

## **Report on the Macroeconomic Forecasts for the Autonomous Regions' Budgets for 2017**

The mission of AIReF, the Independent Authority for Fiscal Responsibility, is to ensure strict compliance with the principles of budgetary stability and financial sustainability contained in article 135 of the Spanish Constitution.

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## **Executive Summary**

**AIReF endorses as likely the forecasts for 2017 of all the Autonomous Regions whose forecasts are different from Spain's forecasts.** As established in Organic Law 6/2013 on the creation of AIReF, this report is centred on the endorsement of autonomous regions' macroeconomic forecasts that present differences with those of the Spanish economy as a whole. In view of the heterogeneity regarding the preparation and approval of the Autonomous Regions' budgets for 2017, the ARs analysed amount to eight, namely: Andalusia, Balearic Islands, Canary Islands, Catalonia, Valencia, Galicia, Murcia and Navarra.

None of the ARs analysed have presented forecasts with an upward bias (outside the confidence interval) in GDP and employment. In the case of Andalusia, Canary Islands, Valencia, Galicia and Navarra, the forecasts are deemed prudent, as they present downward biases or fall within the lower limits of the intervals, as can be seen in chart 1 on GDP forecasts.

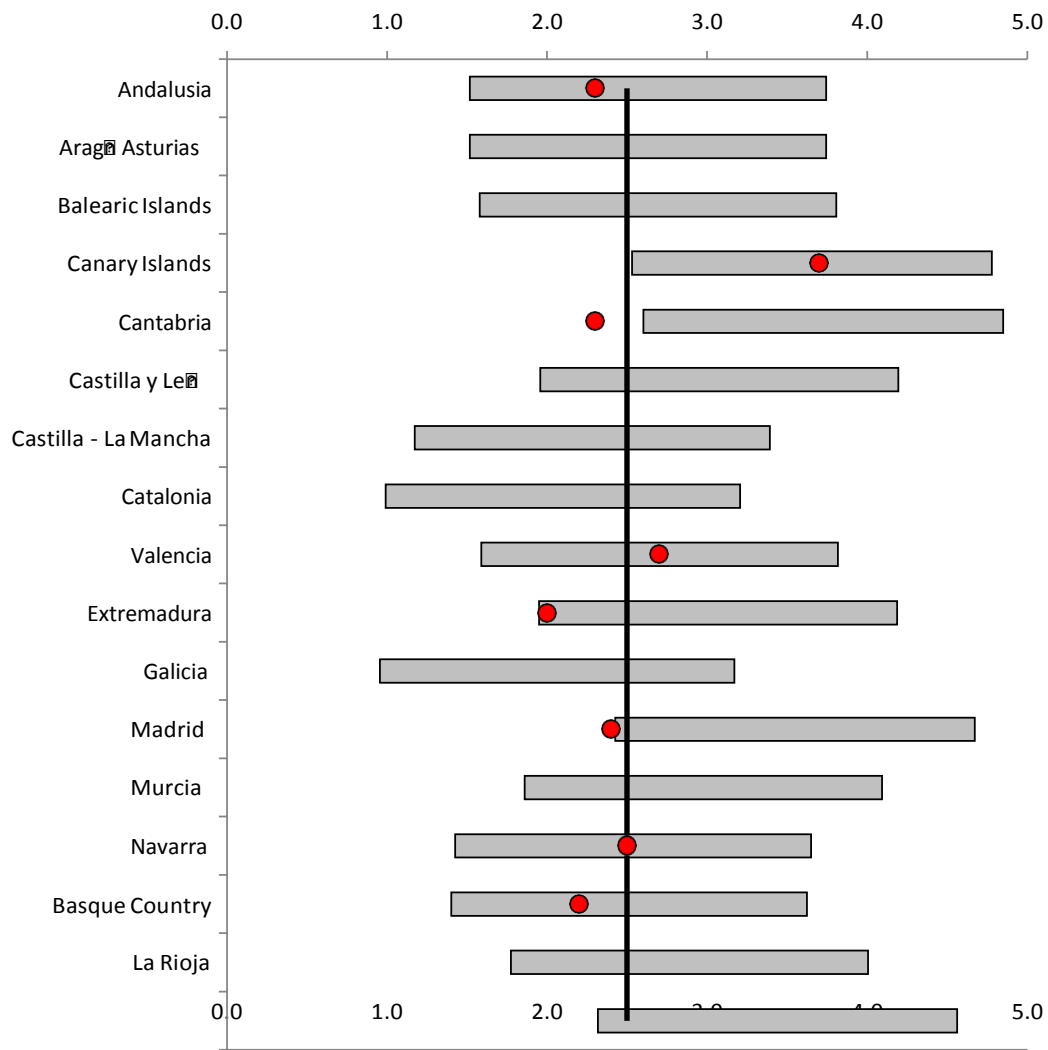
**In view of the analysis carried out, AIReF recommends:**

- **That the models and parameters used in drafting the macroeconomic forecasts are published,** in compliance with Directive 2011/85/EU on requirements applicable to the budget frameworks of member States.
- **That ARs submitting forecasts that are identical to those of the Spanish economy as a whole make this explicit.**

**As advice on good practices, AIReF**

- Underscores the importance of including a comparison against other independent forecasts.
- Insists on the need for ARs adopting forecasts that differ from the rest of the economy to provide information, at least, on GDP and employment in homogeneous terms.

