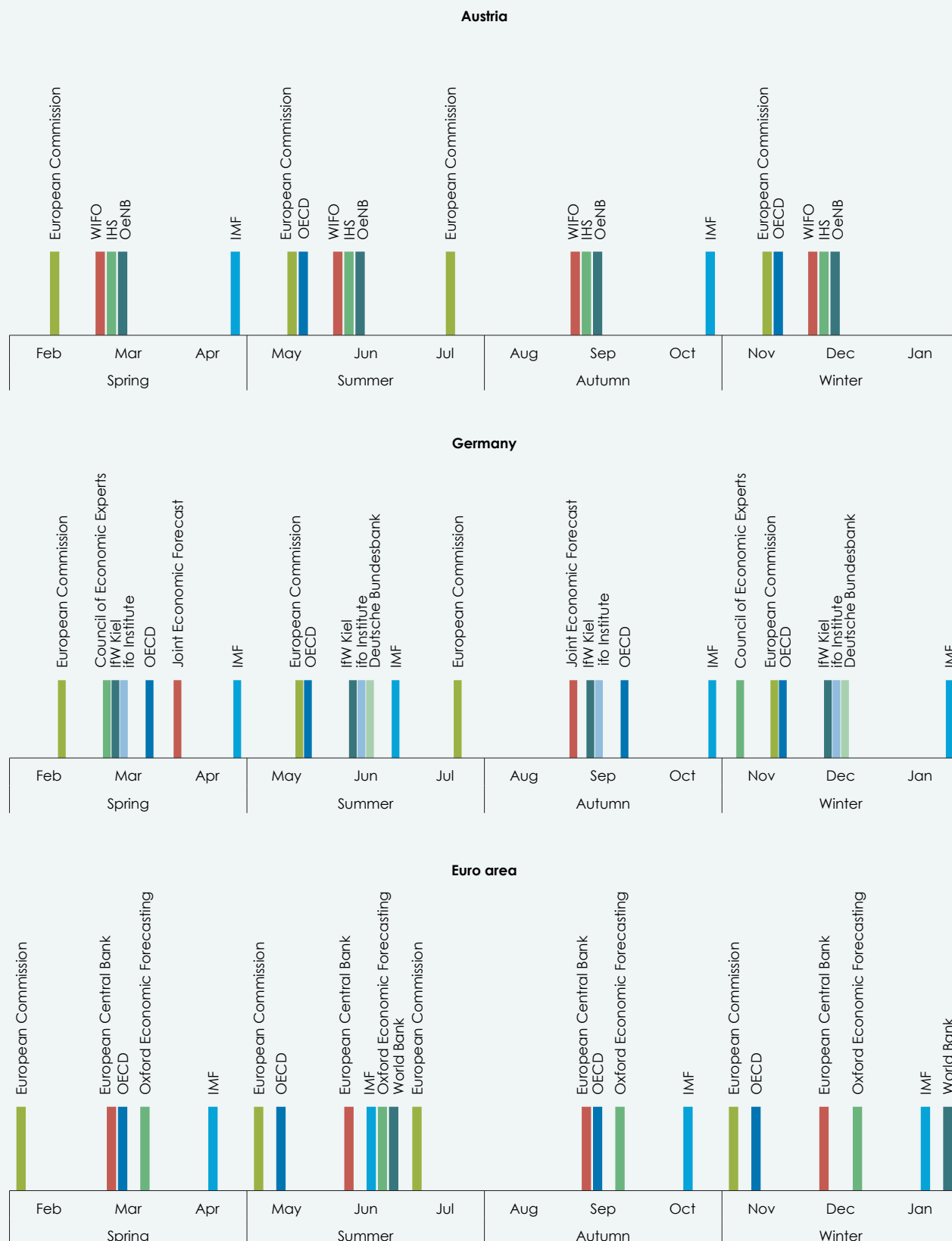
Source: WIFO. The OeNB started to publish forecasts four times a year in 2024; until then, forecasts were only published in June and December. The European Commission's July interim forecast is included in the autumn forecasts. In the case of Austria, the IMF's October forecast is included in the winter forecasts; the OECD and IMF do not publish figures for Austria in their interim forecasts.

