July 2023 N.º 9

BANCO DE ESPAÑA EVALUATION PROGRAMME

EXTERNAL EVALUATION OF BANCO DE ESPAÑA MACROECONOMIC PROJECTIONS

Banco de España

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1 Executive Summary

The forecasts of the Banco de España (BdE) are of very high quality, they provide a comprehensive picture of the likely evolution of the Spanish economy, and they are well founded on analytical work and on facts. They also have an excellent reputation and are seen as authoritative, prominent and at the "top of the league". Among central banks, the BdE is known for the excellence of its staff, the notable resources devoted to the projection exercise, the high quality of its research, and the breadth of its expertise on the Spanish economy.

We provide below a brief summary of our main recommendations in bullet points, with further elaboration and additional recommendations in the main body of the document.

Models, judgment and forecast accuracy

- The BdE should incorporate into its main model, "Modelo Trimestral del Banco de España (MTBE)", whenever possible, some of the "off model tools", like the satellite models, currently used to inform the expert assessment.

- The ongoing work on inserting expectations' assumptions in the model is very positive. As a following step, more sophisticated expectations assumptions can be included in the model to enhance its performance and broaden its use.

Characteristics of the projection exercise

- The BdE might prepare and publish a forecast over a longer-term horizon for the prospects of the Spanish economy, at regular intervals, with an assessment of the impact of various structural and long term factors on certain key variables. In the same vein, it might include in the forecast its views on the state of the economic cycle.

- The forecast would benefit from the inclusion of some explicit measures of uncertainty. This can be done by constructing ranges around the baseline, or through regular use of alternative scenarios, as was done very effectively in the aftermath of the COVID shock and after the start of the war in Ukraine.

- In order to study specific issues heavily affecting the forecast or new topics increasing in importance, we recommend to systematically establish working groups comprising BdE economists, both generalists and experts, and if necessary external experts.

- A more systematic use of high-frequency and big data could provide nowcasting and short-term forecasting for variables that suffer from long lags in data releases.

Procedural aspects

- It would be well advised to establish a simple non quantitative internal process to assess the risks and their balance on the outlook for growth and inflation. The risk assessment should be performed by staff familiar with the baseline and the related risks.

- The projection process would benefit from a very detailed timetable, prepared well ahead of the exercise, with realistic, manageable and binding cut off dates for the forecast deliverables. It should also include an internal peer review process and a post-mortem meeting at the end of the exercise.

- A clear back-up system may be established to reduce operational risks. This requires that alternative persons are adequately trained to step in, in case that certain key technical experts are absent. It also requires tested and up-to-date manuals.

Communication

- The published macroeconomic projections' section of the Economic Bulletin should: (i) include brief boxes, signed by the authors, to elaborate on certain key projection topics; (ii) mention the key judgmental calls made in the projections and the related reasons; (iii) refer to some key labor market variables; (iv) include a short part on public finances; and (v) identify specific risks and provide an assessment of the direction of each of them and an assessment of the overall risk balance for growth and inflation.

- The BdE might consider the preparation of two different presentations to the media: a longer one geared towards a more informed public, and a shorter one, less technical, for a less informed public. For the latter, advice from communication experts would be most helpful.

Governance

- Ownership of and responsibility for the projections is a key issue. Currently the projections are appropriately prepared by staff without any intervention from the policy level. For the future the BdE should consider adopting procedures to ensure that the independence of the staff projections is preserved. This should be communicated externally in order to enhance the reliability and credibility of the projections.

Staff Issues

- BdE senior management should provide clear signals of appreciation to the staff involved in the projection exercise, as well as devise strategies to further enhance recognition of their work, such as setting percentages for forecasting and analytical work in the evaluation scheme or introducing voluntary mobility of staff.

- The staff seems to be almost continuously busy in producing numbers, speeches, boxes, etc. This reduces the time for the analytical underpinning of the forecast. Economizing staff resources to be utilized for further analytically underpinning the projections is essential.

2 Introduction

The macroeconomic projections for the Spanish economy are a key function of the BdE. Comprehensive macroeconomic forecasts are produced by the Directorate General Economics, Statistics and

Research four times a year, twice in the context of the Broad Macroeconomic Projections Exercise of the Eurosystem (BMPE).

These forecasts provide the official view of the BdE on the outlook of the Spanish economy and are an essential component of the euro area outlook that informs policymaking by the European Central Bank (ECB). They also help shape market views on the prospects of the Spanish economy and they provide essential guideposts for fiscal policy decisions by the Spanish authorities and the key macroeconomic framing for private sector decisions.

To further the BdE's Strategic Plan for 2020-2024, the three authors of this report were commissioned to evaluate the BdE macroeconomic projections. In particular, the terms of reference for this evaluation spelled out the following specific objectives:

a) The characteristics of the projection exercises: phases of the different contributions to the process, including the description of the agents involved, the narrative of the factors underlying the projections, the constraints on the preparation of the projections and the implications of such constraints, and the publication and dissemination strategy.

b) The usefulness of the projections: domestic and international relevance.

c) The adaptation of the projection processes in a rapidly changing environment (pandemic, war in Ukraine): the use of new indicators and models, the construction of scenarios and the measurement and disclosure of risks.

d) Governance of the projection preparation processes within the Banco de España, including the provision of resources to conduct the exercise and the participants' incentives.

e) The methods and models used to produce the projections, focusing on their theoretical rigor and empirical validation and, insofar as possible, by comparing the Banco de España with other institutions.

f) The quantitative accuracy of the projections, in terms, inter alia, of evaluating forecasting errors and, insofar as possible, by comparing the Banco de España with other institutions.

Our assessment, conducted during the period October 2022-July 2023, involved a series of interviews with BdE staff as well as with several external domestic and international institutions. It also entailed reviewing a large number of forecast-related documents.

We want to express our gratitude to BdE staff for their enormous help. They were generous with their time, candid in our conversations, and provided well-organized material. We are also grateful to the experts from external institutions for their valuable time as well as for their most useful inputs and insights.

3 Spanish and international institutions' assessment and suggestions

According to one of the previously mentioned objectives, this evaluation comprises the review of the usefulness of the projections, at both the domestic and international level. To that effect, we conducted interviews with a number of Spanish and international institutions,[1] both private and public, to ask them about their assessment of the forecasts of the BdE.

The overall reaction of these institutions was very positive. They all indicated that the BdE prepares high-quality and comprehensive forecasts, which are seen as being authoritative and prominent, "at the top of the league" as regards the outlook for Spain, and getting media coverage. In Spain, forecasters see the BdE projections as the benchmark against which they often have to explain and justify their own projections. In other words, "when the BdE speaks, people listen".

The quality of the BdE forecasts is associated with the high-caliber staff of the BdE, the resources devoted to the forecasting exercise compared to other institutions, as well as some data advantages –such as a large database with data on enterprises and the balance sheet of banks.

Our interlocutors expressed appreciation for the clear narrative underpinning the projections, the details provided on issues where domestic institutional knowledge is particularly important (such as fiscal policy or labor markets), as well as the analytical work published in connection with the projections. Many external forecasters are intensive users of the BdE analytical work, even though they eventually come up with their own forecast.

They praised also the improvement in terms of quality and quantity of communications during the tenure of the current Governor. In particular, the increase in transparency in the forecast process (including some analysis of forecast errors and the reasons for changes in forecasts across different vintages), as well as the publication of analytical notes on key topics shaping the forecast, were seen as very useful. They were very appreciative of the quality of the documents illustrating the BdE forecast as well as their formal and informal discussions with BdE staff. These discussions were seen as very helpful in clarifying the thinking behind the forecast and in shaping their own work. The presentations by the Director General of Economics, Statistics and Research posted on the BdE website, were generally found to be very comprehensive and helpful to an informed audience.

Key suggestions from external institutions

- Our interlocutors felt that a perspective spanning over a longer horizon would be useful. Beyond the focus on the next couple of years, a view on where the economy would go in the longer term (drivers and obstacles) could help shape economic policy. A possibility would be

1 Spanish institutions interviewed were: the Autoridad Independiente de Responsabilidad Fiscal (AIReF), Banco Bilbao Vizcaya Argentaria (BBVA), the research center "Funcas", and Caixabank. The International institutions interviewed were: Barclays, the Banca d'Italia, the European Central Bank (ECB), the European Commission, and the International Monetary Fund (IMF).

to prepare a forecast with a longer-term horizon once a year. This could be an opportunity to address certain key topics.[2]

- They noted the lack of an explicit formal assessment of the state of the cycle in the published projections exercises.[3]

- They suggested to flesh out quantitatively the assessments of risks and uncertainty surrounding the forecast, also through more alternative scenarios.

