



Independent Authority
for Fiscal Responsibility

Report

29st July 2015

Report on the macroeconomic forecasts in the 2016 Draft State General Budget

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.

AIReF:

José Abascal, 2, 2nd floor. 28003 Madrid. Tel. +34 910 100 599

E-mail: Info@airef.es

Website: www.airef.es

The information in this document may be used and reproduced, in whole or in part, provided its source is acknowledged as AIReF.

Executive summary:

AIReF endorses the Spanish government's macroeconomic scenario forecasts as likely. AIReF regards the government's macroeconomic scenario as likely overall although the eventual composition of growth may be different from the forecast.

The risks stemming from the external environment are balanced. The assumptions made about interest rates are prudent and the assumptions about the growth of the international economy, oil prices and exchange rates are realistic.

The government forecasts are subject to fiscal policy implementation risks. Insufficient implementation of the stringent policy to restrict government sector consumption —affecting the Autonomous Regions (ARs) above all— represents a major risk. AIReF's view is that it will be difficult to meet the government deficit targets.

AIReF recommends publication of the methodologies, assumptions and parameters underpinning the forecasts. The Ministry of Economy has indicated its readiness to follow this recommendation and so should include these methodologies, assumptions and parameters in the Spring 2016 Stability Programme Update.

1.	Introduction.....	5
2.	Macroeconomic forecasts for the years 2011 to 2014	7
2.1	Criteria for comparison with other forecasts.....	7
2.2	Analysis of the forecasts for 2011-2014	8
3.	Macroeconomic forecasts for 2015-2016	10
3.1	General remarks.....	10
3.2	Analysis of the forecasts.....	10
3.2.1	International environment.....	10
3.2.2	GDP and demand composition	11
4.	Conclusions: realism and risks in the forecasts.....	16
5.	Endorsement of the forecasts and specific recommendations	19
	ANNEX OF TABLES AND GRAPHS.....	20
	Tables 20	
	C.1) Key assumptions in the 2015-2016 scenario	20
	C.2) Macroeconomic forecasts made by the Spanish government ..	21
	C.3) Forecasts made by international organisations	22
	Graphs	23
	G.1) Forecasts and macroeconomic results 2011-2014	23
	G.2) Forecasts for the Spanish economy 2015-2016.....	24
	ANNEX ON METHODOLOGY	26
1.	Structural single-equation models.....	26
1.1	Household final consumption.....	27
1.2	Investment in capital: capital equipment	27
1.3	Investment in capital: construction.....	27
1.4	Exports of goods and services	28



1.5	Imports of goods and services	28
2.	Reduced-form multivariate model	28
3.	Dynamic factor models.....	29
4.	Bibliographical references	32

1. Introduction

The Independent Authority for Fiscal Responsibility (AIReF) is required by the Organic Law under which it was established to prepare a report on the macroeconomic forecasts incorporated in the draft budgets of all the administrations in the General Government sector in Spain. The report must indicate whether or not AIReF endorses the forecasts. This report on the macroeconomic forecasts in the 2016 State General Budget Draft complies with that statutory duty. The main body of the report is divided into two sections: the first one evaluates the macroeconomic forecasts of previous years (Section 2) and the second one analyses in detail the forecasts for 2015 and 2016 (Section 3). Lastly, Section 4 takes an overall look at the results of this analysis and puts forwards the conclusions reached by AIReF and its specific recommendations.

The macroeconomic forecasts made in previous years are examined in order to assess whether the errors in them have had any significant biases¹. To do that, AIReF first compares the government's forecasts for the key macroeconomic variables with the forecasts made by other independent institutions, both private and public. Secondly, it compares them with the actual results observed. A bias in the forecasts of the different macroeconomic variables is deemed significant if it has been systematic, i.e. repeated in consecutive years and if, in addition, it has been a large bias and is not justified by a better approximation to the observed results. However, AIReF does not analyse the possible explanations for those biases.

The aim of the detailed analysis of the Spanish government's forecasts for 2016 is to evaluate whether they are realistic and if they define the most likely macroeconomic scenario or a more prudent one². To do that, the forecasts are first checked to see if there is any bias in them by comparing them with the forecasts made by other institutions as was done in previous years. Also, the methods, parameters and assumptions underpinning the forecasts are revised

¹ Article 14.4 of the Organic Law on the establishment of an Independent Fiscal Authority under which AIReF was set up states that this report shall include an assessment in order to determine if there is any significant bias in macroeconomic forecasts estimated for a period of four consecutive years, all in accordance with COUNCIL DIRECTIVE 2011/85/EU of 8 November 2011 on the requirements applicable to the budgetary framework of Member States.

² Article 14.3 of the Organic Law on the establishment of an Independent Fiscal Authority under which AIReF was set up states that this report shall determine if the forecasts made are compliant with COUNCIL DIRECTIVE 2011/85/EU of 8 November 2011 on the requirements applicable to the budgetary frameworks of Member States. Article 4.1 of that directive says that budgetary planning shall be based on the most likely macrofiscal scenario or on a more prudent scenario.

—provided the available information allows that to be done— and a check is done to find out if the most up-to-date information has been used to make the forecasts.

AIReF analyses how realistic the forecasts of each variable are using models that establish a statistical relationship between the different variables and with behavioural equation models that relate each variable to their fundamental determinants³. These partial results about the probability of the forecast made for each variable are subsequently integrated into a macroeconomic scenario that guarantees the internal consistency of the set of related variables in national accounts, as well as the risks that exist in that scenario.

AIReF then makes an overall assessment of the results of these comparative checks to conclude whether or not the macroeconomic scenario contained in the Spanish government’s State General Budget Draft for 2016 is deemed the most likely scenario or a more prudent one. A more prudent scenario would be a scenario that took into account the materialisation of any risks identified in the baseline scenario that would be unfavourable for economic activity and the correction of the existing imbalances.

³ The models used and how they are applied in the analysis of the forecasts is described in the Annex on methodology.

2. Macroeconomic forecasts for the years 2011 to 2014

2.1 Criteria for comparison with other forecasts

When comparing different forecasts it is essential to bear in mind the information that was available at the time each forecast was made and the specific assumptions that were used in them because these two elements can have a significant influence on the differences observed between them. The reasons for such differences need to be understood for an assessment to be made on whether there have been any ex ante biases in the government forecasts, i.e. biases at the time they were made. The comparisons of the forecasts for 2015 and 2016 are considered in the next section of this report.

Ex post comparisons check whether the errors in the government forecasts were associated with a significant bias when compared to the forecasts of other institutions. The institutions used for comparison purposes include both private institutions (grouped together in the consensus forecast) and public institutions (European Commission, Banco de España, IMF and OECD, each considered individually). The purpose here is not to analyse or justify the reasons that could explain the differences observed in previous years.

The consensus forecasts of the private institutions are published regularly but they do not cover all the variables of interest to us. The latest forecasts published before the draft budget is presented may include the most up-to-date information publicly available and all the forecasts are published at the same time. For comparison purposes, the average or consensus forecast of this diverse panel of private forecasters provides a satisfactory reference in terms of the independence and predictive results of the key macroeconomic variables.

The forecasts made by the European Commission, Banco de España, the OECD and the IMF are more complete but less directly comparable because they are published less frequently. As a result they could be out-of-date by the time the government is preparing its forecasts, and their specific assumptions may differ substantially. That is why although the latest forecasts published by the public institutions are a highly relevant part of all the information on which the government's forecasts are based, they will be dealt with separately from those of the private institutions.