2. Reasons for the revisions

Figure 3 shows the revisions to the forecasts for economic growth in Austria for the years 2020 to 2024. The first forecast for 2020 was published in December 2018, i.e., two years earlier ($t-2$). This was followed by recalculations on a quarterly and half-yearly basis. The forecast values remained relatively unchanged until the forecast date in December 2019 ($t-1$). It was not until March 2020 ($t0$) that the forecast was revised significantly downwards due to the emerging COVID-19 pandemic. Instead of economic growth of around 1½ percent, a contraction of over 2 percent was subsequently assumed. With the spread of the pandemic, the forecasting institutes felt compelled to revise the expected decline in GDP again to around 5½ to 7½ percent in June 2020. In September and December 2020, hardly any adjustments were necessary, with forecasts fluctuating uniformly between –6¾ and –8 percent. The actual figure for 2020 (–6.8 percent) published first time by Statistics Austria in its annual national accounts in autumn 2021 was within this range.

A forecast for 2021 was first-time made in December 2019 ($t-2$). At that time, the pandemic was not yet foreseeable, which is why growth of around 1½ percent was predicted for 2021. With the outbreak of the pandemic in March 2020 ($t-1$) and the first lowering of the forecasts for 2020, the crisis was expected to be short-lived, which is why an upward revision was made for 2021. The assumption that the pandemic would be overcome quickly remained virtually unchanged in the following two forecast dates. It was not until December 2020 ($t-1$) and March 2021 ($t0$) that some institutes anticipated a weaker recovery in 2021 due to repeated lockdowns, but they revised this assessment again in the course of the year. Nevertheless, the extent of the recovery (+4.7 percent, according to the September 2022 quarterly national accounts) was underestimated by most forecasting institutes.

For 2022, the institutes expected a further recovery and growth of real GDP of around 4½ percent. In the first quarter of 2022 ($t0$), which included Russia's invasion of Ukraine, the institutes initially lowered their forecasts but returned to their original assessments as positive economic data came in over the course of the year. Even the rise in energy prices, which accelerated since the start of the war and peaked in September 2022, did not lead to any adjustments by the end of the year. The figure for 2022 published by Statistics Austria in autumn 2023 was not far from the figures forecast in the course of 2021 ($t-1$) and expected again at the end of the forecast interval.

The shock caused by the rise in energy prices and the subsequent sharp increase in consumer prices did not dampen economic growth until 2023. While the institutes had still expected robust growth of between 2 and 2½ percent in December 2021 ($t-2$), they were forced to gradually lower their expectations for 2023 from March 2022 ($t-1$) onwards due to the sharp rise in prices. WIFO lowered its GDP forecast more quickly than other institutes, reaching –0.8 percent in September 2023 ($t0$), the figure provisionally published by Statistics Austria in autumn 2024.

Looking ahead to 2024, the extent of the revisions may come as a surprise, given that no additional exogenous shocks occurred. The pandemic and the subsequent recovery phase were over, and inflation was on the decline from the high levels seen at the beginning of the year. However, the unusually long duration of the industrial recession and sluggish consumer demand were new factors. The uncertainty of the forecasting institutes in dealing with these phenomena is reflected in their hesitant and only gradual downward revisions. Between December 2022 ($t-2$) and December 2024 ($t0$), they had to continuously lower their GDP forecasts for 2024 by around 1¾ to 2¾ percentage points. Business surveys in the euro area, Germany and Austria painted an unclear picture of the economy, with temporarily more optimistic trends emerging. However, sentiment indicators subsequently declined repeatedly thereafter (Figure 1). It was not until the end of the forecast cycle that the forecasts for Austria approached the later realised value[4].

In times of crisis, official statistics are also under greater pressure to revise results retrospectively. This can be observed internationally, as Shrestha and Marini (2013) demonstrated for the G20 countries during the financial market and economic crisis of 2008-09[5].

> **Instead of the forecasted economic growth of around 1½ percent, the Austrian economy contracted by almost 7 percent in the crisis year 2020.**

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[4] This was calculated on the basis of the four published quarters from the Quarterly National Accounts of 6 June 2025. The actual annual accounts for 2024 will not be published by Statistics Austria until autumn 2025.

[5] Shrestha, M. L., & Marini, M. (2013). Quarterly GDP Revisions in G-20 Countries: Evidence from the 2008 Financial Crisis. *IMF Working Paper,* (2013/060).

Figure 3: **Time line of real GDP forecasts**

Legend: WIFO — IHS — OeNB — European Commission — OECD — IMF — Actual September t + 1[1]

Source: WIFO. – [1] The figure for 2024 reflects the actual outcome as calculated in June 2025 based on the quarterly national accounts.