Chart 1. Real GDP growth forecasts for 2017 (%)



Source: AIReF

## **Table of Contents**

<b>I. Introduction .....</b>	<b>5</b>
<b>II. Endorsement of the macroeconomic forecasts made by the Autonomous Regions for 2017 .....</b>	<b>8</b>
Table 1. Biases and assessment of forecasts for 2017 .....	8
Table 2. Forecasts for growth in GDP .....	9
Table 3. Forecast for growth in employment.....	9
Table 4. Formal and methodological requirements .....	10
<b>III. Recommendations and advice regarding good practices .....</b>	<b>10</b>
<b>ANNEX: CHARTS.....</b>	<b>11</b>
Chart 1. Real GDP growth forecasts for 2017 (%) .....	11
Chart 2. Employment growth forecasts for 2017 (%) .....	12
Chart 3. Panel forecasts for GDP growth.....	13
Chart 4. Panel forecasts for growth in employment .....	14
<b>METHODOLOGY ANNEX.....</b>	<b>15</b>

## **I. Introduction**

**AIReF is mandated to draft a report on the macroeconomic forecasts in the Public Administrations' draft budgets, indicating whether or not the forecasts are endorsed by AIReF**, as per article 14 in the Organic Law on its foundation and article 12 on its Organic Statute. However, should any government entity incorporate into or apply to its budgetary plans a set of forecasts that correspond exactly to those incorporated by another government entity within whose territorial scope it falls, if AIReF has already endorsed those forecasts it is not necessary for a specific report to be published. Instead, it will be sufficient to expressly state this circumstance in the draft budget itself.

**In December AIReF endorsed the Government's macroeconomic forecasts included in the Draft Budgetary Plan Update.** As stated in the report published by AIReF, the Government macroeconomic scenario for 2017 is deemed prudent overall and, therefore, is endorsed, on the grounds of exogenous assumptions and policies defined therein.

**At the time of publishing this report, only eleven ARs' macroeconomic forecasts have been analysed.** In view of the exceptional nature of the budget cycle for 2017, with the extension to the General State Budget coming into force automatically on 1 January 2017, the ARs' situation with respect to submission and approval of their budgets has been widely diverse. This has influenced the drafting of the macroeconomic forecasts underpinning those budgets. In sum, the forecasts that have been analysed are those for Andalusia, Asturias, Balearic Islands, Canary Islands, Cantabria, Catalonia, Valencia, Extremadura, Galicia, Murcia and Navarra.

**Eight of the eleven Autonomous Regions analysed submitted differentiated macroeconomic forecasts.** Among the forecasts analysed, no information is available for the macroeconomic scenario in Asturias, Cantabria and Extremadura. As no disaggregated forecasts are available for these regions, and no indication is given as to their adherence to the national forecast, the latter situation is assumed. This assumption is arguably upheld by the synchronicity between the ARs' economic cycles and the aggregate domestic economy (see table 1). However, this should not prevent the ARs from making disaggregated macroeconomic projections in the context of their budget cycle.

**The macroeconomic forecasts analysed need to satisfy certain requirements applicable to the budgetary frameworks of EU member States**, as specified in article 4 of Directive 2011/85/EU, of 8 November 2011. Article 14 of Organic Law 6/2013 on the foundation of AIReF requires its report on macroeconomic forecasts to assess the degree to which the forecasts meet these requirements. This report interprets that, in the case of the Autonomous Regions, these requirements are that forecasts must be:

- i. realistic and use the most up-to-date information.
- ii. based on the most likely macro-budgeting scenario or one that is more prudent.
- iii. compared with the forecasts of other independent bodies.
- iv. inclusive of the methodology, assumptions and relevant parameters underpinning the forecasts.

**This report evaluates the macroeconomic forecasts for GDP and employment for each Autonomous Region in 2017, estimating the confidence intervals for said forecasts and analysing for biases, but without conducting an ex-post assessment of previous years' forecasts.<sup>1</sup>**

**A bias will be deemed to exist in the forecast of a variable if the variable deviates by more than one standard deviation from the forecasts in the statistical models used to contrast it.** This is a statistical forecasting model that incorporates relevant information on complementary regional indicators in addition to the expected growth rates for Spain. The details can be consulted in the Methodology Annex.

**The criteria applied for endorsement of the GDP and employment forecasts** of those Autonomous Regions whose forecasts differ from the forecast contained in the Budgetary Plan Update 2017 are as follows:

- Forecasts **will not be endorsed** if they have an upward bias in both variables.
- They will be **endorsed as unlikely** if they have an upward bias in one of the two variables.
- They will be **endorsed as likely** if they do not have upward biases, and
- They will be **endorsed as prudent** if they fall within the lower limit of the interval (below the median) or have downward biases in both variables.