If a bias in the government forecast is large, not justified and repeated over several consecutive years it will be considered a significant bias. A bias in a variable is defined as the difference between two forecasts for that variable. To assess whether the biases in the government forecasts for the different variables defining its macroeconomic scenario were significant in recent years, the government's initial forecasts (G) are compared with the most recent previous forecasts of the private institutions published in the consensus forecast (C) and with the observed result (R), or the most up-to-date forecast made by the government itself is used if the result has not yet been estimated. A bias is large if the government forecast falls outside of the interquartile range⁴ of distribution of the panel forecasts. The deviation of the government forecasts against the consensus forecasts will be considered not justified if its absolute forecast error is greater than that of the consensus forecast; in other words if $|G-R| > |C-R|$.

2.2 Analysis of the forecasts for 2011-2014

The forecasts for the years 2011-2013 were already analysed by AIReF in its Report on the macroeconomic forecasts in the 2015 State General Budget Draft⁵. In this section AIReF examines the forecasts made for 2014 and assesses the ex post biases of the forecasts for the years 2011-2014 (see G.1 panel of graphs). The updated forecasts made by the government for 2015 are studied in the following section of this report together with the forecasts for 2016 in the light of the information available up to the present time.

The real GDP growth forecast by the government for 2014 in its Budget bill submitted to Parliament in September 2013 was the same figure as in the consensus forecasts (0.7%) published that month. The composition of expected domestic demand according to the government's forecasts differed considerably from the consensus view because the government expected more growth in private consumption demand and investment, offset by a steeper fall in government expenditure on goods and services. The European Commission, on the other hand, was rather more optimistic in its forecast, predicting 0.9% growth.

During the course of 2014 there were positive surprises in the economic growth trend, driven by domestic demand. After successive upward revisions, real GDP growth ended the year on 1.4%, double the anticipated figure included in the State Budget for the year. Moreover, the labour market also developed more positively than had been forecast, surprising the government and the consensus

⁴ The interquartile range is a dispersion measure defined as the difference between the first and third quartile, thus including 50% of the observations found around the median.

⁵ Available in [Report on macroeconomic forecasts Draft State Budget for 2015](#)

institutions in equal measure. The negative bias in government consumption in the Spanish government's initial forecast, on the other hand, was not justified ex post, as it remained practically flat in real terms.

The consensus agreed with the government's deficit target for 2014 (5.8% of GDP). The result has been in line with that forecast (5.7% excluding financial assistance), and could have been even better if there had not been the negative impact of a one-off, non-recurring event (the refund of the so-called "health cent").

For the years 2011-2014 the government's forecasts have had systematic, generally small, biases when compared against the consensus forecasts.

There have been the same upside or downside biases in consecutive years in most of the variables (See G.1 panel of graphs). The average absolute bias of the government's forecasts for the period between 2011-2014 when compared against the consensus forecasts was 0.8% for all the variables taken together as a set, and 0.9% for GDP and its components. In the four years between 2011 and 2014 the government forecast was always higher than the consensus forecast for growth in private consumption and lower for government consumption. The government forecasts for the balance of current operations with the rest of the world and for the government deficit were also persistently more positive than the consensus forecasts. Lastly, for the growth rates of real GDP, exports and imports, consecutive upside biases were recorded through the years 2011-2013.

The mean absolute error (MAE) in the government' forecasts in its macroeconomic scenarios for the years 2011 to 2014 was greater than the MAE in the consensus forecasts. For the eleven variables included in the scenarios, the mean error in the government forecasts was 1.5%, compared to the 1.1% error in the consensus forecast. If only GDP and its five demand-side components are considered, the respective mean errors for government and consensus forecasts are 1.6% and 1.4%. This behaviour was especially relevant in the case of private and government final consumption expenditure. The ex post deviations of these variables against the initial forecasts are partly related to the persistence of the economic recession as a context and the sharper than expected contraction of private consumption that softened the procyclical contractionary adjustment the fiscal policy had been programmed with.

The biases can be regarded as significant in the case of the real growth rates for private consumption (2011-2013) and government consumption (2012-2014). The government's initial forecasts were outside the respective interquartile ranges and these deviations turned out not to be justified ex post by a greater approximation to the outcomes eventually observed during three consecutive years.

3. Macroeconomic forecasts for 2015-2016

3.1 General remarks

The macroeconomic scenario forecasts made by the Spanish government for 2015-2016 use the most updated information available. This information includes the latest economic indicators, which have a very significant influence on the immediate outlook and therefore on the whole macroeconomic scenario for both years.

No information has been published about the methodologies and parameters that underpin the government forecasts.⁶ As AIReF has already pointed out in earlier published reports, although the methodology used to draw up the forecasts appears to be standard, with models and equations widely used by analysts, the specific instruments used have not yet been published. Furthermore, nor is the set of information and forecasts that should be included in an accounting framework to give it unity and internal consistency published together with the forecasts. This makes it extremely difficult to understand the connection between the key variables in the macroeconomic scenario described.

3.2 Analysis of the forecasts

3.2.1 International environment

The international economy has developed positively in the first half of 2015. The external assumptions of the macroeconomic forecasts contained in the budget for 2015, which were aligned with the assumptions made by international organisations such as the IMF and the ECB, expected a favourable international context: an expansionary monetary policy with falling interest rates and lower sovereign risk premiums, moderate fiscal consolidation, a faster pace of growth in the euro area and a lessening of geopolitical tensions. These hypotheses would suggest on the whole the existence of downside risks stemming from lower growth in the euro area, a less bullish financial environment or heightened geopolitical tensions. These risks have not materialised. There were also upside risks, albeit with a more limited short-term impact, such as the risks derived from a bigger fall

⁶Article 4.5 of Directive 2011/85/EU requires Member States to make public the methodologies, assumptions and parameters underpinning their macroeconomic and budgetary forecasts.

in the value of the euro and a stronger reactivation of lending, as a result of the monetary policy measures implemented. These risks, on the contrary, have materialised to a fair extent, fuelling an even more expansionary international context than the one envisaged in the Spanish government's budget for 2015.

The basic hypotheses in the macroeconomic scenario for 2016 are prudent and slightly more conservative than the forecasts of the international institutions and market expectations (see tables C.1 and C.3). The assumptions for 2016 build a probable external environment in which the recovery in the advanced economies—especially in the European Union and in the euro area—gains momentum and the possible downside risks do not materialise. This scenario rests on two assumptions. Firstly, that oil prices will continue to be significantly lower than in the past, so driving up real disposable income in oil-importing countries. Secondly, that the ECB will maintain its expansionary policy and its asset purchase programme will have a positive impact (limited by the Greek situation) on the interest rate curve, the euro exchange rate and the price of equities, as well as reducing financial fragmentation. Lastly there is an implicit assumption of no further escalation in geopolitical tensions.

The key hypotheses assume that the long-term interest rates on Spanish government debt will rise significantly, while still remaining at historically low levels against a backdrop of improving financing conditions for businesses and families. In the macroeconomic scenario the yields on 10-year Spanish government bonds would rise to 2.15% in 2015 and 2.6% in 2016. This hypothesis implies a widening of the Spanish sovereign debt spread against the German bond, which would be compatible with the fact that tensions in Greece will continue to be a factor right through 2016. At any rate it is consistent with some degree of normalisation of financing conditions for firms and households, after the significant bank restructuring process in Spain and the progress made to bring down private-sector debt levels.