3. Comparison of forecast accuracy

To facilitate comparison of the GDP forecast deviations of the individual institutes from the annual figure ultimately published, Figure 4 shows all forecast errors[6]. The forecast error is defined as the deviation in percentage points of the forecast value at time $t − s, q$ (i.e., in the respective quarter) from the annual value $t + 1$ at the time of the first publication by Statistics Austria in the third quarter of the following year. By using the absolute value, no distinction is made between positive and negative deviations, i.e., overestimates and underestimates of GDP

development, in terms of the extent of the revision.

The forecast errors in the period from December 2019 ($t − 2$ for 2021) to December 2024 ($t0$ for 2024) are shown as points in Figure 4. The top point shows the maximum forecast error, and the bottom point the minimum forecast error in the period under review. If the latter is on the x-axis, the GDP growth published later was correctly predicted at some point during the forecast period. The further the lower points are away from the x-axis, the higher the smallest error

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[6] Schuster, P. (2024). *Evaluation of economic forecasts for Austria. An update for the years 2005 to 2023.*

Austrian Fiscal Advisory Council) covers a longer period, but only refers to the Austrian forecast.

ever achieved. The horizontal lines represent the Mean Absolute Error (MAE) for 2021-2024 and the Root Mean Squared Error (RMSE) for 2021-2024. The RMSE gives greater weight to larger deviations and thus "penalizes" them more heavily than the MAE[7].

Figure 4: **Absolute forecast errors in GDP growth forecasts for Austria**
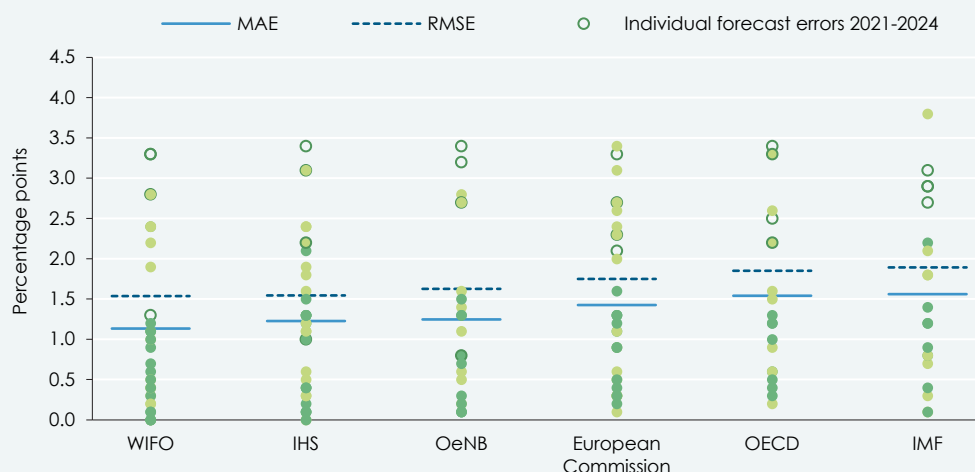
Source: WIFO. MAE . . . Mean absolute forecast error 2021-2024. RMSE . . . Root mean squared forecast error 2021-2024. The dots indicate the forecast errors of the individual forecasts: open circles represent forecasts made in December two years earlier ($t-2$), filled light green dots represent forecasts made in the previous year ($t-1$), and filled green dots represent forecasts made in the current year ($t0$).

For the COVID-19 crisis year 2020, the maximum forecast error across all institutes was around 8½ percentage points (Figure 3). In addition, there was a clear bimodal distribution of revisions. Once the effects of the pandemic were recognised, rapid downward revisions brought the forecasts fairly quickly into line with the target values published later.

For 2021, the forecast errors were significantly lower, as economic growth set in again[8]. The largest errors resulted from underestimating growth, as there were no signs of a slump in December 2019 and therefore no recovery in economic output in 2021. The smallest maximum forecast error for 2021 was 3.1 percentage points (IHS and IMF).

The forecast for 2022 revealed significant differences in the accuracy of the individual institutes' forecasts for the first time (Figure 3). The OeNB's forecast error was only 0.8 percentage points, while the other two national institutes were off by a maximum of 1.2 (IHS) and 1.3 percentage points (WIFO). By contrast, the forecast errors of the international institutions were around twice as high (European Commission: 2.3 percentage points, OECD: 2.5 percentage points, IMF: 2.7 percentage points). As already explained in Chapter 1, the European Commission and

the OECD may be at a disadvantage due to their early forecast date, while the IMF may have benefitted from its late date.