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<sup>1</sup> It should be pointed out that the unusual time delay in drafting the draft budgets by the autonomous regions has made it possible for the reference for the national economy aggregate not to be the forecasts made in the Stability Programme Update, as was the case last year, but those included in the Budgetary Plan Update.

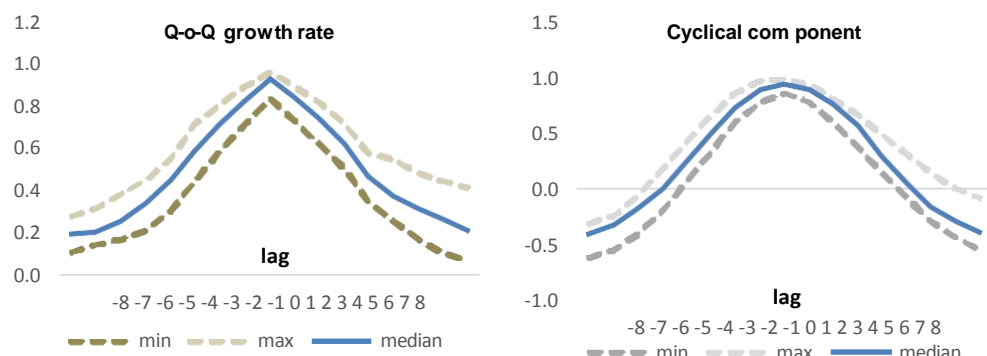
Table 1. Synchronicity in the national economic cycle and that of the autonomous regions

The degree of synchronicity among the autonomous regions (AR) is a significant aspect in the overall analysis of the fiscal position. To quantify this synchronicity, cross-correlation functions have been calculated between the growth rate for inter-quarterly GDP for each autonomous region and the growth rate for Spain.

As shown in figure 1, on the left panel, these correlations are clearly grouped at zero delay and centred around a high value (0.84 and 0.97). Consequently, the regional growth pattern is markedly procyclical and synchronic with regard to the aggregate. In terms of contemporary correlation, the maximum correlations correspond to Catalonia, Valencia and Murcia. At the other extreme are Balearic Islands, Castilla-La Mancha and Aragón.

As a test of robustness, the analysis was repeated applied to the cyclic components of the quarterly series for GDP. These cyclic components, estimated by means of Butterworth passband filters, isolate the recurrent fluctuations with a duration of 2 to 8 years from the remainder of components of the series observed. The results are shown on the right-hand panel in figure 1. Again, high synchronicity is observed among regional economies' cycles as well as the intensity of their correlation with the aggregate cycle, to which that of Spain comes close. These correlations are grouped contemporaneously in a range of high values, between 0.86 and 0.98. At present, the ARs with the highest contemporary correlation are Valencia, Catalonia and Basque Country, while Canary Islands, Castilla-La Mancha and Cantabria display the lowest.

Figure 1: Cross-correlation functions with Spain



These results are in tune with those presented by Bandrés et al (2017), who estimate that the Spanish ARs are united in a single group when analysed together with the remainder of European regions.

Bandrés, E., Gadea-Rivas, M.D. & Gómez-Loscos, A. (2017) "Regional business cycles across Europe", Banco de España, Working Paper No. 1702.

## II. Endorsement of the macroeconomic forecasts made by the Autonomous Regions for 2017

AIReF endorses the macroeconomic forecasts for 2017 incorporated in the budgets (or draft budgets) of ARs that have submitted information. Of the ARs analysed, none have submitted forecasts identified by the model used for checking purposes as upwardly biased for GDP and employment, as summarized in table 1.

The forecasts for Andalusia, Canary Islands, Valencia, Galicia and Navarra are endorsed as prudent, whereas endorsement for the three remaining regions falls within the category of likely, defined above.

Table 1. Biases and assessment of forecasts for 2017

	<b>GDP</b>		<b>EMPLOYMENT</b>	
	Bias	AR forecasts	Bias	AR forecasts
Andalusia	NO	LOW	NO	LOW
Balearic Islands	NO	MEDIUM	...	...
Canary Islands	YES*	LOW	YES*	LOW
Catalonia	NO	MEDIUM	NO	LOW
Valencia	NO	LOW	NO	LOW
Galicia	NO	LOW	NO	LOW
Murcia	NO	MEDIUM	NO	LOW
Navarra	NO	LOW	NO	LOW

\* The biases presented by Canary Islands are downward biases, falling below the lower limit of the confidence interval.