3.2.2 GDP and demand composition

In line with the other institutions, the Spanish government forecast for 2015 envisaged a consolidation of the economic recovery with a 2% real GDP growth rate. The forecasts for domestic demand composition also greatly matched those of other institutions with private consumption growing around 2% and government consumption acting as a slight contractionary influence, investment in capital equipment growing at high rates and the construction sector moving into a new expansionary phase after a lengthy and deep recession over the past few years. Net external demand was expected to make a positive

contribution to the real growth in GDP (0.2%) as a consequence of exports growing faster than imports.

These government macroeconomic scenario forecasts for 2015 were regarded as realistic overall, when taking into account the methodological peculiarity that the forecast contraction in government consumption is of a normative nature. The initial upside bias in the government's forecast for real growth in gross fixed capital formation was also large and was linked to the uncertainty about the strength of the cyclical upturn in construction and the slowdown in investment in capital equipment. The biases in the other variables were smaller and their impact on the growth of GDP was approximately neutral. In domestic demand the risks were slightly downward in private consumption and gross fixed capital formation and upward in government consumption. In external demand upside risks were perceived in both exports and imports with a net effect that was approximately neutral. The risks for growth in real GDP and employment were judged to be balanced.

The expansion of the Spanish economy picked up pace in the first half of 2015. The macroeconomic cyclical upswing scenario has developed significantly better than predicted in the budget forecasts for 2015. The downside risks identified in October have not materialised; indeed additional factors fuelling growth have appeared in the scenario. There is greater confidence in both Spain and the international economy with domestic demand, the external sector and the labour market all developing better than expected.

The real GDP growth forecasts for 2015 and 2016 have been revised upwards, to 3.3% this year and 3% for next year. Although all the short-term forecasts have been revised in the same direction, the Spanish government's forecasts are situated at the upper end of the range of private forecasts in the FUNCAS panel and in forecasts by public institutions, although the upside bias is only two tenths of a percentage point in 2015 and three tenths in 2016 (see G.2 panel of graphs), which according to AIReF's methodology is classified as a large bias. This bias falls within the confidence interval of a standard deviation in the forecast of the statistical models used by AIReF (see G.3 panel of graphs, which have been generated using the dynamic forecasting model methodology described in the Annex on methodology). As such, they cannot be regarded as unlikely.

Economic growth is mainly underpinned by private consumption. The forecast for growth in real private consumption for 2015 as included in the budget (2.1%) was judged likely and in line with the other available forecasts. Those forecasts have fallen far short of actual outcomes and the average consensus forecast now stands at 3.3%, very close to the 3.4% put forward in the

government's macroeconomic scenario. The strong recovery of the labour market and the housing market, rapid job creation, the slight fall in prices and the substantial progress made in the process to bring down household debt levels are all boosting real disposable income levels. Combined with greater consumer confidence and an additional impact of tax cuts, these factors are underpinning high levels of consumption growth that even entail a slight fall in the savings rate. For 2016, the government is forecasting a slight slowdown in private consumption (down to 3%) that is lower than the figure predicted in the consensus of private institutions (2.8%) and the figures forecasted by Banco de España (2.3%), the European Commission (2.8%) and the OECD (2.6%). The models used by AIReF to check the forecasts put the government's forecasts close to the centre of the confidence interval (see G.3 panel of graphs).

Private consumption forecasted by the government for 2015-2016 incorporates a normative element that, as in previous years, cannot be considered "the most likely hypothesis". In the previous three years already, the initial forecasts for public consumption contained in the State General Budget bills had been characterised by a significant restrictive bias. The forecast for 2015 of a 1% fall in real public consumption was a little more than a standard deviation in the consensus forecast that was for zero growth, and outside the interquartile range. The bias was therefore large and AIReF warned that it was unlikely that the reduction in public consumption forecast by the government would be achieved unless additional cost containment measures were implemented, especially in the autonomous regions. The government's updated forecasts are now saying that this variable will stabilise in 2015 although the available indicators show a pattern of sustained acceleration and the pure statistical forecasting models point to some growth in government consumption. In the 2016 government budget bill this restrictive orientation for government consumption is maintained as one of the key elements of the fiscal consolidation strategy followed consistently over recent years. This countercyclical policy of stringently contained expenditure at a time of rapid recovery of private demand would have a moderating effect on the financial imbalances that this expansion generates and would help make real GDP growth more sustainable in the medium term. However, no information has been made available to AIReF allowing it to appraise the measures that might uphold this forecast.

The government forecasts of growth in gross fixed capital formation for 2015-2016 seem optimistic. Although the initial forecasts for 2015 were also slightly optimistic (4.5%), displaying a large upside risk compared with the private forecaster consensus, they were not considered unlikely as they fell sufficiently within the confidence intervals estimated with AIReF's models. That bias in the government's forecasts has been correct and none of the current forecasts for the

current year are below that initial forecast. However, successive upward revisions of the government's forecasts now put gross fixed capital formation growth at 6.4% for this year and 5.5% for next year, keeping a significant upward bias compared to other private and public forecasts. Both rates are situated in the upper part of the confidence range of AIReF models, both for investment in capital equipment and primarily for investment in construction. The short-term projections of the model suggest a slowdown in investment towards the end of the current year. Furthermore, the incorporation of the notable rise in interest rates assumed by the government's macroeconomic scenario accentuates that slowdown, placing the government's forecasts at the high end of a standard deviation of the central estimate.

The real growth rates of exports and imports forecasted in the government's macroeconomic scenario are likely. The forecasts are in line with the forecasts of the other private and public institutions and centred in the uncertainty ranges of AIReF's models. The expansionary profile of exports —somewhat higher in 2016 than in 2015— is also shared by all the forecasts. The upturn in Spanish export markets and the prospects of higher growth for the euro area, together with the depreciation of the effective nominal exchange rate this year and its expected stabilisation afterwards, support this forecast made in the government economic scenario. Imports, on the contrary, have a lower growth profile in the current year and a slight rebound in 2016, which is also common in the forecasts of both private and public institutions. The stable path of domestic demand with a lower weight of investment and higher weight of consumption lead to an expectation that the acceleration of imports observed in the last few quarters will gradually tail off as the effect of the exchange rate depreciation on higher price of purchases made to non-euro area countries wears off. The sustained expansion of domestic demand as well as the stabilisation assumed in the ratio between import and domestic product prices support this forecast for the development of imports.

The information on the developments expected by the government for the labour market and prices is sparse and does not allow AIReF to make a detailed analysis. The forecasts for 3% growth in employment and a fall in the unemployment rate to 22% in 2015 envisaged by the government are likely and in line with the consensus. They are also ratified by AIReF's own projections. However, the persistence of higher employment rates and the reduction in the unemployment rate in 2016 expected by the government have a large upside bias compared to the consensus and to the forecasts made by the public institutions. The latter are generally envisaging a gentle slowdown in employment growth to around 2.5% and unemployment rates that do not drop below 20% compared to the government's projection of 19.7%. The greater pace of job creation expected

by the government is consistent with its forecasts of a faster rise in compensation per employee of almost one percentage point, to 1.4% in 2016. This increase is also bigger than the consensus forecast, which is approximately half a percentage point in this case. As for prices, the government is forecasting the rate of increase not to be as high as expected by all the other private and public institutions whose consensus is aligned with the forecasts published by Banco de España. These differences entail implicit consequences for unit labour costs, the competitiveness and profitability of the economy, for income, saving, investments and borrowing or lending by families and businesses. These implications cannot be analysed in this report because insufficient information is provided in the official forecasts.