For 2023, the maximum forecast errors of all institutes were again significantly higher, with the three national institutes showing similar values at around 3½ percentage points. The maximum errors of the European Commission and the OECD were somewhat lower. At just under 4 percentage points, the IMF not only made the largest forecast error, but also remained around 1 percentage point above the target in its last forecast for 2023.

Looking ahead to 2024, the range of forecast errors is relatively narrow. The IMF again made the largest maximum error at 2.9 percentage points, followed by WIFO (2.8 percentage points), the OeNB (2.7 percentage points), the European Commission and the OECD (both 2.6 percentage points). The lowest maximum forecast error was recorded by the IHS at 2.4 percentage points. However, it should be noted here that the annual value based on the quarterly national accounts from the beginning of June 2025 was used to calculate the forecast error, as the annual result for 2024 will not be published until September 2025.

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[7] The literature contains other interesting error measures. However, as only the period from 2021 onwards is examined here, it is difficult to make statements about their statistical significance.

[8] When there is uncertainty about the economic situation, forecasting positive growth in line with the trend growth minimises the forecast error.

As the maximum forecast error for 2020 was particularly high due to the unexpected outbreak of the COVID-19 pandemic and would dominate the analysis, the following sections focus only on the years 2021 to 2024. Figure 4 and Table 1 summarise the results for this period. At 3.3 percentage points,

WIFO's maximum absolute forecast error was lowest in the period 2021 to 2024. The IHS, the OeNB, the European Commission and the OECD were only slightly higher at 3.4 percentage points, while the IMF was significantly above with 3.8 percentage points.

Table 1: **Forecasts for volume GDP growth – forecast errors 2021-2024 at a glance**

	Number of forecasts in the period 2021-2024	Maximum forecast error	Mean absolute forecast error (MAE)	Root mean squared forecast error (RMSE)
	n		Percentage points	
Austria				
WIFO	35	**3.3**	**1.1**	**1.5**
IHS	35	3.4	1.2	**1.5**
OeNB	22	3.4	1.2	1.6
European Commission	33	3.4	1.4	1.7
OECD	20	3.4	1.5	1.9
IMF	20	3.8	1.6	1.9
Germany				
Joint economic forecast	20	3.4	1.4	1.7
Council of Economic Experts	16	3.9	**1.0**	1.5
IfW Kiel	34	3.8	1.3	1.8
ifo Institute	36	4.0	1.2	1.7
Deutsche Bundesbank	24	3.3	1.1	1.5
European Commission	32	3.3	1.2	1.6
OECD	33	3.2	1.1	1.5
IMF	36	**3.0**	1.1	**1.4**
Euro area				
European Commission	35	4.1	0.9	1.3
European Central Bank	36	4.0	0.8	1.3
OECD	34	4.1	0.8	1.2
IMF	36	**3.9**	**0.6**	**0.9**
Oxford Economic Forecasting	36	4.1	0.9	1.2
World Bank	20	4.0	0.8	1.2

Source: WIFO. The minimum values are highlighted in bold.

In terms of the average absolute forecast error (MAE), WIFO also performed best in the period 2021-2024, at 1.1 percentage points, just ahead of the IHS and the OeNB (both 1.2 percentage points). The average error for domestic GDP forecasts by international forecasting institutes was around 1½ percentage points.

The root mean squared error (RMSE), which is more strongly influenced by large forecast errors than MAE, is shown in Figure 4 as a blue dashed line. Here, WIFO and IHS each posted an error of 1.5 percentage points, marginally outperforming the OeNB with 1.6 percentage points. The European Commission recorded a value of 1.7 percentage points, while the OECD and the IMF each recorded a value of 1.9 percentage points.

4. Incorrect forecasts of the international economy as a possible cause of forecast errors for domestic development

The following section examines whether the sometimes considerable inaccuracies in GDP forecasts in periods of crisis were due to misjudgements by the institutes regarding the domestic environment or economic developments abroad. To this end, we could look at the extent to which national institutes revised their assumptions about the development of international conditions. However, a poor quality of an institute's forecasts can be reflected in both its national and

international forecasts, without this necessarily implying a causal link.

The maximum absolute forecast error for Germany in the period 2021 to 2024 was in some cases even higher than the error made by Austrian institutes in their forecasts for Austria. In the case of the ifo Institute, it was 4.0 percentage points, followed by the German Council of Economic Experts (3.9 percentage points) and the IfW Kiel

The average forecast errors of German institutes for German GDP in the period 2021-2024 were higher than those made by Austrian institutes in their forecasts for domestic economic development.