**Overall, it appears that none of the forecasts lean toward optimism (top of the interval), either in GDP or in employment, as reflected in tables 2 and 3, and in the panels shown in charts 1 and 2 (see annex on charts).**



Table 2. Forecasts for growth in GDP

GDP	2016			2017		
	Lower limit	Upper limit	AR forecast	Lower limit	Upper limit	AR forecast
Andalusia	2.2	3.6	2.9	1.5	3.7	2.3
Aragón	2.2	3.6	NP	1.5	3.7	NP
Asturias	2.6	3.9	ND	1.6	3.8	ND
Balearic Islands	3.2	4.6	4.1	2.5	4.8	3.7
Canary Islands	3.2	4.5	3.1	2.6	4.9	2.3
Cantabria	2.4	3.8	ND	2.0	4.2	ND
Castilla y León	2.1	3.5	NP	1.2	3.4	NP
Castilla-La Mancha	2.6	4.0	NP	1.0	3.2	NP
Catalonia	2.6	4.0	3.4	1.6	3.8	2.7
Valencia	3.2	4.6	3.2	2.0	4.2	2.0
Extremadura	1.8	3.1	ND	1.0	3.2	ND
Galicia	2.8	4.1	3.1	2.4	4.7	2.4
Madrid	2.5	3.9	NP	1.9	4.1	NP
Murcia	3.0	4.3	3.3	1.4	3.7	2.5
Navarra	2.5	3.9	2.8	1.4	3.6	2.2
Basque Country	2.6	4.0	NP	1.8	4.0	NP
Rioja	2.9	4.3	NP	2.3	4.6	NP

Table 3. Forecast for growth in employment.

Employment	2016			2017		
	Lower limit	Upper limit	AR forecast	Lower limit	Upper limit	AR forecast
Andalusia	1.7	3.5	2.7	1.5	4.6	2.2
Aragón	1.0	2.9	NP	0.0	3.1	NP
Asturias	1.5	3.3	ND	0.2	3.3	ND
Balearic Islands	3.3	5.2	ND	2.7	5.8	ND
Canary Islands	2.8	4.6	4.3	2.7	5.8	2.0
Cantabria	1.6	3.4	ND	1.2	4.3	ND
Castilla y León	1.2	3.1	NP	0.8	3.9	NP
Castilla-La Mancha	1.8	3.6	NP	0.1	3.2	NP
Catalonia	2.3	4.2	3.0	0.9	4.0	2.2
Valencia	2.4	4.2	2.8	1.8	5.0	2.5
Extremadura	1.2	3.0	ND	0.0	3.1	ND
Galicia	1.6	3.5	1.9	0.7	3.8	1.6
Madrid	1.6	3.4	NP	1.4	4.5	NP
Murcia	3.3	5.2	5.7	1.6	4.7	1.8
Navarra	1.0	2.8	2.4	0.4	3.4	1.7
Basque Country	1.8	3.6	NP	0.2	3.3	NP
Rioja	0.9	2.7	NP	0.1	3.1	NP

**Note:** ND denotes information that is not available among the submitted information; NP denotes information that has not been submitted

With regard to the remaining applicable requirements defined above, their compliance is varied, as shown in table 4. All of the forecasts make use of the latest information available, and specify the underlying exogenous assumptions. It must be said, however, that none of the forecasts provide sufficient specific details of the methodologies and parameters used. Similarly, it must be pointed out that only two of the eight regions analysed fail to include a comparison with other forecasts: Balearic Islands and Murcia.

Table 4. Formal and methodological requirements.

	UPDATED INFORMATION*	COMPARISON WITH OTHER FORECASTS	EXOGENOUS ASSUMPTIONS	METHODOLOGIES AND PARAMETERS
Andalusia	Y ES	Y ES	Y ES	NO
Balearic Islands	Y ES	NO	Y ES	NO
Canary Islands	Y ES	Y ES	Y ES	NO
Catalonia	Y ES	Y ES	Y ES	NO
Valencia	Y ES	Y ES	Y ES	NO
Galicia	Y ES	Y ES	Y ES	NO
Murcia	Y ES	NO	Y ES	NO
Navarra	Y ES	Y ES	Y ES	NO

**Note:** ND denotes information that is not available among the submitted information; NP denotes information that has not been submitted

### III. Recommendations and advice regarding good practices

In view of the analysis carried out, AIReF recommends:

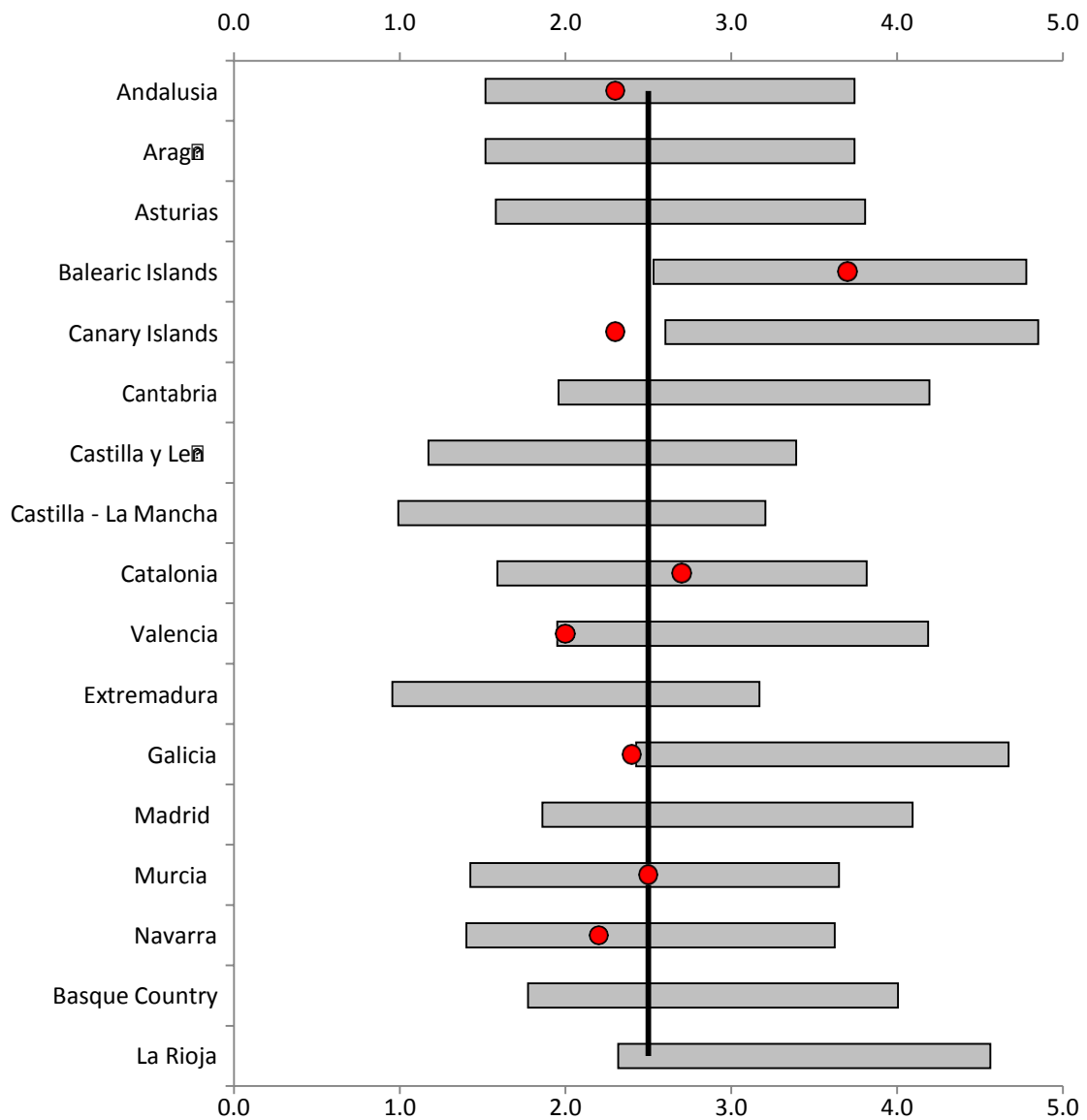
- **That the models and parameters used in drafting the macroeconomic forecasts should be published**, in compliance with Directive 2011/85/EU on requirements applicable to the budget frameworks of member States.
- **That ARs submitting forecasts that are identical to those of the Spanish economy as a whole should make this explicit.**

As advice on good practices, AIReF

- Underscores the importance of including a comparison against other independent forecasts.
- Insists on the need for those ARs adopting forecasts that differ from the rest of the economy overall to provide information, at least, on GDP and employment in homogeneous terms.