- Some institutions thought that the BdE teams need to be more agile to address rapidly changing issues where expertise may be partly lacking, either through occasional reliance on external expertise, or by having some "generalists" who could shift their focus on the key topics of the day.

- Some institutions suggested that the BdE would benefit from tailoring its presentations to different audiences, including less analytically sophisticated ones. They also proposed that the BdE could provide more information about its models, tools, techniques and procedures.

The positive assessment of the BdE forecasts by external private and public institutions is very much in line with ours. We elaborate further on these and other recommendations in the course of our report.

4 Dealing with a rapidly changing environment

The Spanish and the global economy have experienced in recent years a number of very large shocks, such as the COVID pandemic and the war in the Ukraine. These shocks and their aftermath had major macroeconomic repercussions, and they provided a very tough challenge for forecasters –namely pervasive uncertainty related to non-economic factors (such as length and severity of the pandemic, duration of the war in Ukraine and imposition of sanctions), disruptions to data collection, and the need to rely on alternative high-frequency data sources, given the speed of change in economic developments and the dramatic differences on the impact of the shocks across economic sectors. It is therefore important to assess how the BdE forecasting exercise has responded to the challenges posed by these shocks.

4.1 The COVID shock

In the immediate aftermath of the COVID shock, the BdE published in April 2020 an analytical article in the Economic Bulletin,[4] with a set of reference scenarios for the Spanish economy in view of the COVID crisis.

2 E.g. the impact of labor market reforms and NGEU funds on potential output, issues related with the green energy transition, etc. Some of these external institutions noted that the Bank of England in its February inflation report provides an assessment of the supply side, which is seen as very helpful. Such topics are addressed in research work by the BdE but are not explicitly included in the published projection exercises.

3 E.g. an assessment of the output gap, the unemployment gap, etc.

4 See "Reference macroeconomic scenarios for the Spanish economy after COVID-19", in the 2/2020 Economic Bulletin.

New indicators

Given fast-moving developments and the unprecedented nature of the shock, forecasters at the BdE relied on a broad set of alternative indicators and data sources, including credit card data to monitor consumption behavior, daily social security registry data to monitor employment, daily electricity consumption, traffic in motorways and airports, and Google mobility data. In addition, the BdE conducted rapid business surveys. For instance, one for family-owned firms, detailed in Box 1 of the aforementioned analytical article, provided valuable real-time information on firms' decisions at the peak of the COVID pandemic and helped to inform estimates of the impact of the shock.

Models

Standard techniques to estimate short-run activity based on the use of statistical models could not adequately capture the dramatic repercussions triggered by the exceptional nature of the shock. Therefore, the BdE used a "supply-side approach" for short-run projections, estimating the level of activity across economic sectors, in light of the impact of mobility restrictions and other measures to curtail the spread of the virus.

More standard models were instead used for projecting three alternative scenarios further into the future, characterized by different evolutions of the pandemic and the associated need for lockdowns as well as different degrees of effectiveness of policy interventions. The calibration of these models was informed by the new indicators cited above, by cross-country experience (particularly the one of China, where the pandemic first surfaced) and by existing epidemiological evidence.

A similar approach, based on the presentation of several alternative scenarios, was adopted in the June 2020 projections (part of the Eurosystem's forecast exercise), as well as subsequently both in September 2020 and in the Eurosystem's forecast exercise of December 2020.

4.2 The war in Ukraine

The war in Ukraine has added further macroeconomic challenges, in addition to the tragic loss of life and the rising geopolitical tensions. Even though the Spanish economy had relatively limited direct trade and financial links with both Russia and Ukraine, the repercussions of the war through other channels—ranging from confidence to the price of energy—could be very substantial. The impact of higher energy prices, due to the war, compounded already rising inflationary pressures originating in previous energy and commodity price increases, supply-chain bottlenecks, the swift recovery in demand after the end of lockdowns, and other factors.[5]

In light of such high uncertainty, the March 2022 macroeconomic projections included an analysis of the potential impact on output and inflation of the materialization of four risks: (i) a more marked and

5 See Chapter 3 "Rising Global Inflation" of the 2021 Annual Report of the Banco de España.

lasting increase in commodity prices, (ii) a complete suspension of bilateral trade flows between Russia and the European Union (EU), (iii) second-round effects of the hike in energy prices, and (iv) an increase in household demand, associated with a swifter reduction in the surplus savings built up during the pandemic.

While the war considerably increased uncertainty, its macroeconomic repercussions were more amenable to an analysis with existing modeling tools, especially when compared to the COVID shock. But at the same time, the magnitude of the energy shock —particularly the spike in the price of gas, which is tied to electricity tariffs by existing electricity pricing mechanisms— required the development of expertise on such pricing mechanisms, as well as on the evolution of gas prices more generally.

4.3 Conclusions

In general, the BdE forecasts did a good job of "linking" the latest forecast with previous forecasts, through a quantification of the elements that led to deviations between these two. This is a particularly important task during periods of high volatility and uncertainty, like the ones experienced since the onset of the COVID pandemic.

Despite the massive amount of uncertainty on developments, going well beyond the usual economic uncertainty, the early assessments of the severity of the crisis by the BdE were generally quite accurate, and subsequent forecasts were appropriately linked to previous ones, identifying the main factors accounting for changes in outcomes.

Our view is that the reaction of the BdE in its forecasting exercise to the challenges posed by the COVID pandemic was swift and comprehensive. The BdE was quick to develop alternative high-frequency indicators to monitor developments, including designing and conducting business surveys that provided virtually real-time evidence on firm behavior, which was useful in assessing the intensity of the shock as well as its impact across sectors. The supply-side approach to estimating the short-run impact of the pandemic was also appropriate, and in line with the approach used in other organizations. In these circumstances, constructing alternative scenarios was essential. These scenarios were chosen on the basis of sensible criteria and were well explained in the articles presenting the forecast.

Our assessment is that the reaction of the BdE to the shock of the war in Ukraine was also swift and effective, with an appropriate emphasis on the uncertainty surrounding the forecast, illustrated for instance by the quantification of the potential impact of four plausible shocks (in terms of deviations from the forecast baseline) in the March 2022 projection exercise.

5 Accuracy of the projections

An accurate forecast is an essential input into policymaking. In particular, central bank policy should be forward-looking and thus focus on forecasts of inflation and economic activity rather than on recent outcomes. Additionally, forecasting models and methods are used in the context of monetary and fiscal policies for assessing their consequences on activity and price developments.

This section provides an assessment of the accuracy of the BdE forecasts, and distinguishes to the extent possible the role of the model, of expert judgment, of data and of assumptions. The assessment is conducted on three main macro aggregates: headline inflation, "core" inflation (inflation excluding food and energy), and GDP growth. We consider forecast horizons of one and eight quarters ahead.

We do not assess the accuracy of the BdE forecasts relative to those of other forecasting institutions. The differences in the timing of the preparation of the various forecasts and therefore in the information set available to forecasters and the presence of different technical and external assumptions would make such a comparison not only impractical, but also deprived of any useful informational content.

5.1 Nowcasting - one quarter ahead forecasting

Table 1 presents the forecast evaluation, in terms of the Root Mean Square Error (RMSE) for real economic activity, inflation and core inflation. Given the disruptive nature of the COVID, the left side of the table includes the pandemic in the assessment, while the right side only assesses the forecast performed before the outbreak of the pandemic.

The first line, BdE real-time, reports the RMSE for the forecasts published by the BdE (baseline). This forecast includes the impact of the assumptions (such as the path of interest rates, exchange rates, energy prices, and the external environment more generally) and of data, the related pure model results, plus the judgements that were incorporated at that time.

The second line, MTBE real-time, shows the RMSE of a projection that excludes judgement, and only feeds the assumptions and the data at that time into the econometric model (MTBE). The difference between the two errors is very sizeable, showing that at very short horizons the role of informed judgment is essential in reducing forecast errors. At this horizon, the model is mostly a disciplining device for experts, who look at short-term indicators and different nowcasting tools, adding expert judgement.