(3.8 percentage points). Maximum deviations comparable to the forecasts for Austria were achieved by the Joint Economic Forecast (3.4 percentage points), the Deutsche Bundesbank and the European Commission (3.3 percentage points each). The OECD (3.2 percentage points) and the IMF (3.0 percentage points) had the lowest maximum forecast errors. This means that the international organisations predicted Germany's GDP growth more accurately than the German institutes. For Austria, the opposite was true: here, the local institutes were more accurate. However, it should be noted again that the European Commission and the OECD may have been at a disadvantage due to their early forecast date, while the IMF was able to draw on more recent economic data for its late forecast and should have benefitted from this.

Figure 5: **Absolute forecast errors in GDP growth forecasts for Germany**
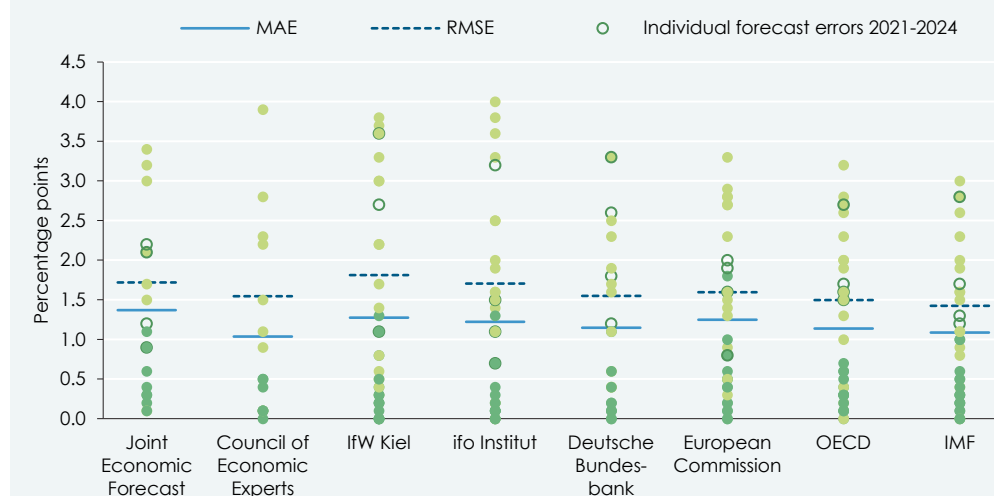
Source: WIFO. MAE . . . Mean absolute forecast error 2021-2024. RMSE . . . Root mean squared forecast error 2021-2024. The dots indicate the forecast errors of the individual forecasts: open circles represent forecasts made in December two years earlier ($t-2$), filled light green dots represent forecasts made in the previous year ($t-1$), and filled green dots represent forecasts made in the current year ($t0$).

Although the German Council of Economic Experts had the second-highest maximum forecast error (3.9 percentage points in March 2022 for 2023), it achieved the lowest average deviation (1.0 percentage point) over the entire 2021-2024 period. This suggests either that new information was incorporated into its forecasts quickly and rigorously, or that the fact that forecasts are only made every six months proved to be an advantage in this case. The OECD, the IMF and the Deutsche Bundesbank also achieved good results, with 1.1 percentage points each (Ø 2021-2024). They are followed by the ifo Institute and the European Commission, both with 1.2 percentage points. Bringing up the rear are the IfW Kiel (1.3 percentage points) and the Joint Economic Forecast (1.4 percentage points). Apart from the latter two institutes, the MAE in the forecasts for Germany are comparable to those of the Austrian forecasting institutes.

In terms of the root mean squared error (RMSE), which takes greater deviations more into account, the IMF achieved the lowest value at 1.4 percentage points. It is followed by the German Council of Economic Experts, the Deutsche Bundesbank and the OECD, each with values of 1.5 percentage points. The ifo Institute, the European Commission and the Joint Economic Forecast recorded values of 1.6 and 1.7 percentage points respectively. The IfW Kiel achieved the least favourable value at 1.8 percentage points.

Finally, the forecasts of international organisations for the euro area will also be examined for their quality. Significant revisions could once again indicate that the errors made by domestic institutions in their economic forecasts for Austria were at least partly attributable to the difficult-to-predict environment. Figure 6 and Table 1 show the maximum and average absolute forecast errors (MAE and RMSE) of the European Commission, the European Central Bank (ECB), the OECD, the IMF, Oxford Economics and the World Bank made in their euro area forecasts.