External and public accounts balances projected by the government are more optimistic than those made by the other institutions. The current account balance expected by the government remains stable in 2015 and 2016 at 1.2% of GDP, half a percentage point above the consensus forecasts, at the upper end of the interquartile range of those forecasts. For the public accounts balance, the consensus of private institutions is that the budget stability target of the government in 2015 will not be met, falling short by around two tenths of a percentage point. AIReF also believes that there is no guarantee the public deficit can be brought down to 4.2% in this year as it stated already in the assessment made in its recent report on expected compliance with the targets⁷. For next year the consensus forecasts likewise indicate that it will be difficult for the public accounts to end the year with an imbalance of only 2.8% as proposed by the government. The consensus is that the figure will be as high as 3.2%. At the time of preparation of this report AIReF had no detailed information on any substantive fiscal policy measures the Spanish government intends to implement in 2015 and 2016. Nor does the information provided allow a connection to be established to other variables in the macroeconomic scenario. As a result the internal consistency of these public and national accounts balance targets cannot be assessed through the accounts of institutional sectors.

⁷ See [Report on expected compliance with the 2015 budget stability, government debt and expenditure rule targets by the public administrations in Spain](#)

4. Conclusions: realism and risks in the forecasts

The government's forecasts are generally realistic but they are subject to a number of different risks. Firstly, there are the risks stemming from the non-occurrence of the exogenous assumptions described earlier in this report. The assumptions for higher interest rates and oil prices than the current ones are prudent, implying that the government's key forecasts may be overshoot in reality. Secondly, there are risks relating to the implementation of the policies designed by the government and to the effects they may have. In particular, those risks concern the effectiveness of the restriction on increasing expenditure on the part of the autonomous regions and the stimulus the new tax cuts will entail for private consumption. Their impact on GDP would be very different depending on the combination of risks that eventually materialises. Overall, however, the risks surrounding GDP growth are regarded as balanced.

The risks stemming from the external environment are approximately balanced. On the one hand, uncertainty about the situation in the euro area persists. Furthermore, geopolitical tensions whose impact may be to push up the oil price could hold back world growth. In the financial sphere, the lack of any synchronisation of monetary policy in the advanced economies might end up triggering a change in the configuration of exchange rates and an unexpected increase in volatility and sovereign risk premiums. On the upside, there are other risks that could also be mentioned stemming from the positive momentum triggered by cheaper oil prices, the depreciation of the euro, lower interest rates and improved financing conditions that might last longer or have a greater than expected impact on economic activity.

Although the assumption about long-term interest rates is prudent, given that the trend forecast is above the path stemming from market expectations, this interest rate trend is subject to upside risks –stemming from the foreseeable normalisation of monetary policy in USA and the still uncertain situation in Greece— and downward risks, if governance in the euro area manages to gain greater credibility. This assumption is very important because of its impact both on GDP growth (essentially through investment) and on the interest burden on the public administrations in Spain and consequently on their deficit target.

There is also a risk that oil prices will rise more quickly than expected although the impact of this hypothesis would not be substantial in the short term. The reduction in supply in response to lower prices could be particularly intense. Additionally, although Iran's return to the crude oil markets could give rise

to expectations of more output, any escalation in the existing tensions with Russia or in the Middle East could end up strangling supply. In the opposite direction a bigger impact of real income gains from the fall in oil prices on economic activity cannot be ruled out either.

There are significant risks of insufficient implementation of the stringent government expenditure restriction policy included in the government consumption forecasts. Although there is uncertainty about the accuracy of the different forecasting instruments used, the models developed by AIReF suggest that the simultaneous rises in interest rates and oil prices contained in the government's hypotheses together with the maintenance of the notable government expenditure restrictions included in the forecasts for 2015 and 2016 could entail a slowdown in economic activity of one percentage point compared to the government's scenario, and lower growth in employment of the same size. There is an additional uncertainty related to the difficulties of implementing the forecast expenditure policy. If sufficient expenditure restraint measures—affecting the expenditure implemented by the autonomous regions above all—were to be applied in order to meet the government consumption target proposed by the government, as well as to comply with the expenditure rule in the whole General Government sector, the deficit target for the whole sector envisaged by the government in its macroeconomic scenario would be achievable. This countercyclical budget constraint policy, which is linked to the requirement for compliance with the expenditure rule laid down in the Organic Law on Budgetary Stability and Financial Sustainability, would have a moderating effect on the financial imbalances that a swift expansion of private demand generates and would contribute to making the growth in real GDP more stable in the medium term.

Any relaxation of government expenditure control discipline would have negative consequences for budget stability and contrasting effects on growth in the short and medium term. If, as seems likely to judge from past experience, the risk of significantly higher government expenditure than the figure included in the forecasts materialises, less fiscal policy restraint on the spending side would fuel growth in domestic demand, increasing inflationary tension and undermining the competitiveness gains that wage moderation, structural reforms and price stability have brought. Additionally, the reduction in the government deficit forecast in the budgetary scenario would not be the scheduled figure in nominal terms because the side-effects of the greater expansion of economic activity and higher prices on revenue and expenditure with cyclical sensitivity would not be enough to offset the higher government expenditure on goods and services. If that happened there would definitely be a lesser degree of fiscal consolidation in structural terms and impairment of medium-term growth.

In summary, the risks for the key macroeconomic variables in 2015 and 2016 seem broadly balanced. There are factors that would boost growth in the short term, such as the persistence of an expansionary outlook in monetary policy which is committed at least until September 2016 and might maintain more comfortable financing conditions than those assumed in the government's scenario. This favourable financial environment might be combined with a relaxation of fiscal policy both on the expenditure side and the revenue side that would exacerbate the procyclical momentum of economic policies, with negative results for the sustainability of growth in the medium term. Other factors, in contrast, might moderate the economic expansion. On the international front, growth in the world economy might slow down because of the weakness in the emerging economies and so negatively affect the growth of Spanish markets abroad and exports. In the euro area, the uncertain situation in Greece might deteriorate further. This would undermine confidence and lead to a new tightening of the conditions to obtain financing that our economy relies so heavily on with negative consequences for investment. In Spain, job creation might be lower than the figure expected by the government and this would affect the forecasted strength of private consumption. The risks concerning external demand are judged to be balanced, although the forecasts of the current account balance to remain above 1% of GDP are optimistic. The government deficit targets that have been met in recent years are deemed difficult to achieve in 2015 and 2016.

5. Endorsement of the forecasts and specific recommendations

AIReF endorses the Spanish government's macroeconomic scenario forecasts as likely. AIReF is of the view that the government's macroeconomic scenario is likely on the whole. However, the composition of growth may be different from the projection given, with more consumption and less investment and slightly lower job creation than expected.

AIReF makes two suggestions of good practices to the Spanish government:

1. In order to improve the forecasting process in the future, it would be advisable for the government to make its forecasts using the assumption of unchanged policies. The forecasts should be accompanied by a separate quantification of the impact of any new measures planned and how they would affect the macroeconomic aggregates.
2. With respect to the minimum information to be provided in the forecasts, AIReF reiterates its earlier recommendation to include the key elements in the forecasts in a simplified national accounting framework. This would make it possible to understand the connections between economic activity, demand and employment on the one hand, and income flows and borrowing requirements on the other, and so identify the impact of the policy measures adopted by the government.

AIReF recommends that the work should be completed so that the published macroeconomic forecasts include all the relevant methodologies, assumptions and parameters underpinning them, so making them compliant with Directive 2011/85 on budget frameworks and with article 29 of the LOEPSF, which defines the content of the medium-term budgetary plans of the General Government sector. This recommendation is in the process of being complied with by the Ministry of Economy and Competitiveness. AIReF considers the Stability Programme Update in Spring 2016 should include these aspects.