Table 1
The role of models, assumptions, data and judgement in short-term forecasting (nowcasting)

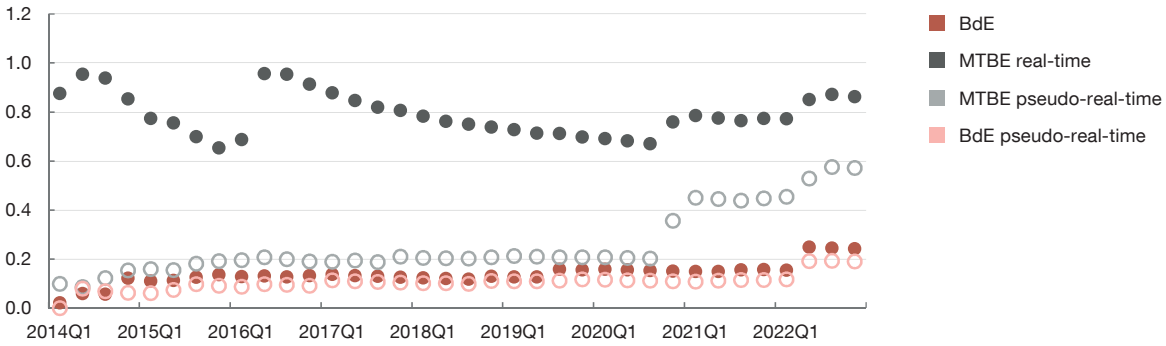
	Full sample			Pre-pandemic		
RMSE one quarter ahead	GDP	HICP	HICPX	GDP	HICP	HICPX
BdE real-time	1.30	0.24	0.14	0.11	0.16	0.07
MTBE real-timee	3.79	0.86	0.76	0.24	0.70	0.57
BdE pseudo-real-time	1.19	0.19	0.35	0.20	0.12	0.06
MTBE pseudo-real-time	3.36	0.57	0.62	0.49	0.21	0.22

SOURCE: Banco de España.
NOTES: BdE real time: the RMSE for the published forecasts (baseline). It reflects the impact of the assumptions and data (both real time), the related pure model results and the judgements. MTBE real time: the RMSE of a projection that excludes judgement, and only feeds the assumptions and data (both real time) into the econometric model. BdE pseudo real time: the RMSE when updating the actual forecast with ex-post (realized) information on assumptions and data. The judgment included is the same as in the baseline. MTBE pseudo real time: the RMSE when a forecast is done only with the model, with the assumptions and data being ex post (realized) but without judgment.

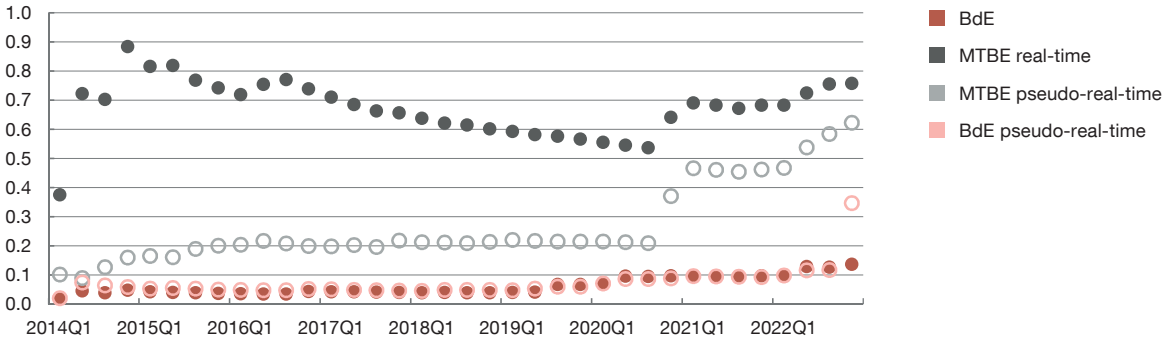
Chart 1

The role of models, assumptions, data and judgement in short-term forecasting (nowcasting) - evolution over time

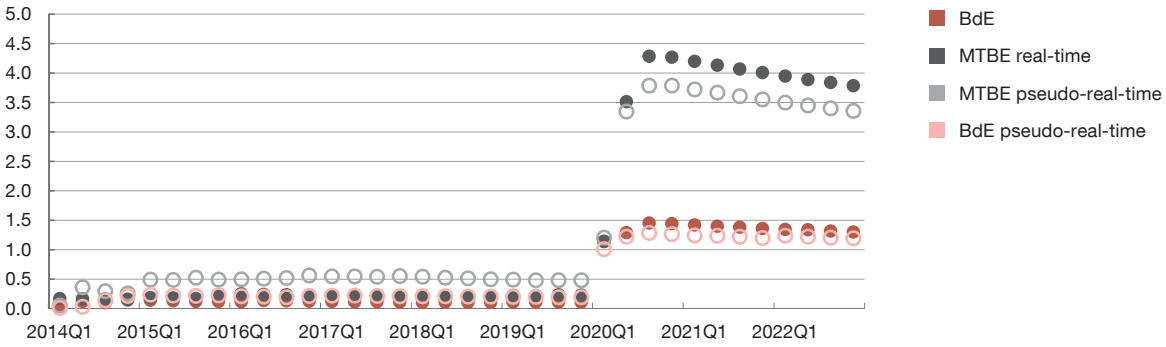
1.a One-quarter-ahead cumulative RMSE for YoY HICP inflation



1.b One-quarter-ahead cumulative RMSE for YoY HICPX inflation



1.c One-quarter-ahead cumulative RMSE for QoQ GDP growth



SOURCE: Banco de España.

The third line, BdE pseudo real-time, shows the RMSE when updating the actual forecast (in line 1) with ex-post (realized) information on assumptions and data. The RMSE decreases only slightly, showing that, in the very short run, the assumptions and data are not a major source of forecast errors. At this short horizon, fixing the errors in the assumptions or including new data would help, only to some extent if a very extreme shock happens (such as the pandemic).

Finally, the fourth line, MTBE pseudo real-time, considers the RMSE of a pseudo-real time forecast, in other words a forecast done only with the model, when the assumptions and data are final (no real-time, but ex post realizations) but without judgment. The RMSE numbers are similar to those reported for the second line, confirming that at this horizon the main source of errors is lack of detailed information in the form of expert judgement.

The evolution of forecast errors in the case of short term forecasting can also be observed over time. Chart 1 shows the RMSE for one quarter ahead over time. For inflation and core inflation, the model performance (grey dots, darker and lighter) appears to worsen around 2016 and with the COVID pandemic around 2020, while the outcomes including judgement (copper dots, darker and lighter) provide a more consistent performance across time. The chart on GDP forecasts shows that judgement also systematically improved the BdE forecast on the real side. The Russian invasion of Ukraine seems to have "surprised" both models and experts. However, expert judgement limited the loss in performance across all variables.

5.2 Business cycle frequency: eight quarters ahead forecasting

The medium term leg of the forecast (about eight quarters- two years' horizon) is more important for central banks. While characterized by higher uncertainty, this longer horizon is the appropriate one to evaluate the effects of different policy options, and in particular of monetary policy. It is also the horizon that business cycle models such as the MTBE can tackle best. We therefore repeat the assessment of the previous subsection in Table 2.

Eight quarters ahead, the first line, BdE real-time RMSE, are close to the second line, MTBE real-time RMSE. This shows that judgment plays a much more limited role when the forecast horizon is longer but expert judgement still has an advantage, albeit to a lesser extent.

At this medium term horizon, errors in the assumptions play an important role in forecasting overall Harmonized Index of Consumer Prices (HICP). Comparing the third line, BdE pseudo real-time (with

Table 2
The role of models, assumptions, data and judgement in medium-term forecasting (8 quarters)

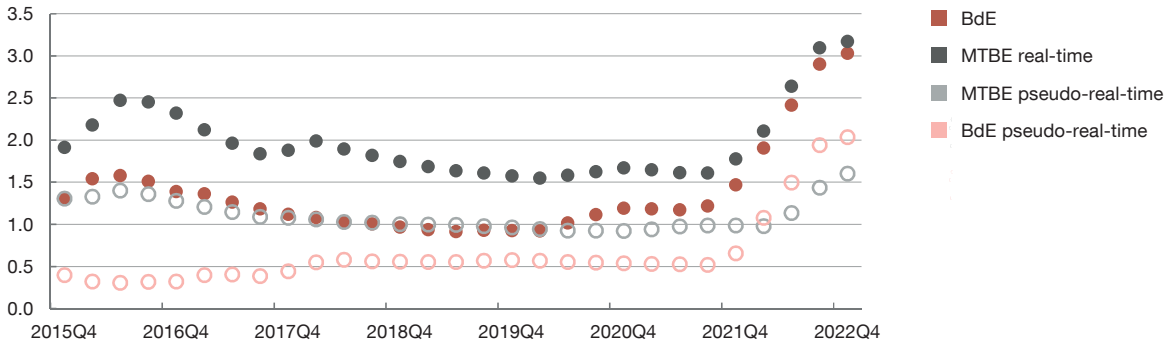
	Full sample			Pre-pandemic		
RMSE 8 quarters ahead	GDP	HICP	HICPX	GDP	HICP	HICPX
BdE real-time	6.62	3.03	1.74	0.71	1.22	0.63
MTBE real-time	6.42	3.17	1.94	0.72	1.61	1.29
BdE pseudo-real-time	5.61	2.03	1.20	0.76	0.52	0.72
MTBE pseudo-real-time	4.85	1.60	1.48	1.43	0.98	0.97

SOURCE: Banco de España.
NOTES: BdE real time: the RMSE for the published forecasts (baseline). It reflects the impact of the assumptions and data (both real time), the related pure model results and the judgements. MTBE real time: the RMSE of a projection that excludes judgement, and only feeds the assumptions and data (both real time) into the econometric model. BdE pseudo real time: the RMSE when updating the actual forecast with ex-post (realized) information on assumptions and data. The judgment included is the same as in the baseline. MTBE pseudo real time: the RMSE when a forecast is done only with the model, with the assumptions and data being ex post (realized) but without judgment.