Figure 6: **Absolute forecast errors in GDP growth forecasts for the euro area**
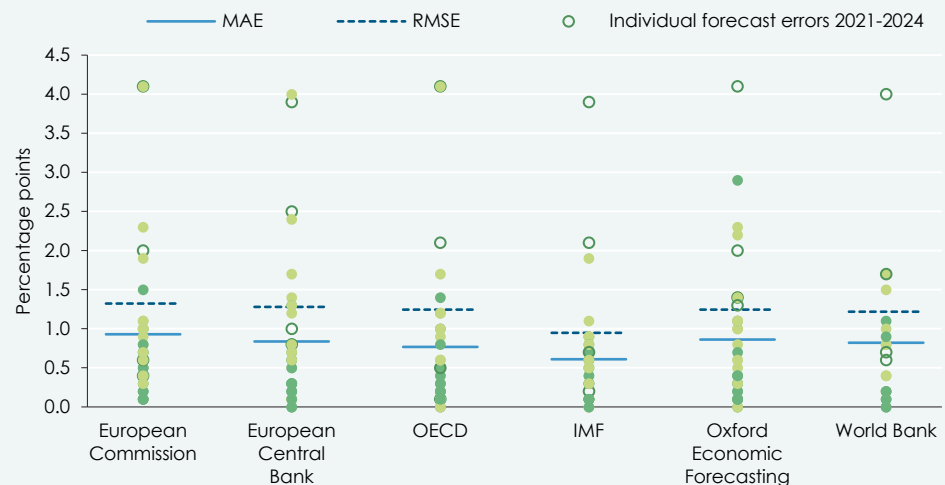
Source: WIFO. MAE . . . Mean absolute forecast error 2021-2024. RMSE . . . Root mean squared forecast error 2021-2024. The dots indicate the forecast errors of the individual forecasts: open circles represent forecasts made in December two years earlier ($t-2$), filled light green dots represent forecasts made in the previous year ($t-1$), and filled green dots represent forecasts made in the current year ($t0$).

The maximum forecast errors of the international organisations for the euro area significantly exceed those calculated for Austria and Germany, amounting to around 4 percentage points across the board. However, in most cases, this high error was attributable to the same forecast date (December 2019 forecast for 2021; Figure 5). Thereafter, the maximum forecast errors were 2.9 percentage points in the case of Oxford Economics and up to 2.5 percentage points for the other institutions. Thus, the average absolute errors for 2021-2024 were much smaller than those for Germany and Austria. The highest average values were observed for the European Commission and Oxford Economics at 0.9 percentage points, while the IMF recorded the lowest at 0.6 percentage points. The root mean squared error (RMSE) is also lower than for Germany and Austria, ranging from a maximum of 1.3 percentage points (European Commission, ECB) to a minimum of 0.9 percentage points (IMF).

5. Conclusions

The uncertainties surrounding the COVID-19 pandemic and the war in Ukraine have made it difficult to reliably forecast GDP development in recent years. This has led to some drastic forecast revisions across all the institutions considered.

For Austria, a comparison of the GDP forecasts of WIFO, IHS, OeNB and international institutions (European Commission, OECD and IMF) showed similarly high maximum deviations. Only the IMF was significantly higher. The average absolute forecast errors for 2021-2024 ranged from 1.1 (WIFO) to 1.6 percentage points (IMF). In terms of the root mean squared deviation, WIFO and IHS achieved the most favourable values at 1.5 percentage points, while the OECD and IMF recorded the least favourable values at 1.9 percentage points.

Measured in terms of maximum forecast errors and RMSE, the forecasts for German GDP show a similar range to those for Austria. The average maximum errors are also comparable in the case of national institutes, but significantly lower in the case of international organisations. Thus, the pronounced forecast errors in the crisis years were not specific to Austria and its forecasting institutes. International institutions also misjudged not only domestic economic developments, but also those outside Austria, albeit to a lesser extent.

The smallest absolute errors in GDP forecasts were made by international organisations in their forecasts for the euro area. Their average absolute deviation and RMSE were also lower than in the forecasts for Germany and Austria. One possible explanation for this lies in the years 2023 and 2024, when Germany and Austria were in a prolonged recession due to their large industrial shares, while GDP in the euro area was already growing again. While similar GDP growth rates had been assumed for all economic areas at the beginning of the forecast intervals (December $t-2$), these had to be revised significantly downward for Germany and Austria due to the unusually long recession.