## ANNEX: CHARTS

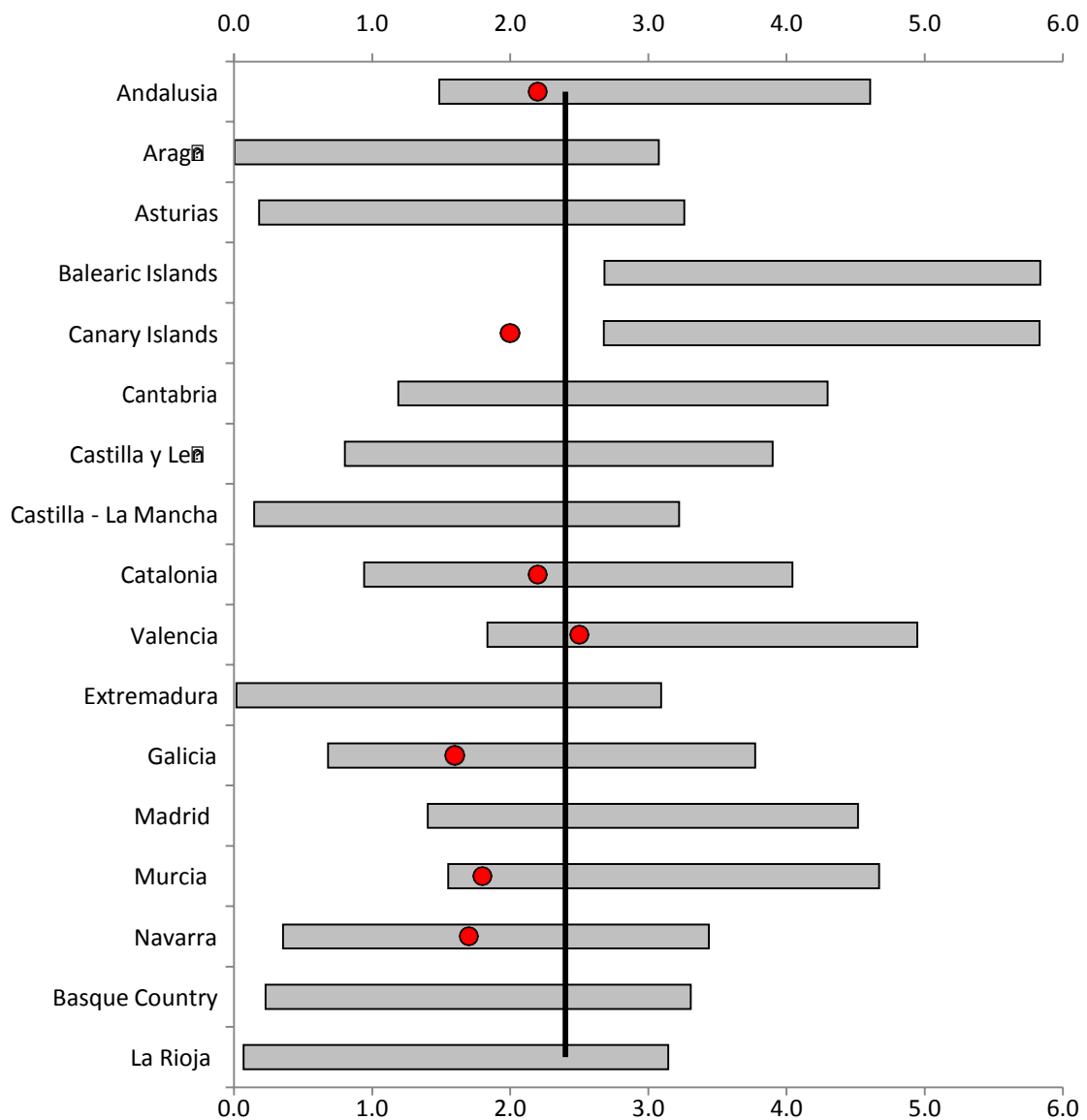
Chart 1. Real GDP growth forecasts for 2017 (%)



Source: AIReF

The dots indicate the forecasts submitted by the ARs and the line is the forecast for Spain included in the 2016 General State Budget. The grey bands represent the confidence intervals at 68% probability estimated by AIReF.

Chart 2. Employment growth forecasts for 2017 (%)