ANNEX OF TABLES AND GRAPHS

Tables

C.1) Key assumptions in the 2015-2016 scenario

Key assumptions in the 2015-2016 macroeconomic scenario

Annual % change unless stated otherwise

	FORECASTS		
	2014	2015	2016
Short-term interest rates (3-month Euribor)	0,21	0,02	0,02
Long-term interest rates (10-year government debt, Spain)	2,7	2,1	2,6
Exchange rate (USD/euro)	1,3	1,1	1,1
Nominal effective exchange rate euro area (% change)	2,1	-6,2	-0,5
World GDP growth excluding EU	3,8	3,8	4,3
EU GDP growth	0,9	1,5	1,9
World import volume excluding EU	1,9	3,4	4,9
Spanish export markets	2,9	3,6	5,2
Brent oil price (Brent, USD/barrel)	99,4	61,5	68,8
Sources: European Commission and Ministry of Economy & Competitiveness, Spain			

C.2) Macroeconomic forecasts made by the Spanish government

MACROECONOMIC SCENARIO 2015-2018

	FORECASTS		
	2014	2015	2016
GDP by demand components (% real change)			
Domestic final consumption expenditure	1,8	2,6	2,3
- Private domestic final consumption (a)	2,4	3,4	3,0
- Government consumption	0,1	0,1	0,3
Gross capital formation	4,2	6,2	5,4
- Gross fixed capital formation	3,4	6,4	5,6
Tangible fixed assets	3,6	7,1	5,9
Construction	-1,5	5,5	5,5
Capital equipment and other assets	12,2	9,3	6,6
- Inventories variation (contribution in p.p.)	0,2	0,0	0,0
Domestic demand (contribution to GDP growth)	2,2	3,3	2,9
Exports of goods and services	4,2	5,5	6,0
Imports of goods and services	7,6	6,0	6,4
External balance (contribution to GDP growth)	-0,8	0,0	0,1
GDP	1,4	3,3	3,0
GDP at current prices: thousand million euros	1.058,5	1.098,2	1.142,5
GDP at current prices: % change	0,9	3,8	4,0
PRICES (% change)			
GDP deflator	-0,5	0,5	1,1
Private final consumption expenditure deflator	-0,1	-0,1	1,1
LABOUR COSTS AND EMPLOYMENT (% change)			
Compensation (labour cost) per employee	-0,2	0,5	1,4
Total compensation (labour cost)	1,3	3,6	4,4
Total employment (b)	1,2	3,0	3,0
Employment salaried employees (b)	1,6	3,0	3,0
Productivity per worker (b)	0,2	0,2	0,0
Unit Labour Cost (ULC)	-0,4	0,3	1,5
Pro memoria (EPA data)			
Unemployment: % working population	24,4	22,0	19,7
GOVERNMENT SECTOR			
General government net borrowing (+) / lending (-) (EDP)	-5,8	-4,2	-2,8
EXTERNAL SECTOR (% GDP)			
Trade balance (fob-fob)	-2,0	-1,9	-2,0
External goods and services trade balance	2,4	2,8	2,8
Balance of current operations with the rest of the world	0,6	1,2	1,2
Lending (+) /borrowing (-) compared to the rest of the world	1,0	1,5	1,6
(a) Households and NFPSHs			
(b) Full-time equivalent employment			
Sources: INE and Ministry of Economy & Competitiveness, Spain			

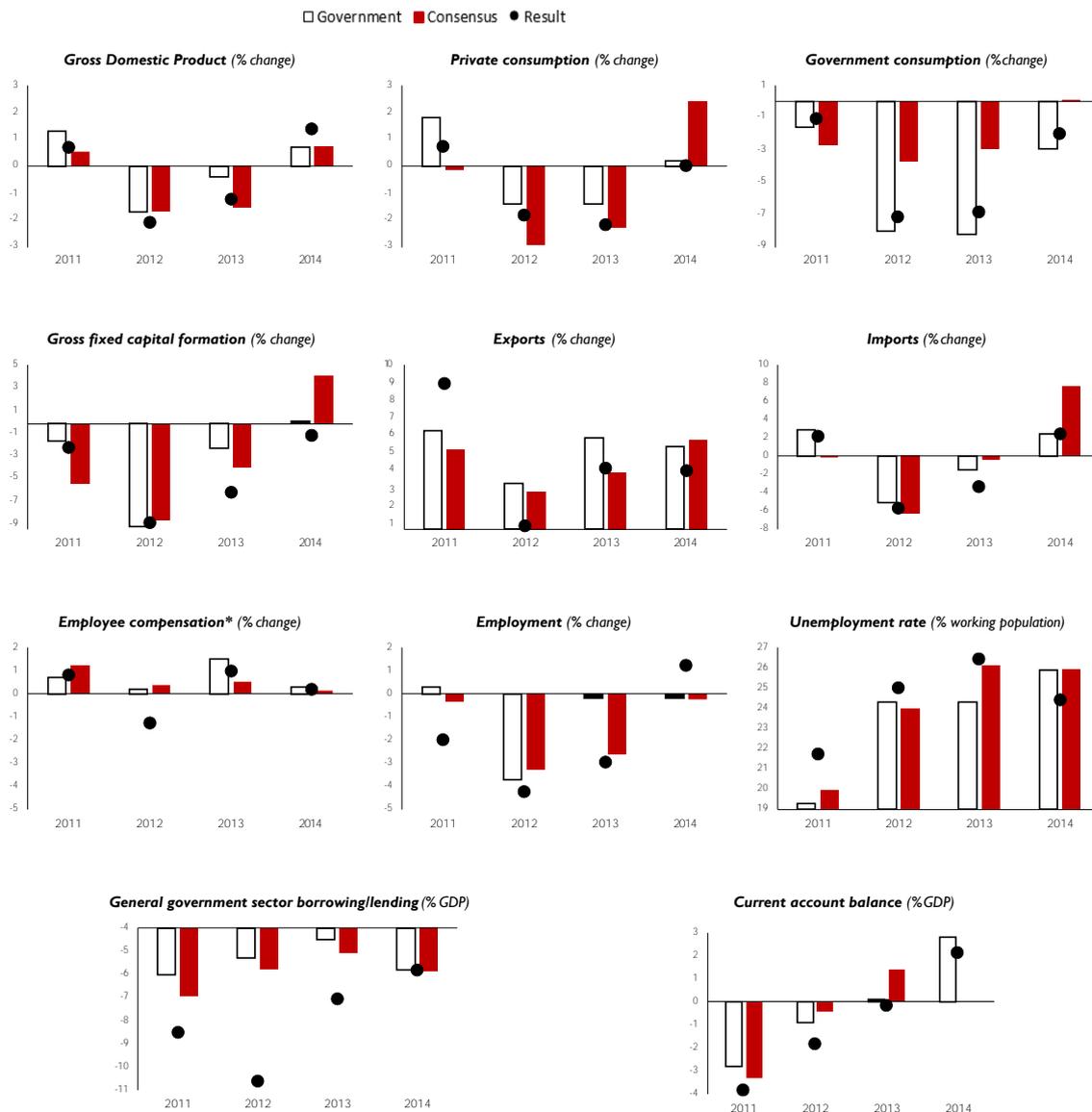
C.3) Forecasts made by international organisations

Forecasts by international organisations
(annual % change unless otherwise stated)