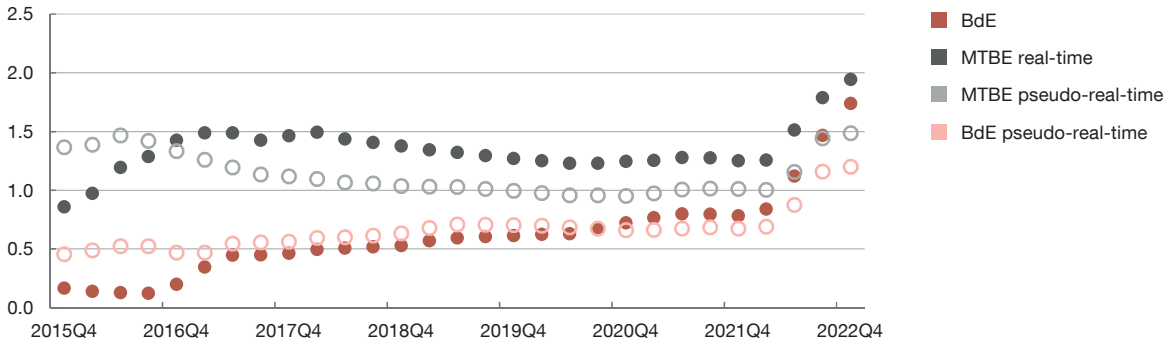
Chart 2

The role of models, assumptions, data and judgement in medium-term forecasting (8 quarters) - evolution over time

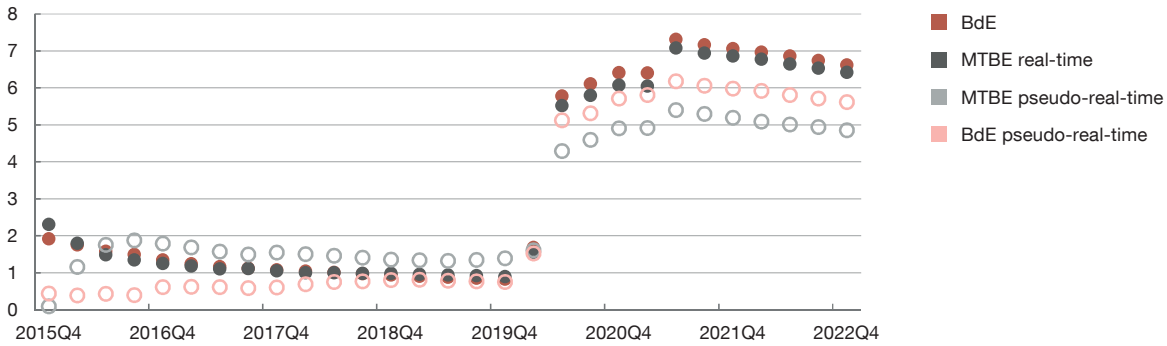
2.a 8-quarters-ahead cumulative RMSE for YoY HICP inflation



2.b 8-quarters-ahead cumulative RMSE for YoY HICPX inflation



2.c 8-quarters-ahead cumulative RMSE for YoY GDP growth



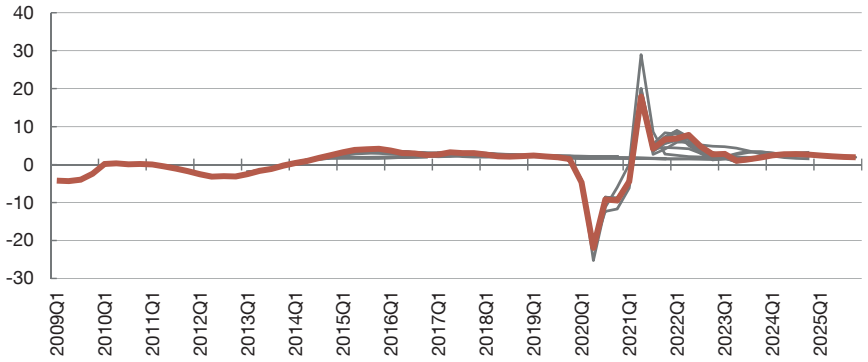
SOURCE: Banco de España.

realized assumptions and data), with the first line, BdE real-time (with real-time assumptions and data), the reduction in RMSE shows that the assumptions and data explain more than half of the forecast errors in headline inflation in the pre-pandemic period. In particular, the HICP inflation forecast would naturally have benefitted strongly from knowledge about commodity prices, while the forecast of core

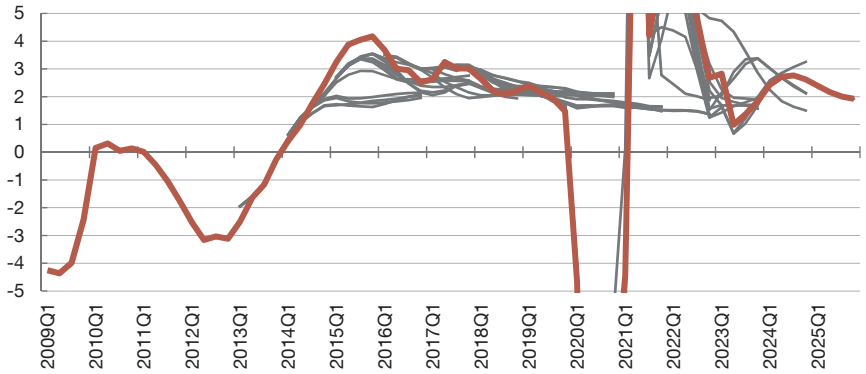
Chart 3

Real time GDP forecasts made by BdE staff between 2014 and 2022: strong mean reversion. Year on year growth rate

3.a GDP



3.b GDP (zoomed in)



SOURCE: Banco de España.

inflation would have improved only modestly with the use of actual data instead of the assumptions. The assessment for GDP does not reveal a relevant role for the assumptions in the pre-pandemic sample. This implies that the main sources of errors about the GDP forecast are related to internal shocks not captured by the assumptions (and this remains so even when including the pandemic, although in that case the assumptions also explain part of the forecast errors).

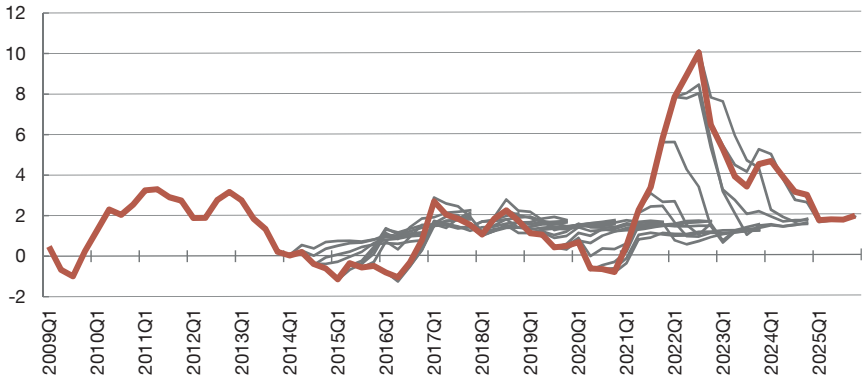
When including the COVID crisis in the sample (left part of the table), a stronger result emerges. In a very volatile international environment, a correct knowledge of the assumptions would have improved the performance of the forecast of all three variables. This is expected, given that the pandemic and the invasion of Ukraine implied strong movements in the assumptions (especially commodity prices) that could not be foreseen in advance.