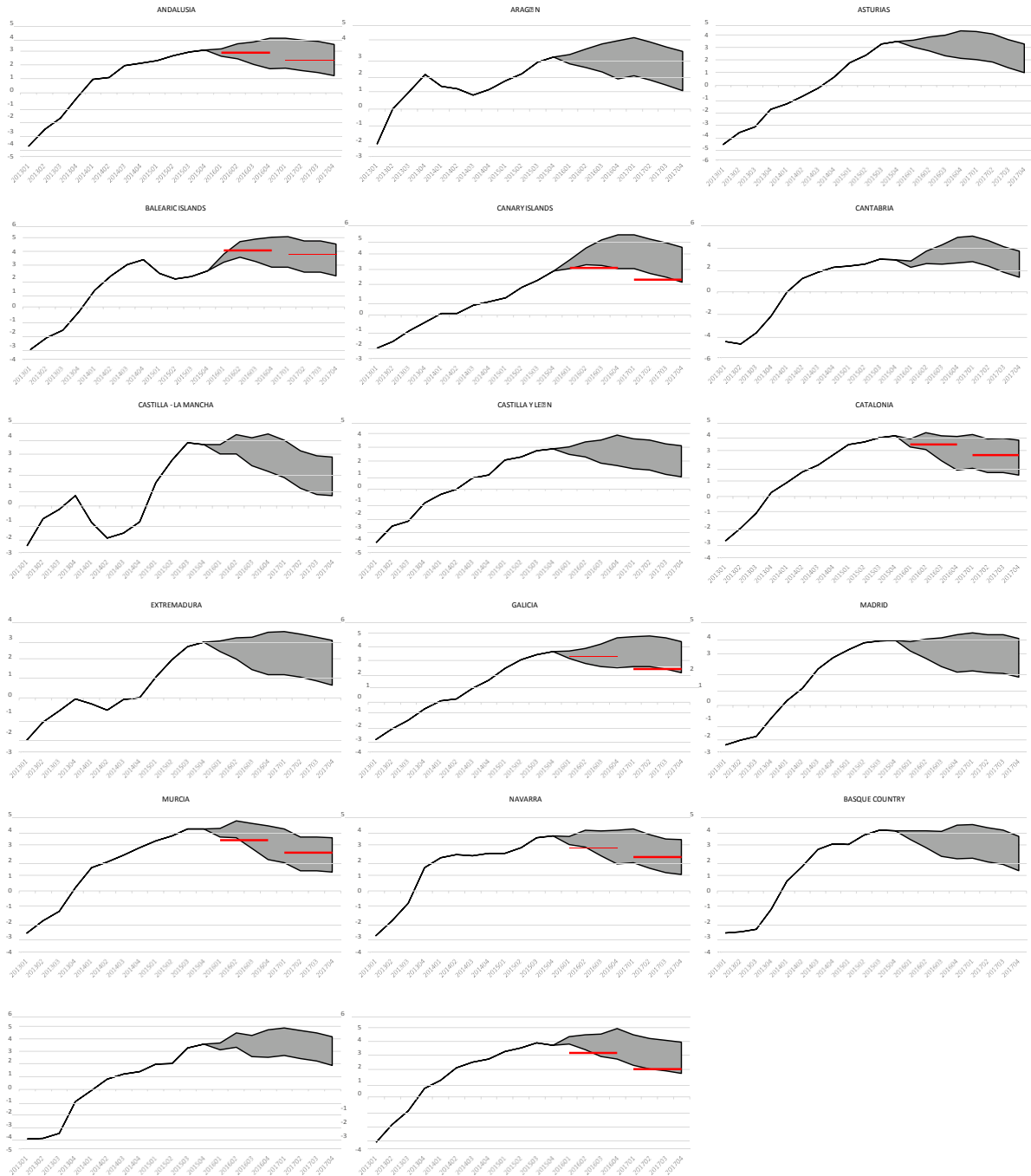


Source: AIReF

The dots indicate the forecasts submitted by the ARs and the line is the forecast for Spain included in the 2016 General State Budget. The grey bands represent the confidence intervals at 68% probability estimated by AIReF.