		2014	FORECASTS	
			2015	2016
ECB (June 2015)	World GDP (ex euro area)	3,7	3,4	4,1
	Euro area GDP	0,9	1,5	1,9
	Imports of goods and services (ex euro area)	2,7	2,0	4,8
	Brent oil prices (USD/barrel)	98,9	63,8	71,0
	Euribor, three months (%)	0,2	0,0	0,0
	10-year Spanish government bond yield (%)	2,0	1,3	1,7
	Exchange rate USD/EUR (level)	1,33	1,12	1,12
	Euro effective exchange rate	0,6	-9,5	-0,2
IMF - WEO Update (July 2015)	World GDP	3,4	3,3	3,8
	Euro area GDP	0,8	1,5	1,7
	EU GDP (WEO April 2015)	1,4	1,8	1,9
	Trade in goods and services	3,2	4,1	4,4
	Brent oil prices (USD/barrel)	98,9	60,6	66,1
European Commission (May 2015)	Libor, three months (%)	0,2	0,0	0,0
	World GDP	3,4	3,5	3,9
	Euro area GDP	0,9	1,5	1,9
	EU GDP	1,4	1,8	2,1
OECD (June 2014)	Imports of goods and services	2,6	3,8	5,1
	World GDP	3,3	3,1	3,8
	OECD GDP	1,8	1,9	2,5
	Euro area GDP	0,9	1,4	2,1
	Trade in goods and services	3,2	3,9	5,3

Graphs

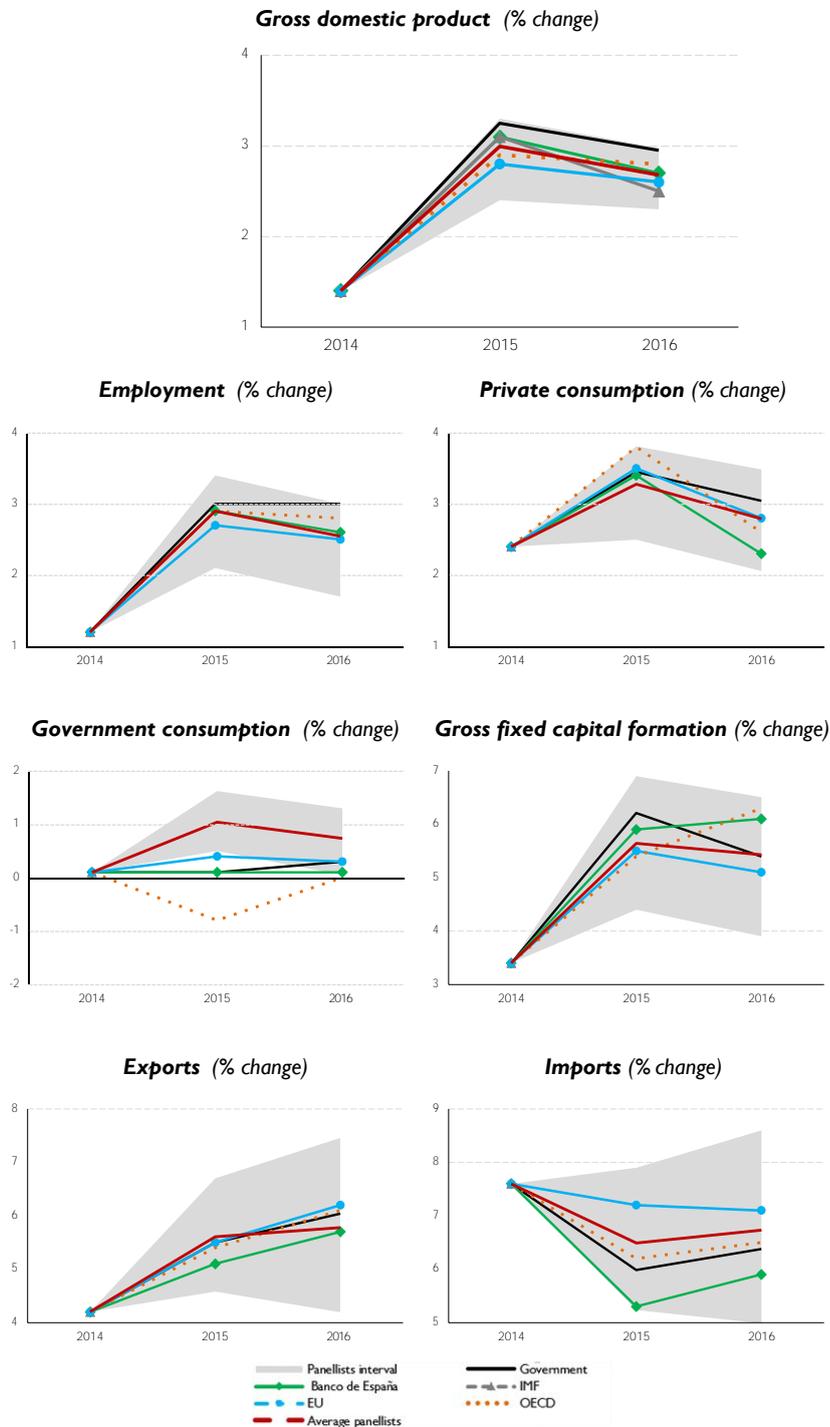
G.1) Forecasts and macroeconomic results 2011-2014



Sources: Graphs prepared by AIReF with data from INE, FUNCAS and AIReF's own estimates.

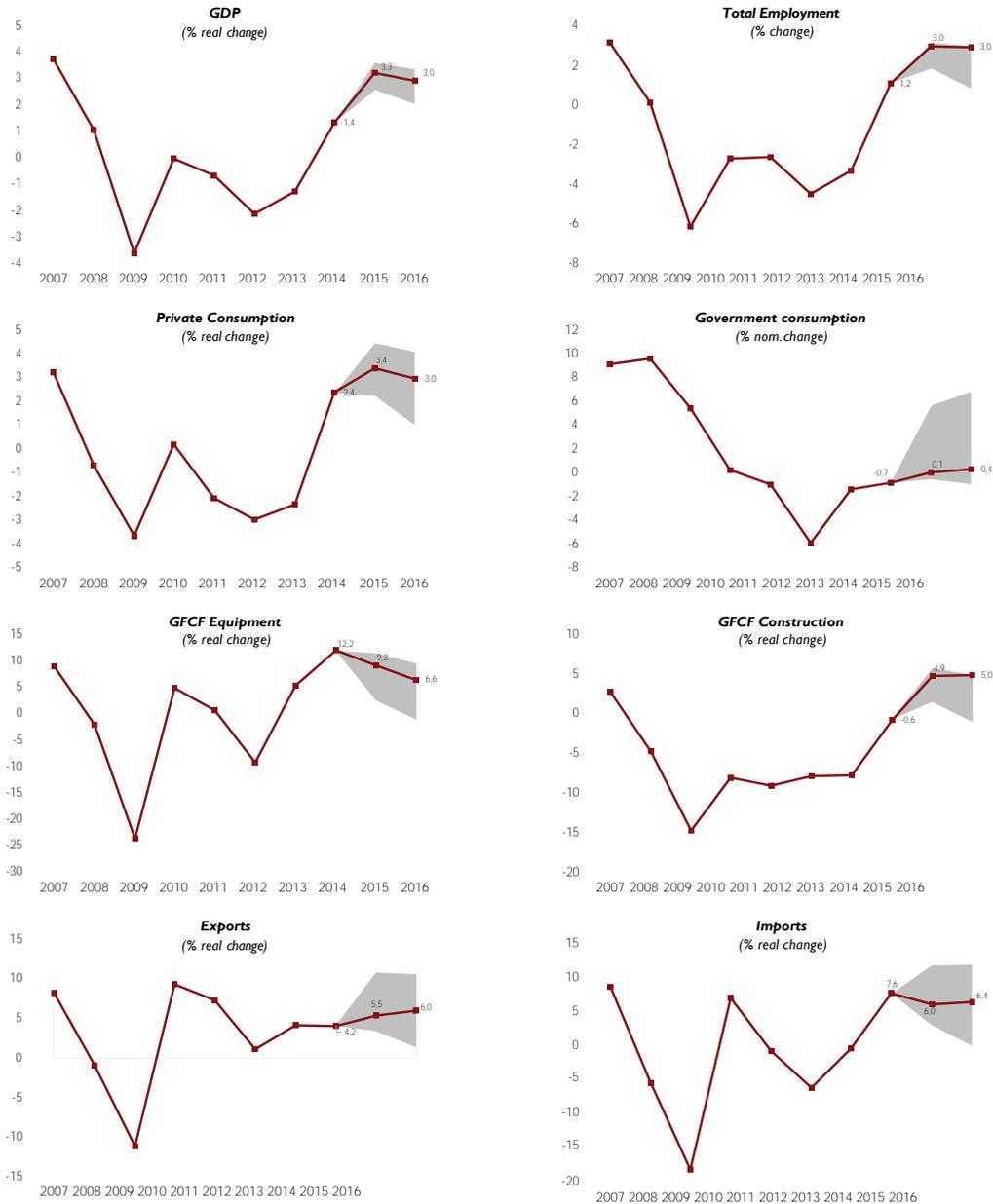
N.B.: * FTE = Full-time equivalent.