The evolution of forecast errors in medium term forecasting over time, covered in Chart 2, is less indicative than in the assessment with shorter-term forecasting, because the model changed several times. Older versions of the model had, in particular, problems in forecasting inflation; this has improved in recent versions.

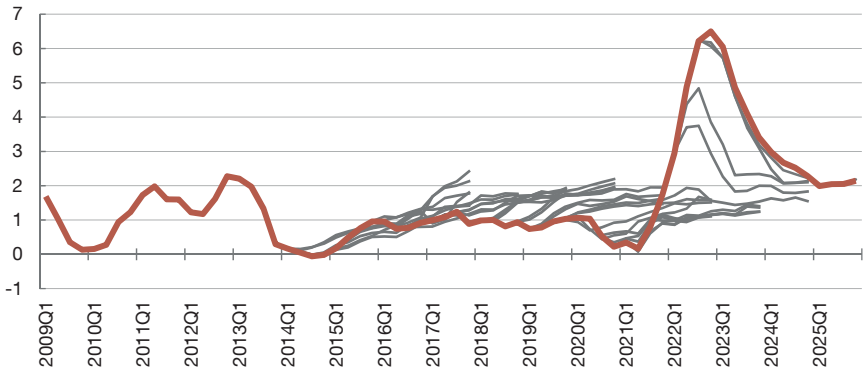
Chart 4

Real time inflation forecasts made by BdE staff between 2014 and 2022: strong "back to 2%" reversion

4.a HICP



4.b HICP excluding energy and food



SOURCE: Banco de España.

We focus on the emergence of the COVID crisis, which determined a strong increase in the forecast errors as of 2021.

- In terms of real GDP (last panel to the right), the model-based projections (without judgment) performed rather well in forecasting real GDP growth. In other words, these model-based forecasts (without judgment) are comparable to the judgmental/official forecast, especially in the most turbulent phase of the sample.

- In terms of headline and core inflation (first two panels), the model-based forecasts underperform the forecasts including expert judgement throughout the sample, although the model has improved over time.

- The performance of model-based and judgmental forecasts is more similar in the last part of the sample but this is because no forecasts can account for the abnormal shocks of the recent crises.

- In general, it seems that the assumptions and data are partially responsible for a deterioration of the forecast, as pseudo-real-time forecasts are often better than those performed using real-time assumptions. The effect is more sizeable for the forecast of headline inflation.

A notable feature of the MTBE that can explain part of the RMSE is that the model features a high degree of mean reversion, see Charts 3 and 4. Looking at the projected paths over time vs. the realized paths (both for real GDP growth as well as for HICP inflation), the tendency to mean revert over a rather short period is rather strong, an assumption which does not necessarily hold for the Spanish economy during this period. Nonetheless, it should also be mentioned that the way the assumptions are generated (like the random walk for the exchange rate or futures for oil prices) plays an important part for that mean-reversion behavior, particularly for headline inflation.

6 Challenges and recommendations

The following list elaborates further on the main topics discussed in the previous sections as well as on additional topics, such as procedural, communication, governance and staff issues. This section also includes our related recommendations, those highlighted in bold are meant to be the most relevant.

Our recommendations are meant to address some issues in an already very well-functioning and effective process. We also understand that some of the recommendations dovetail with ongoing changes and improvements to the forecasting exercise, although we have kept them in our report in order to underscore their importance and support such ongoing changes and improvements.

Overall, our aim is not to be prescriptive but to provide ideas for possible improvements to be considered by the BdE in a broader context.

We have organized these challenges and recommendations into six key areas.

6.1 Use of models and judgment

6.1.1 Construction of the projections

The BdE produces a model-based projection, strongly complemented by judgment, that is based on the output of satellite models/equations, various analytical pieces, various indicators and ultimately expert assessment. In particular, the projection structure is organized around a central, general equilibrium model,[6] and a large number of peripheral models and other inputs.[7]

6 The central model, the MTBE, is a mid-scale macro-econometric model composed of a series of error-correction equations, which track the behavior of the key components of aggregate demand (consumption, investment, international trade) as well as employment, prices, and wages. Output is basically demand determined. The latest MTBE updated version also includes re-estimated wage and price equations, with a non-flat Phillips curve.

7 The peripheral models/other inputs include: (i) sectoral models and input/output models, deepening the analysis of main components of output or prices; (ii) econometric time series models, exploiting disaggregated information, additional indicators, and high frequency data to inform, mostly, the short-term part of the forecast; (iii) microeconometric models and micro simulations, translating the results of the macro forecast in additional information (e.g. regional, or related to unequal effects of shocks); (iv) fiscal models, where assumptions and judgements are essential; (v) models producing additional variables (e.g. output gap); and (vi) expert judgment, opinions surveys, and other qualitative information.

The process starts with an update of the previous forecast in the light of new data, new external assumptions and new technical assumptions. Subsequently, "informed" judgmental calls are imposed on most endogenous variables and their impact on the model outcome is assessed, for instance, by the pattern of add-factors that these judgmental calls produce. Then, an iterative process between model results and judgmental calls takes place, until a projection narrative accompanied by plausible residuals is achieved.

We find the use of extensive judgmental calls appropriate. The teams that follow specific sectors or variables can provide indeed valuable inputs to the projections, due to the expertise that they have accumulated over time.

The judgmental calls are as little arbitrary as possible, as they are based on satellite models/ equations, analytical pieces, various indicators and only ultimately expert assessment. Our understanding is that a great effort is put to justify with evidence and analysis such judgmental calls and limit their arbitrariness. This creates a strong base for credibly explaining and justifying them. In particular, the satellite framework allows to deal with an assessment of real-financial interactions in a satisfactory manner. However, it is important that in the narrative of the forecast, the impacts of these real-financial interactions are clearly explained.

While a great effort is made to limit the arbitrariness of judgmental calls, the perceived need to always have solid supportive evidence and analyses to back the judgments may lead to inertia and keep for too long figures in the projections that intuitively appear inappropriate, due to the fact that the related research has not been completed yet.[8]

There is a need to find a balance between having solid supportive evidence and considering the potential consequences of structural changes –particularly in periods when such changes can take place more quickly in light of shocks, important reforms, and shifts in policy. In other words, there is a trade-off between in-depth analysis to inform some key variables in the projections (mostly those variables affected by structural reforms) vs. speed and flexibility.

As regards the potential limitations to the MTBE, we would highlight the following issues:

- A specific one relates to the model's ability to track post-COVID price dynamics, since it has been estimated during a period with subdued price and wage pressures. Here we understand that the price equation of the model was estimated up to late 2022 and now features a steeper Phillips curve. The next published version of the model should explicitly explain the incorporation of such dynamics.

8 One example is the high Non-Accelerating Inflation Rate of Unemployment (NAIRU) figure, which has been for some time well above the current rate of unemployment, as the impact of the reforms has not yet been reflected on the NAIRU because ongoing work on the impact of structural reform on the NAIRU is not yet complete.

- A more general challenge relates to the robustness of estimating (stable) cointegrating relations over a period (1999-onwards) with a lot of structural changes and consequent shifts in expectations, namely the adoption of the euro, the boom-bust of the first decade of the 21st century, the global financial crisis, and most recently the COVID shock and the repercussions of the war in Ukraine.

- Finally, the model does not seem suited to longer-term analysis with potential supply-side changes.

Recommendations:

- Temporarily shift the balance towards a "less deep analysis" in order to alter timely certain key projection variables when there is a consensus that a current variable is largely seen as "unrealistic". In order to facilitate this process, we recommend (a) to dedicate time between forecast rounds mostly to analyses of forecast related topics; (b) be more flexible, and use preliminary analysis which can be deepened subsequently by further analytical work.

- Despite the fact that the MTBE is currently fit for the purpose of forecasting, the version discussed in its most recent publication[9] would benefit from some extensions in order to address some broader questions, such as policy analyses and simulations. The extensions may involve:

  - **Explicitly incorporating expectations in the model**. While there is no forward-looking behavior explicitly incorporated in the published version of the model, we understand from staff that its new version takes a first step in this direction. Reduced-form, level-1 expectations (based on previous forecasts) have already been tested, and adaptive and rational expectations (model-consistent) are being tested. In the following step, we recommend more sophisticated expectations assumptions (such as sticky versions of rational expectations) if the model were to discuss scenarios where structural breaks or reforms are being implemented, as agents are likely to react to those proactively.