Chart 3. Panel forecasts for GDP growth

Year-on-year variation

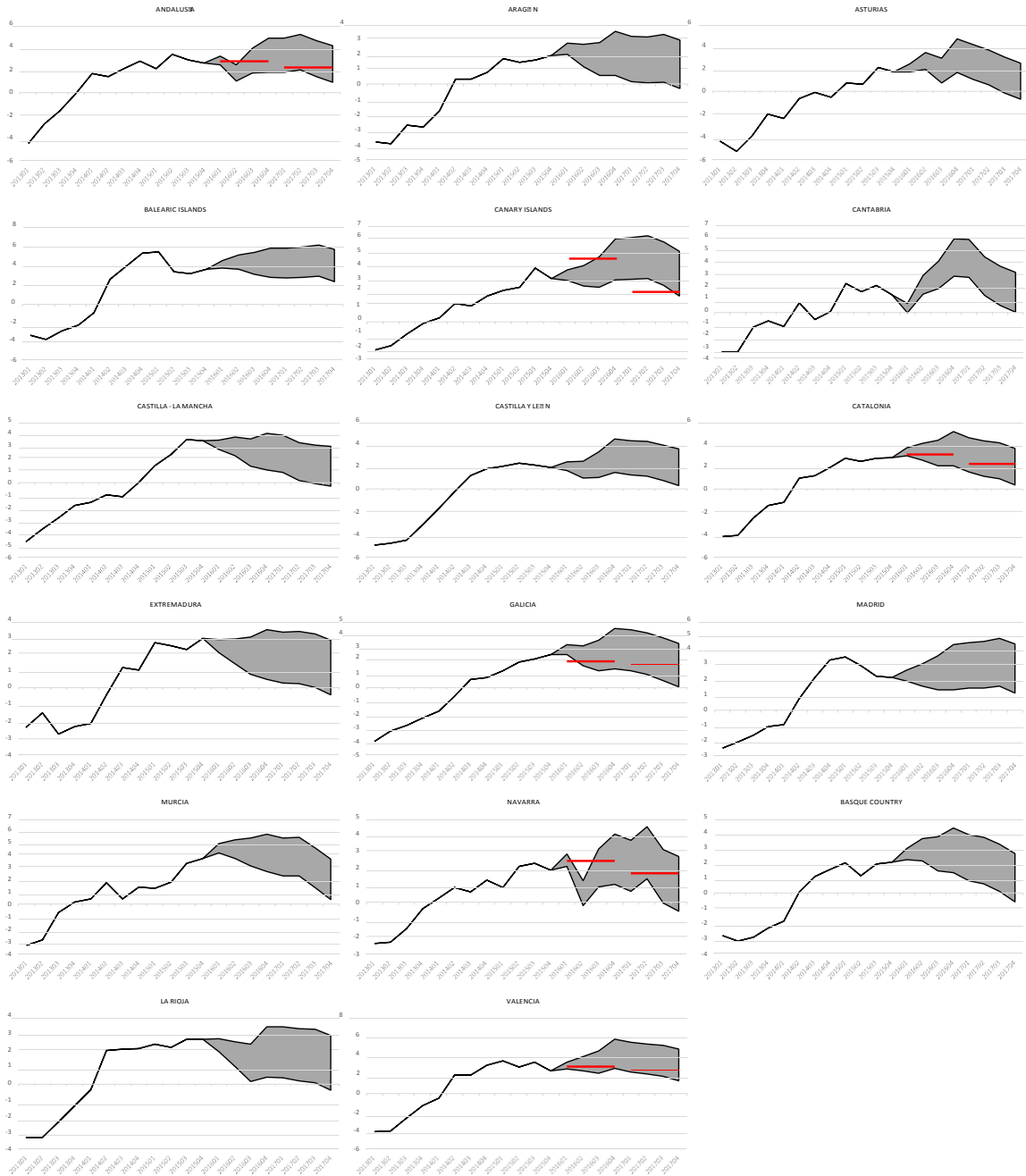


**Note:** The horizontal lines represent the forecasts of the different ARs

**Source:** AIReF

Chart 4. Panel forecasts for growth in employment

Year-on-year variation



**Note:** The horizontal lines represent the forecasts of the different ARs

**Source:** AIReF

## METHODOLOGY ANNEX

The quantitative methodology used in the Prediction Model combines three kinds of statistical data available for regional analysis: monthly data on short-term economic indicators broken down to a territorial level, annual data compiled in national accounting terms by Spain's Regional Accounts (SRA) and finally, the estimates for Spain as a whole published in Spain's National Quarterly Accounts (CTR). This combines the latest and most up-to-date short-term indicators, the structural information provided by the SRA and the national reference, to ensure the consistency of individual regional estimates.

In order to integrate these sources of information that differ in both their compilation procedures and their publishing timelines (monthly, quarterly and annual), a three-stage procedure has been designed that allows their integration in an econometrically sound and operative manner.<sup>2</sup>

The first stage consists of extrapolating short-term regional indicators by using their ARIMA univariate representations. The extrapolated series are corrected for seasonal and calendar effects using the same methodology as the CNTR. Finally, the short-term indications are merged using factorial analysis techniques that give rise to a synthetic quarterly index for each Autonomous Region.

The short-term relevance and responsiveness of the indicators is integrated in the second stage, in the form of the synthetic index estimated in the previous stage, with the structural soundness of the SRA estimates in three main dimensions:

- Consistency, for each region, between the macroeconomic aggregate (GDP, employment) and its component parts.
- Coherence, for each region, between the estimates of their operations in nominal terms (at current prices) and in terms of volume (chain-linked indices).
- Coherence, for all the regions, between the individual estimates and those of the national total (transverse consistency).

Benchmarking methods (temporal disaggregation) allows quarterly aggregate series (GDP, employment) to be estimated for each Autonomous Region using the short-term information condensed in the regional high-frequency synthetic indices, giving rise to time series that are consistent with SRA annual series.

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<sup>2</sup> See Cuevas et al (2013) and Cuevas and Quilis (2015).

Lastly, transverse coherence is ensured in the third stage between the quarterly estimates of the macroeconomic aggregate (GDP, employment) calculated for each Autonomous Region and the nationwide information provided by the CNTR and the forecasts for these variables for Spain as a whole calculated by AIReF. Once again, benchmarking techniques are used (multivariate temporal disaggregation) to guarantee transverse consistency without losing the temporal consistency attained in the previous stage.

In the specific case of GDP, temporal consistency requires giving consideration to the non-additive character of the chain-linked volume figures used by Spain's National Accounts. This procedure means that the links have to be obtained for each Autonomous Region and for Spain as a whole (quarterly and annual flows assessed at average prices for the previous year); benchmarking procedures have to be applied to these variables; and the volume indices have to be reconstructed using the chain-linking formulae used by CNTR.



## References

Abad, A., Cuevas, A. & Quilis, E.M. (2009) [“Índices trimestrales de volumen encadenados, ajuste estacional y benchmarking”](#), Instituto de Estudios Fiscales, Working Paper No. 05/09.

Caporello, G. & Maravall, A. (2004) [“Program TSW. Revised manual”](#), Banco de España, Occasional Paper No. 0408.

Cuevas, A. & Quilis, E.M. (2015) [“Quarterly regional GDP flash estimates for the Spanish economy \(METCAP model\)”](#), AIReF, Working Paper 3/2015.

Cuevas, A., Quilis, E.M. & Espasa, A. (2013) [“Combining benchmarking and chain-linking for short-term regional forecasting”](#), Departamento de Estadística, Universidad Carlos III de Madrid, Working Paper No. 11/41.

Gómez, V. & Maravall, A. (1996) [“Programs TRAMO and SEATS”](#), Banco de España, Working Paper No. 9628.