G.2) Forecasts for the Spanish economy 2015-2016



Sources: Graphs prepared by AIReF using data from INE, MINECO, FUNCAS and AIReF's own estimates.

G.3) Government forecasts and AIReF uncertainty ranges



Sources: Graphs prepared by AIReF using data from INE, MINECO and AIReF's own estimates.

ANNEX ON METHODOLOGY

In the preparation of this Report on the government's macroeconomic forecasts AIReF has used a variety of different econometric tools covering a fairly broad methodological spectrum. This annex provides a summary description of the main characteristics of those tools with the aim of explaining the methodology supporting the report.

The first section presents the structural single-equation models and their design methodology. These models have been selected as a way of checking the consistency of the official forecasts against the assumptions about how the macroeconomic determinants of the key variables will behave. These models use quarterly data and apply linear estimation.

Section two of this annex describes the reduced-form multivariate econometric model used. This model summarises the joint dynamics of the key aggregates of real macroeconomic activity and allows quarterly confidence intervals to be derived with very mild theoretical assumptions a priori. This model also uses quarterly frequency data and estimation procedures.

The third and last section in this annex provides some details of the dynamic factor models used for the short-term forecasts (two quarters) of GDP and its components. These models show the impact of the most recent economic information on those aggregates.

1. Structural single-equation models

Several behavioural equations have been used based on the error correction mechanism in order to make a quantitative assessment of the consistency of the forecasts supported by a structural formulation suggested by economic theory. A simplified Excel version has been made available for any analysts who may be interested in using these equations on AIReF's website. [\[enlace\]](#)

The general principle behind this approach is applied as follows. First, a behavioural relationship is defined between a given variable and its determinants following economic theory. This theoretical relationship is quantified by a linear relationship that characterises the long-term behaviour of the variable to be explained and its macroeconomic fundamentals. This equation defines what is known as an "equilibrium relationship" that acts as a basin of attraction towards which the variable being analysed has to converge although it does not necessarily have to be fulfilled as an exact relationship in each period. This deviation or error between the compatible value with the theoretical fundamentals and the observed variable primarily reflects the shocks distorting the long-term relationship and decoupling the observed variable from its fundamentals.

Secondly, the short-term dynamics —usually measured by the quarter-on-quarter growth rate—is the result of combining two elements. One is a partial correction of the existing error in the long-term relationship. This gradual adjustment quantifies the rate at which the variable reduces its gap with respect to the level consistent with its long-term fundamental. The second element is a purely statistical short-term dynamic complementing the earlier dynamics that defines what the empirical relationship is between the growth rates of the variable to be explained and the corresponding rates of its determinants.

This equation, known as an error correction model (ECM), is supported by an econometric methodology called cointegration analysis. This analysis tests first of all the existence of a stable and well-defined relationship in the long term that may be used in a second stage to quantify the short-term dynamics

A summary description is given below of the equations used. In all of the equations the data are observed with a quarterly frequency and have been corrected for seasonal and calendar effects. The sample interval covers the period from 1995:Q1 to 2015 Q1.

1.1 Household final consumption

The equation describing the final expenditure demand of households considers that the behaviour of that variable depends on the real disposable income of households, their financial and real estate wealth (taken separately), the unemployment rate, the volume of real available credit for consumer goods, and the real interest rate. The real interest rate is defined as the difference between the three-month Euribor rate and the deflator of final consumption expenditure.

1.2 Investment in capital: capital equipment

This equation assumes that businesses take decisions on their investment in capital equipment in line with the development of aggregate demand, the expected return on their investment projects, the labour factor price, the cost of the use of capital and the utilisation rate of productive capacity. Aggregate demand is approximated by Gross Domestic Product in volume terms. The expected return on investment is measured using Tobin's Q ratio, estimated as the ratio between the IBEX-35 and the stock of productive capital. For the labour factor price, compensation per employee is used.

1.3 Investment in capital: construction

The determinants of gross fixed capital formation in construction included in this equation are real disposable income and the financial and real-estate wealth of the households sector. Other factors intervening in the equation are the unemployment rate, the flow of credit for the

purchase and renovation of housing, the relative prices of free market housing, deflated by the price index for household final consumption expenditure and the ratio of government debt to GDP as a global indicator of the level of debt.

1.4 Exports of goods and services

In this equation the volume of exports of goods and services depends on a variable approximating the external demand for goods and services and on the relative prices of exports compared to the prices of similar products produced and exported by the other OECD countries.

The proxy variable for the external demand in goods and services is the world trade volume index produced by the Central Planning Bureau (CPB) in the Netherlands. In addition, the relative prices are defined as a variable using the competitiveness trend index calculated by comparing the domestic consumer price indices with the OECD indices after correcting them for the effects of any variations in the nominal exchange rate.

1.5 Imports of goods and services

The demand for imports of goods and services depends on the spending capacity of the resident units in the economic territory and on the prices of the imported products compared to their domestic substitutes in such a way that the imported goods and services compete against domestic products for total expenditure.

An index that weights each component of final demand (consumer, investment and exports) according to their import content serves as a proxy for the demand for imported goods and services. The ratio between the deflator of imports of goods and services and the domestic demand deflator is used as an indicator of relative prices

2. Reduced-form multivariate model

A Bayesian Vector Autoregressive (BVAR) model with exogenous variables has been used as the econometric time-series model to evaluate the projections contained in the macroeconomic forecasts accompanying the Draft State General Budget (SGB) for 2016.

BVAR models combine flexibility and objectivity. They are flexible because they allow the observed dynamics to be matched to a high degree, and they are objective because once the set of variables to be analysed in the model has been decided its estimated parameterisation can be made using objective statistical criteria that can be fully reproduced.