  - **Including variables measuring uncertainty (from standard indicators to e.g. big data text-based real time indicators) to assess its effect on consumers' choices and firms' investment**. Alternatively, the impact of uncertainty indicators can be assessed through satellite models and then imposed on the projections for consumer spending and investment. Along these lines, BdE economists have already undertaken a notable body of research on the impact of uncertainty on activity.[10] We commend the efforts and the plans to assess quantitatively the impact of uncertainty, which should be clearly communicated.

9 See "New version of the quarterly model of Banco de España (MTBE)", Arencibia, Hurtado, De Luis and Ortega (2017).

10 See "Measuring economic and economic policy uncertainty and their macroeconomic effects: the case of Spain", Ghirelli, Pérez, and Urtasun (2019), "The spillover effects of economic policy uncertainty in Latin America on the Spanish economy", Ghirelli, Pérez, and Urtasun (2021), and "A new economic policy uncertainty index for Spain", Ghirelli, Gil, Pérez, and Urtasun (2021).

- **Exploring whether some of the "off model tools", like the satellite models used to inform the expert assessment, can be incorporated into the main model.** In the present assessment, the contribution of such "off model" tools combined with the expert assessment is recorded as "judgment" in the main model, although part of it reflects the input of such off model tools. This overstates the measured amount of judgment and makes this evaluation exercise more difficult. Moreover, the inclusion of such additional equations in the main model would enhance its explanatory power and increase the consistency among its variables.

- **In order to possibly reduce excessive mean reversion and, overall, improve the medium-term forecast performance, we recommend to review and enhance the supply side of the MTBE model**, to explore whether secular trends and longer run movements can be accommodated, also in view of a possible lengthening of the forecast horizon and of the possible extension to scenarios of structural reforms.

- As econometric models seem to perform well either in exceptional circumstances (COVID pandemic) or in normal times, the BdE might consider the example of other institutions and central banks, currently investing in models featuring stochastic volatility, or generally time varying volatility.

- Single-equation models, acting as satellite models, are sometimes fruitfully complemented or substituted by multivariate models (VAR/BVAR/SVAR models), which have the advantage of accounting for interactions and of providing an easier interpretation, as via historical decompositions. In particular, the BdE might consider multivariate Bayesian models, which can provide a general framework to encompass very detailed and disaggregated price equations.

- The main model provides very useful output to be used in the context of the forecast process. The document explaining the revisions and their sources is particularly valuable during the process. We suggest a mostly cosmetic change, namely to condense in one document the presentation of the forecast output in levels and the forecast output expressed in differences from the previous forecast, with tables for levels and revisions that are jointly visible.

- Finally, we recommend a systematic and regular analysis of the forecasts performance, which may also be published, explaining also the related caveats of such an exercise.

6.1.2 The monthly inflation updates

The BdE prepares updated inflation projections on a monthly basis, and disseminates them internally. These updated inflation projections are not simple mechanical updates. This process is mostly based on a variety of time series models but, we understand, that judgmental calls would be implemented. We highly commend this practice as being very useful and informative.

Recommendations

- Updates of inflation for the monthly report to the Governor should be as streamlined as possible. These updates should take in new information but, as a rule, no new judgmental calls, unless major events arise that require additional judgment. Given the importance of inflation and the relative high frequency of updates, a short, possibly one page, live note could be automatized. This note could be made available internally, as a frequently updated document or a website.[11]

- The in-between-projection rounds streamlined inflation updates would free time and resources for analytical work, so that economists are not on a continuous forecast mode.

- On the modelling side, there is extensive literature suggesting that the main components of HICP (those delivered in the NIPE process) are best forecast jointly. The BdE might consider using multivariate models capable of providing unconditional and conditional forecasts that could be tested and at least kept as non-judgmental benchmarks. These could further provide a clear distinction between direct, indirect and second round effects in inflation. In this case, core inflation forecasts would be obtained by aggregating the related subcomponents.

6.2 Characteristics of the projection exercise

As already discussed in the section on models, the projection exercise is comprehensive and uses up-to-date technical tools. In this section, we highlight a few directions to further broaden the scope of the exercise in terms of length of the projection horizon, supply-side analysis, assessment of the cycle, and treatment of uncertainty.

6.2.1 Horizon of the forecast and supply-side assessment

Currently, the projection horizon spans two to three years. However, a view on longer-term economic prospects would be very useful and could help shape economic policy. This would provide an opportunity to assess the impact on certain key variables, like potential output and the NAIRU, of certain long term factors, such as the demographic transition, the implications of structural changes (also those induced by COVID), the consequences of labor market reforms, the supply-side implications of reforms linked to NGEU funds, the energy transition, etc. This echoes comments from some of the external forecasters, as discussed in the previous section. BdE staff have undertaken important research work in these areas which could usefully be integrated in the projection exercise.[12] We understand that an endogenous growth model calibrated to the Spanish economy is currently under elaboration, and this could help provide an analytical framework for tackling these long-term questions.

11 See "Euro Area Macroeconomic Real-time Monitoring" as an example.

12 See "The Potential Growth of the Spanish Economy after the Pandemic", Cuadrado et al (2022). This paper documents the impact of the pandemic and contains simulations on the impact of the Next Generation EU program both through reforms and investments. See also "A Production Network Model for the Spanish Economy with an Application to the Impact of NGEU Funds", Fernández-Cerezo, A, E. Moral-Benito y J. Quintana (2023); and "Carbon Tax Sectoral (CATS) Model: A sectoral Model for Energy Transition Stress Tests Scenarios", Aguilar, P., B. González y S. Hurtado (2022).

Recommendations:

- **To prepare and publish a forecast with a longer-term horizon at regular intervals** (for instance, once a year), with an assessment of the impact of various structural and long-term factors on certain key variables, like potential output and the NAIRU.

6.2.2 Assessment of the cyclical position of the economy

The published projection exercise lacks a formal assessment of the state of the cycle, such as an assessment of the output gap or the unemployment gap.

Recommendations:

- To prepare and publish a formal assessment of the state of the cycle in the economy, as part of the projection exercise (like the output gap or the unemployment gap). It would also be useful to provide an overall assessment of the cyclical state of the economy by discussing and comparing the various cyclical indicators.

6.2.3 Uncertainty

As discussed in the previous section "Accuracy of the projections", the BdE forecasts prepared when virtually unprecedented shocks were unfolding were effective in conveying the extreme uncertainty surrounding the projections, in particular through the use of alternative scenarios. Under more normal circumstances, the forecast article includes a (generally qualitative) discussion of risks. In the section on procedural aspects, we include a proposal on how to structure a more systematic process for the assessment of risks. Nonetheless, a regular assessment of uncertainty is also needed in more normal circumstances. Given the potential for financial market developments, particularly at the tails of the distribution, to substantially alter the macroeconomic outlook, this would also be an opportunity to further integrate real-financial linkages in alternative scenarios.

Recommendations:

- **To provide some explicit measures of uncertainty surrounding the forecast**. This can be done in different ways:

  - Constructing ranges around the baseline—for instance, using past forecast errors is a standard way to convey the uncertainty.

  - Regular use of alternative scenarios and targeted sensitivity analyses. This was done very effectively in the immediate aftermath of the COVID shock as well as after the start of the war in Ukraine. The selection of such scenarios can be informed by the internal discussion on the extent and ranking of different risks (see "Challenges and Recommendations", section 6.3) and include the potential impact of alternative financial market developments on macroeconomic outcomes.

- **To establish systematically working groups of BdE economists, both generalists and experts, and if necessary external experts, to study specific issues heavily affecting the forecast or new topics increasing in importance**. This practice is in line with what is done in other institutions and is particularly important in periods of rapid structural change and rising uncertainty due to large shocks. These working groups would be formed on an ad-hoc basis, and have a specific time horizon. In other central banks, this modality of work is also used for specific short-term requests of the Governor, in which case it only includes internal economists working under tight deadlines. Such groups could be formed by the Director General of Economics, Statistics and Research or the Associate Director General of Economics and Research. We understand that some initiatives along these lines are already ongoing at the BdE, with working groups being led by senior staff of the Economic Developments Department.

- Undertaking and publishing ex post analyses when large shocks cause systematic and significant deviations of important macroeconomic variables from their forecast. This is the case for inflation developments, which across virtually all major economies have surprised on the upside for most of 2021 and 2022.[13] Therefore, we recommend further analysis comparing inflation forecasts with outcomes during the past two years.

- **To explore the scope for a more extensive use of high-frequency and big data for short-term forecasting**. These are already used, for example, to nowcast labor markets. A more systematic use of high-frequency and big data could provide nowcasting and short-term forecasting for variables that suffer from long lags in data releases. To achieve this objective, it would be necessary to develop the needed technical skills in a team.

- **Regular use of alternative scenarios to provide some illustration of the extent of uncertainty surrounding forecasts**. We found the analysis provided with alternative scenarios to be very useful and absolutely indispensable during periods of large shocks.

6.2.4 Review of the number of the forecast variables

Our understanding is that during the projection process, a very large number of variables is monitored and assessed, with many of them being regularly projected. Monitoring and assessing a very large number of variables is necessary in order to form a clear and reliable view about the status of the economy.

Recommendations:

- **Review whether all forecast variables are needed**, as the published projections entail only rather highly aggregate variables. Our recommendation is not to reduce monitoring and assessing a large number of variables but to consider if there is scope to reduce the preparation

13 A recent Economic Bulletin article, "The spread of inflation from energy to other components", González Mínguez, J., S. Hurtado, D. Leiva-León and A. Urtasun (2023), addresses one important source of "surprise inflation" – energy prices. While its focus is on explaining actual inflation, rather than deviations of inflation from forecasts, its findings (particularly the increase in the pass through of energy price shocks to other prices) provide useful insights on why existing models may have underpredicted inflation, even after taking into account the impact of unexpected shocks.

of some disaggregated and detailed forecasts. While these are certainly useful, in line with our recommendations, there is a need to spare time and resources that could be used for other more central aspects of the forecast exercise, such as analytical investigation of projection topics.

6.3 Procedural aspects

Given the importance of macroeconomic forecasting, the process underpinning the projections is a complex endeavor, involving a large number of staff for a compressed period of time. Our discussion here and the ensuing procedural recommendations are quite specific and draw both on the experience of other institutions, as well as on the extensive and very useful discussions we had with BdE staff and management.

Recommendations:

- **A well-defined process for risk assessment**. It is commonplace that the baseline should be accompanied by an assessment of risks around it. A proper risk assessment helps to better understand the baseline and is also very useful to convey messages to the users of the projections and to the general public. Our understanding is that at present, there is not a well-defined process to assess the risks and their balance. We recommend the establishment of a simple non quantitative internal process to assess the risks and their balance on the outlook for growth and inflation. The risk assessment should only be performed by staff familiar with the baseline and the related risks. The proposed process is simple. However, it would broadly represent the collective risk assessment of staff and it would also allow to discuss and explain the drivers of the risk assessment. See Appendix for further details of the proposed risk assessment process.

- **A regular post mortem exercise at the end of each projection round**. During each projection exercise, even in exercises that run for several years and on well-defined procedures, new issues appear. Some of these issues can be resolved during the process or not.

  - A post-mortem meeting should take place at the end of each projection process, at a date and time already mentioned in the timetable (see below). We understand from staff that such meetings have been conducted after the most recent forecast and we strongly commend their regular adoption.

  - At this meeting, each team comes up with a list of problems that were encountered in the projection exercise and at the same time also proposes means to address these issues in subsequent projection exercises.

  - These problems and proposals should be discussed openly and in good faith.

  - A summary of the meeting should be compiled with the problems and proposed solutions to be implemented in the following exercise. This summary should be circulated to all staff that participates in the projections, inviting them to comment, if they wish. In this manner, the proposed solutions are accepted by all staff.

- If feasible, the agreed solutions should be reflected in the new timetable.

- **A regular peer review process.** The BdE forecast process entails discussions and exchange of views and arguments among staff, which is a very commendable feature. It may be considered to formalize this feature.

  - The idea is that a certain team reviews the output of another team. For instance, the price team reviews the forecasts of the domestic demand team and vice versa. This approach ensures that a team of forecasters, as peer reviewers, thoroughly and in depth considers the work of another team.

  - The comments of the peer reviewers should be made in good faith, be constructive, and provide, if possible, ways to deal with a potential shortcoming.

  - There should be some rotation in the peer review teams to systematically bring new colleagues with a "fresh mind" in the projections. The rotation should not be too frequent (every 4 to 6 rounds may be appropriate) so that a certain review team gains some expertise on the topic of the team they review.

- **A very detailed timetable denoting the tasks on a daily basis**. The projection process at the BdE involves a large number of teams (of various sizes) that provide their input to the projections. In other words, many experts seem to work simultaneously for the projections, over a rather short period of time. The projection process is complex and, as such, its organization should be very well defined. See Appendix for a detailed description of what such a detailed timetable should encompass.

- **Setting realistic, manageable and binding cut-off dates.** In every forecast process, there is a wish to incorporate the latest information before presenting or publishing the forecast. But setting plausible and realistic cut off dates is of key importance to ensure that no last minute mistakes are made (in an attempt to include fully the latest information) and that staff is not overly stressed. It came to our attention that several updates were performed at the last minute. In particular:

  - As in the Eurosystem projection exercises, there can be two cut off dates. An earlier one for the technical assumptions and international variables, and a later one to allow for any last meeting adjustments based on the latest information.

  - If after the cut off dates important changes in the technical assumptions occur (like in the exchange rate or energy prices), the baseline can be accompanied by a mechanical update to denote the impact of the changes of these assumptions, using, for instance, the Basic Model Elasticities, or any other similar tool. Rerunning the baseline at the last minute is counterproductive and prone to mistakes.

- **Establishing a clear back-up system to minimize operational risk**. It is a usual feature of many projection exercises, involving a large number of experts, that certain parts of the process (usually technical or IT related) depend on the expertise of certain persons, whose absence could create a serious bottleneck in the running of the exercise. The process of the BdE seems to have such vulnerabilities with important operational risks. Although the risk of serious bottlenecks due to the absence of certain key persons during the process has been reduced to some extent, we understand that such bottlenecks still exist in some technical areas (such as running the model and running the related platform). This requires that alternative persons are adequately trained to step in, in case that certain key technical experts are absent. In particular:

  – The system of backups should be routinely tested. Manuals as detailed as possible would need to be prepared, in case a person not so familiar with certain tasks needs to unexpectedly step-in. Such manuals should be concise, operational in nature and should be regularly tested and updated to reflect the tasks needed.

  – In order to increase resilience to absences or job changes, a living document could be maintained with basic bullet points about the latest assessment of the economic situation and entry points about where to find relevant information.

  – A standard set of automatically updated slides would be helpful in case of absence of staff, it would free economists' resources and serve as a basis for key presentations. While we agree that complete standardization is not possible, most institutions have a basic structure of such slides for at least part of key presentations. This could also reduce the large word content of the current presentations.

  – Moreover, bottlenecks may also occur if certain key managers are absent. There is also a case to have alternative managers that can step in.

6.4 Communication

The discussion of communication aspects in this report is limited and focused on how to improve the presentation and dissemination of the forecast.

6.4.1 Improvements to the projections article

Until the end of 2022, the projections' article was published in a box in the related Economic Bulletin. We strongly support the recent upgrade of the forecast article from a box to a section of its own, adopted from the beginning of 2023. This "upgrade" is a way to stress to the public the significance of the projection exercise.

Recommendations:

- **BdE staff could consider the use of boxes in this article to briefly provide some additional details on important aspects of the forecast, drawing on analytical research work**. These

boxes should be signed by the authors. Short, topical and targeted boxes in the projection section are preferable to links that lead the reader to boxes or other material in the Annual Report or in other publications.

- **Mention any key judgments adopted in the forecast as well as the reasons behind them**. The key assumptions are clearly stated (such as the duration of the fiscal support measures in the 4/22 Economic Bulletin). However, some other key judgments underlying the projections are not mentioned, for example some judgments made on consumption, investment, or core inflation. For instance, there could be statements like "a steep rise in uncertainty and more adverse credit supply constraints have led to revising down investment more steeply than otherwise or from what the model would have predicted". This would help the transparency of the projections and also the narrative.

- **Some labor market information** (employment, unemployment rate, compensation per employee) could be included in the article.

- **A short regular part on public finances** could be added. This may indicate the path of some key fiscal variables (like the general government budget balance, public debt) and an assessment if fiscal policy is expansionary or contractionary (fiscal stance).

- In the risk part of the projection article, the terms "risks" and "uncertainty" are currently used interchangeably. This should be avoided. It is preferable to refer **to specific risks and also provide an assessment of the direction of each risk**. Subsequently, an assessment of the overall risk balance should be provided – see proposal above.

6.4.2 Publication of quarterly figures for the growth and inflation projections

The forecast article presents annual projection figures. However, it can be argued that annual figures hide a lot of information about the path of the economy in the course of the year. Moreover, on some occasions, the annual projection figures could be misleading if there is a lot of volatility within the calendar year.