The Bayesian component of the model is incorporated to try to improve its forecasting performance and reflects purely statistical interactions of the variables on the dynamics, both

at the univariate and multivariate level. In addition, this Bayesian information component explicitly includes features of the behaviour of the economy in the medium term.

BVAR models with exogenous variables forecast the value of a given variable at a given time as a linear combination of four elements: lagged values of the variable (own dynamics), lagged values of the other variables intervening in the model (cross dynamics), contemporary values of the exogenous variables, and a purely random innovation that reflects the non-systematic component of the equation.

The weight of each one of these components is worked out empirically by seeking the best fit with the sample. The Bayesian elements offset the effects of any overadjustment due to the high number of parameters to be estimated.

The projected point values and their confidence intervals are obtained by projecting the BVAR model into the future. In particular, these confidence intervals quantify the degree of uncertainty attributable to the forecast of the different variables for various forecasting horizons.

The variables included as endogenous variables in this model are: the GDP deflator, the volume index of GDP, full-time equivalent employment (FTE), real credit (financing to businesses and families deflated by the underlying CPI), and the net revenue with cyclical sensitivity (this is defined as the sum total of the taxes on production and imports, the current taxes on income and wealth and the social contributions, minus unemployment benefits) in GDP percentage terms. The exogenous variables examined are: the euro exchange rate, the dollar oil price, EU GDP, interest rates (on loans of up to 1 million euros applied for by companies) and a constant term.

An auxiliary BVAR model is also used representing the joint dynamics of five series that describe the components of GDP from the demand side. The variables considered are: final consumption of households and not-for-profit institutions serving households (NPISHs), government consumption, gross fixed capital formation, exports of goods and services, and imports of goods and services.

3. Dynamic factor models

For short-term forecasting (two quarters) of GDP and its key components of demand (private consumption, government consumption, investment in equipment, investment in construction, exports and imports of goods and services), dynamic factor models are used that are summarised in the so-called MIPRED⁸ model. The joint estimate of GDP and its components offers a more complete and detailed outlook of the state of the economy and allows for

⁸ See [AIReF's real-time GDP forecasts](#) available only on the Spanish version website

identification of the composition of growth taking into account its external or domestic origin and, within it, the composition of final consumption and investment in domestic demand.

Technically the estimate is made in two stages:

In the first stage, GDP and each one of its components are forecast independently, following the methodology of dynamic factor models for real-time forecasting. The forecast is based on a combination of current economic information with different frequencies (quarterly and monthly) by means of respective dynamic factor models. This combination means the forecasts can be constantly updated as new information about the indicators integrating the model becomes available and thus a permanently updated or real time picture of the aggregate state of the Spanish economy can be obtained.

The methodology used for each one of the models consists of the following stages:

1. All indicators in the system are collected and corrected for seasonal and calendar effects.
2. For the quantitative indicators, their rate of change compared against the immediately preceding period is calculated in order to obtain an indication of short-term growth. The qualitative indicators are not transformed as they offer an immediate (directional) interpretation of growth.
3. All the indicators, both qualitative and quantitative, are normalised so that the average is zero and their variance is one.
4. Once the series have been obtained in this way they are combined in a dynamic factor model that breaks down its temporal development into a part that is attributable to elements that are common to all of them and another part that is specific for each one.
5. The dynamic factor model is represented in the space-state, combining a transition equation (that describes the dynamics of the system) and a measurement equation (that defines the connection between the observed series and their underlying factors).
6. The estimation of the model parameters is done by maximising its likelihood function. This maximisation takes into account both the presence of series with a different sampling frequency (monthly or quarterly) like the asymmetrical length of the series included in the data panel, either because not all of the series start at the same time or because they do not end in the same period.
7. Once the dynamic factor model has been estimated, its representation in the space-state form and through the application of the Kalman filter allows both the projection into the future of the series making up the model and the calculation of the standard

deviations around those projections. This gives a measurement of the uncertainty surrounding them.

8. One of the series that forms part of the set of series used will be the aggregate itself whose forecasts are obtained at the same time as the forecasts of the other indicators. This ensures the internal consistency of all of them.
9. Each time a new piece of data becomes available for any one of the indicators in the model the previous steps are repeated, and the forecasts are updated depending on the sign and size of the innovation. This continuous updating process is the process that defines the real-time nature of the system.

In the second stage, all the individual forecasts are reconciled with the forecast of GDP by means of the balancing method proposed by Van Der Ploeg (1982). This method combines the individual forecasts with the accounting constraint that states that the growth in GDP must be equal to the aggregation of the contributions made to its growth by the components that form it. The final forecasts are the result of correcting the individual forecasts in line with any discrepancy observed between the sum of the corresponding contributions to GDP growth and the growth forecast for GDP through its own model, taking into account the historical correlation structure between the series of contributions to GDP growth. Thus, the initial forecasts are modified taking into account their discrepancies when incorporating the accounting constraint. These discrepancies are weighted according to their accuracy, i.e. inversely to the uncertainty associated with the initial estimates.

This procedure has several desirable properties:

1. The size of the revisions, in absolute value, is greater whenever the variance in the initial forecast is greater, i.e. the greater the uncertainty surrounding the initial forecast the greater the modification that it might have to undergo
2. If it is considered that a preliminary estimate is known with absolute accuracy then no correction at all is made in its forecast.
3. If the historical correlation between two components is positive, when they are revised they will either both go up or both go down. On the contrary, if their correlation is negative the corrections will be made in opposite directions: one upward and the other one downward.

4. Bibliographical references

Estrada, A., Fernández, J.L., Moral, E., y Regil, A.V. (2004): "A Quarterly Macro-econometric Model of the Spanish Economy", Working Paper 0413, Banco de España.

García, C., Gordo, E., Martínez-Marín, J., y Tello, P. (2009): "Una actualización de las funciones de exportación e importación de la economía española", Documentos Ocasionales 0905, Banco de España.

Hurtado, S., Fernández, E., Ortega, E. y Urtasun, A. (2011): "Nueva actualización del modelo trimestral del Banco de España", Documentos Ocasionales 1106, Banco de España.

Hurtado, S., Manzano, P., Ortega, E. y Urtasun, A. (2014): "Update and Re-estimation of the Quarterly Model of Banco de España (MTBE)", Documentos Ocasionales 1403, Banco de España.

Litterman, R. (1984): "Specifying Vector Autoregressions for Macroeconomic Forecasting", Staff Report n. 92, Federal Reserve Bank of Minneapolis.

Meucci, A. (2011): "A Short, Comprehensive, Practical Guide to Copulas", *GARP Risk Professional*, p. 22-27.

Ortega, E., Burriel, P., Fernández, J.L., Ferraz, E. y Hurtado, S. (2007) "Update of the Quarterly Model of the Bank of Spain", Working Paper 0717, Banco de España.

Posada, D., Urtasun, A. y Gonzalez, J. (2014): "Un análisis del comportamiento reciente de la inversión en equipo y de sus determinantes", Banco de España, *Boletín Económico*, junio 2014.

Sastre, L. (2005): "Simultaneidad de exportaciones e importaciones, curva J y condición de Marshall-Lerner en España," *Información Comercial Española*, julio-agosto 2005, nº 824.

Van Der Ploeg, F. (1982): "Reliability and the Adjustment of Large Economic Accounting Matrices", *Journal of the Royal Statistical Society, series A*, vol. 145, part 2, p. 169-194.

Villani, M. (2009): "Steady State Priors for Vector Autoregressions", *Journal of Applied Econometrics*, vol. 24, p. 630-650.