Recommendations:

- **Consider publishing the quarterly paths of the growth and inflation projections for the first four to six quarters of the projection horizon**. This would allow a clearer and transparent narrative.

6.4.3 Presentation to the media

The Director General of Economics, Statistics and Research makes a presentation to the media that attracts a lot of public attention. We understand from the external forecasters that this presentation has improved recently. In what follows, we have a number of remarks that might further help improve this presentation.

Recommendations:

- **Consider the preparation of two presentations**: a longer one, geared towards a more informed public, and a shorter less technical one for a less informed public. For the latter, advice from communication experts would be most helpful.

- Reduce the amount of text, apart from some summary slides. Most of the slides in recent presentations only contain text. This may lead the audience reading instead of listening.

- Introduce slides that combine (a) one interesting/telling chart, and (b) accompanying bullet points.

- A reference to labor market variables could be added.

6.4.4 Preparation of a "Projections' Guide"

BdE staff has been very helpful in explaining in detail the various features of the projection exercise. It is however our understanding that there is currently no single document, which encompasses a full description of the projection process and tools. Some other institutions, like the ECB, have prepared in the past such a guide which presents and explains the projection process and tools to the interested public.

Recommendations:

- **The BdE could prepare a "Projections' Guide", which is meant to be published, in order to inform the interested public about the projection process and the tools used.** This would promote transparency and enhance the credibility of the projections, as the public will be informed what a great amount of effort, expertise and time is devoted to this process. It is also important to update this guide at regular intervals (for instance, every five years). The ECB projection guide could be used as the starting point.[14] The guide could contain main organizational features, some additional organizational features of the BMPE, the main procedural steps for preparing the projections, the techniques and projection tools used, the role of judgement, and how uncertainty and risks are assessed.

6.5 Governance

Ownership of and responsibility for the projections is a key issue. It is important, following the ownership principles of the Eurosystem, that the projection exercises are "owned" by staff which is also responsible for the figures and the narrative. The idea is that policy makers should distance themselves from the projections, allowing staff to ensure that the outcome of the projections does reflect their best assessment about the "most likely" path of the economy, without any policy or political motivations. This is an important feature that needs to be clearly communicated to the public.

14 See "A guide to the Eurosystem/ECB staff macroeconomic projection exercises", ECB (2016).

Currently the BdE projections are prepared by staff without any intervention from the policy level. We understand that this occurs largely because of the attitude of the current policy makers, which is highly commendable.

Recommendations:

- **For the future the BdE should consider adopting procedures to ensure that the independence of the staff projections is preserved and safeguarded**, and does not depend on the particular persons at the policy level. This should be communicated externally in order to enhance the reliability and credibility of the projections.

- In particular, the BdE should rename the projections as "BdE staff macroeconomic projections for Spain". This way to referring to the exercise is common in many central banks and in particular at the ECB.

- In addition, to safeguard the independence of the staff projections, the policy makers should see the projection figures and the risk assessment only when they are finalized.

- It could be considered that new members of the Governing Council in the future sign a memorandum of understanding that safeguards the independence of the projections.

- The Director General of Economics, Statistics and Research has the task and the responsibility of ensuring that the projections remain independent and express only the views of staff.

6.6 Staff issues

A theme that came up several times was that staff working on the projections felt overburdened and put under stress. They also felt that their projection work was anonymous and not appreciated enough by senior management and at the policy level. If anything, it seemed that staff would rather leave the projection process in pursuit of other tasks whose analytical content is higher and which promise higher visibility. These feelings are not unique to the BdE but are common also in other central banks (including the ECB) regarding the staff working on the projections. Summing up, there is a general motivation issue among staff. Many feel they are under excessive pressure and that the structure of rewards is tilted towards analytical work.

Recommendations:

- **Staff involved in the forecast exercise and in related analytical tasks must see clear signals of appreciation and recognition of their work**. These could include:

  – Oral statements by senior management and those at the policy level that the work of staff in the projections is valued and appreciated, as the projections is a key function of the BdE and of the Eurosystem.

- Setting percentages for forecasting and analytical work in the evaluation scheme, and discussing/agreeing them with staff during appraisals. These percentages should be aligned to the skillset of each staff member, and reflect her/his general propensity/ability in forecasting/analytical work.

- Introduce mobility of staff (voluntary) to work outside the projections for some time. In general, foster the current mobility schemes, and consider mobility as positive for promotions. A rotation scheme also helps reducing stress and overburdening, and allows "sabbatical time" from the forecasting.

- Provide a negative signal to those who work purely on analytical issues that do not relate to the projections or those who refuse to undertake projection related tasks.

- Publish the list of names of those involved in the projections (both internally and externally). This would also inform the public about the depth of the projection work.

- Boxes in the published projection section, citing the names of the authors (as is done in the Annual Report), would provide another means of recognition to staff working on projection topics. The drafting of such boxes should be valued in the staff appraisals.

- As mentioned above, in changing times, additional focused analysis would need to be addressed by the formation of ad-hoc working groups (in our proposal, under the call from a Director or of someone acting as Head of Research) to deal in a short time with specific topics and changing conditions. Staff involved in these activities should be clearly rewarded.

- In general, senior management must be attentive to ensure a reasonable work-life balance for staff, especially during the peak of the projection rounds.

The staff seems to be almost continuously busy in producing numbers, speeches, boxes, etc. This reduces the time for the analytical underpinning of the forecast.

Recommendations:

- **Devise measures to economize resources to support the analytical underpinning of the forecast**. Such measures could include:

  - A rotation scheme for speeches and briefing.

  - The use of live documents, whereby current monitoring and issues are kept, to facilitate briefing and rotation (as mentioned above).

  - A standard set of slides (as mentioned above).

– A standard mechanical update for key variables, based on simple models, to account for new data.

– Consider reducing the number of forecast variables (as mentioned above).

Appendix

Risk assessment process

The proposed process mentioned below is purely indicative and is meant to be an example of what we had in mind. Such a process could be based on the following steps:

- Staff identifies a number of key risks (or risk events, such as RISK 1, RISK 2 …). For example: a continuation or intensification of the war in Ukraine with renewed increases in energy prices or the opposite; a steep slowdown in China or a strong take-off of the Chinese economy; re-emergence of global supply bottlenecks, etc.

- A number of plausible risks are then selected, maximum 10, at a meeting or by staff voting on a list.

- Once the risks have been selected, each staff member assesses the impacts of the individual risks on growth and inflation in a simple qualitative manner: +1 signifies small upside risks, +2 medium upside risks, + 3 large upside risks. The equivalent with minuses applies to downside risks, while 0 denotes balanced risks. Respondents give each risk a weight capturing its relative importance (w1, w2, w3…). Then, the overall impact for each year is computed as the average product of the weight and the impact for each risk.

- The last row shows the overall assessment of the respondent per year, who judges if this is the overall outcome that she/he wishes to convey.

- The next step is to average the last row (overall assessment) of the respondents. This then represents the collective risk assessment of staff.

Timetable

- We recommend to adopt a very detailed timetable, encompassing:
  - Detailed inputs/outputs needed
  - By whom to be produced and whom they should be delivered to
  - Times of the production and delivery, date/time
  - Scheduling of the forecast related meetings (date/time, duration)
  - Key data releases
  - In case of the BMPE, also related meetings and inputs
  - Cut-off dates

Table A.1
Indicative table for the assessment of risks

	Weight	Impact on growth			Impact on inflation		
		Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
Risk 1	w1	3	2	0	-2	-1	-1
Risk 2	w2	0	-1	-1	0	2	3
Risk 3	w3						
Risk 4	w4						
Risk 5	w5						
…							
Risk 10	w10	…	…	…	…	…	…
Overall impact per year		Weighted average of impact for year 1	…	…	Weighted average of impact for year 1	…	…

NOTES: "Risk 1…Risk 10" are the identified key risks (or risk events); "w1…. w10" denote weights capturing the relative importance of each risk; and the impacts shown for Risks 1 and 2 are examples.

  - Peer review process
  - Regular post-mortem

- The timetable should clearly denote the various tasks on a daily basis.
- Such a timetable should be prepared well ahead of the start of the exercise.
- To the extent possible, the timetable should be adjusted to reflect key data releases.
- Before being finalized, the timetable should be sent out for comments to the participants, to ensure that there are no conflicts and also to ensure an "endorsement" of the timetable by the participants.
- A manager should oversee that the timetable is followed and if not be informed for the reasons.
- The publication of the projections should be announced at the mid/end of year t for the year t+1. This seems to be already the case and it should be strictly adhered to.