MONITORING THE SPANISH ECONOMY FROM A REGIONAL PERSPECTIVE: MAIN ELEMENTS OF ANALYSIS

2018

Concha Artola, Alejandro Fiorito, María Gil, Javier J. Pérez, Alberto Urtasun and Diego Vila

Documentos Ocasionales
N.º 1809

BANCO DE ESPAÑA
Eurosistema

MONITORING THE SPANISH ECONOMY FROM A REGIONAL PERSPECTIVE: MAIN ELEMENTS OF ANALYSIS

MONITORING THE SPANISH ECONOMY FROM A REGIONAL PERSPECTIVE: MAIN ELEMENTS OF ANALYSIS (*)

Concha Artola, María Gil, Javier J. Pérez and Alberto Urtasun

BANCO DE ESPAÑA

Alejandro Fiorito

JOHNS HOPKINS UNIVERSITY

Diego Vila

UNIVERSITY OF AMSTERDAM

(*) The opinions expressed in this paper are those of the authors and not necessarily reflect those of the Banco de España or the Eurosystem.

Documentos Ocasionales. N.º 1809

2018

ISSN: 1696-2230 (on-line edition)

Abstract

In highly decentralized countries the subnational dimension of economic developments acquires particular relevance, given the existence of potential spillover effects across jurisdictions or the existence of asymmetric impacts of national-wide macroeconomic shocks. At the same time, though, the analysis of sub-national macroeconomic and public finance short-term developments tend to be restricted in many countries due to data limitations. Against this backdrop, the aim of this paper is to provide an overview of the available data for monitoring macroeconomic and public finance developments at the regional level in Spain, and to present some examples of its practical use in real time. After a thoroughly review of the publicly available information, we identify two key informational gaps in this area of conjunctural analysis, namely: (i) the lack of homogeneous and official quarterly measures of aggregate regional economic activity (in particular, real GDP), and (ii) the limited sample size of time series pertaining to government budgetary developments at the regional level.

Keywords: regional economics, regional data, macroeconomic forecasting, subnational public finances.

JEL classification: E01, E32, H72.

Resumen

En los países donde existe un elevado grado de descentralización administrativa, la dimensión regional cobra especial relevancia, dada la existencia de interacciones entre la actividad de las regiones o de posibles impactos asimétricos de las perturbaciones macroeconómicas que afectan al conjunto del país. Sin embargo, al mismo tiempo, el análisis de la evolución a corto plazo de la economía y de las finanzas públicas a escala regional tiende a estar restringido en muchos países, dadas las limitaciones existentes de disponibilidad de datos de alta frecuencia. En este contexto, el objetivo del presente documento es ofrecer una perspectiva general de los datos disponibles para el seguimiento de la evolución económica y de las finanzas públicas a escala regional (autonómica) en España, y presentar algunos ejemplos de su uso práctico en tiempo real. Tras una exhaustiva revisión de la información disponible, identificamos dos lagunas de información en el área del análisis coyuntural: i) la falta de una estadística trimestral oficial y homogénea que mida la actividad económica agregada a escala regional (en particular, el PIB real), y ii) el limitado tamaño muestral de las series temporales relativas a la evolución de las finanzas públicas a escala autonómica.

Palabras clave: economía regional, fuentes de datos regionales, predicción macroeconómica, política fiscal subcentral.

Códigos JEL: E01, E32, H72.

INDEX

1 Introduction

In highly decentralized countries the sub-national dimension of short-term economic developments acquires particular relevance. On the one hand, policy actions in one region or group of regions may generate non-negligible spillover effects in other jurisdictions, and in the country as a whole, particularly as regards the operation of fiscal policies. More so in the light of the global rising trend towards fiscal decentralization all over the world (see e.g. Canuto and Liu, 2010, or European Commission, 2012). On the other hand, in the presence of significant heterogeneity in regional economic structures, national-wide shocks may lead to asymmetric effects, and to the existence of region-specific macroeconomic shocks. In those situations, the propagation of shocks at the national level might differ from purely symmetric ones, regarding both its persistence and amplitude. Thus, a purely national perspective to the study of short-term economic developments might disregard important elements of analysis.

Despite the existence of an active field of study of regional economics, the analysis of sub-national macroeconomic and public finance short-term developments tend to be restricted in many countries due to data limitations (see, among others, Koop et al., 2018; Lehman and Wohlrabe, 2013, 2014 and 2016; Henzel et al., 2015; Kopoin et al., 2013, or Gadea et al., 2012). Of particular relevance are the shortages associated to the limited availability of quarterly national accounts' aggregates or of high frequency fiscal data. Spain is no exception in this regard.

In the Spanish case, the analysis of short-term macroeconomic and fiscal policy developments at the regional level is warranted[1]. The current Constitution, voted in 1978, grants significant political and fiscal autonomy to regional governments ("Comunidades Autónomas", CCAA henceforth). The constitutional mandate has been deepened over the last four decades through an intense process of decentralization and the parallel implementation of legislation aiming at granting policy coordination, in particular on the fiscal policy domain, which includes the early detection of deviations from fiscal targets. There are some prominent recent examples of the aggregate relevance of the behavior of sub-central units. One is the episode of substantial sub-central fiscal stress that occurred, mainly, over 2011-2012, significantly influenced the credibility of the country's public finances as a whole[2], and eventually led to the central government to intervene providing liquidity support and other exceptional measures to a number of regions (see Delgado Tellez et al., 2016 and 2017). Another example that can be singled out is the substantial economic and financial uncertainty associated to political tensions in the region of Catalonia, particularly during the last quarter of 2017 (see Banco de España, 2017 and 2018).

1 See López (2016) for a survey of aspects on regional GDP forecasting and an overview of the main institutions that regularly publish regional macroeconomic forecasts in the case of Spain. On related grounds see also Pérez-Suárez et al. (2009). For issues related to regional, short-term fiscal forecasting in Spain see Fernández-Caballero et al. (2012).

2 The episode was closely scrutinized by international investors, international organizations and rating agencies. Just to quote one example, in the 10 March 2011 downgrade of Spain's government debt rating, Moody's justified its decision on the basis of two considerations, one of which was related to the challenges of the fiscal consolidation plans "in part because of the uncertain fiscal outlook of some of the autonomous regional governments". Also, in its placement of Spain's Aa2 ratings on review for possible review of 29 July 2011, Moody's expressed again two considerations, one of which was "the challenges posed to the government's fiscal consolidation efforts by the weak growth environment and the continued fiscal slippage among several regional governments".

Against this backdrop, the aim of this paper is to provide an overview of the available data for monitoring macroeconomic and public finance developments at the regional level, and present some examples of its practical use in real-time. In Spain, a number of government agencies regularly produce and publish territorial statistics sampled at the monthly and quarterly frequencies, most notably the National Statistical Institute (INE), the General State Comptroller (IGAE), and the statistical agencies linked to regional governments. The latter play a core role as, according to the extant legislation, CCAA have exclusive jurisdiction over statistics for Autonomous Community purposes[3]. Nonetheless, some coordination bodies of the activities of national and regional agencies do exist, most notably the *Interterritorial Statistics Committee*[4]. After a thoroughly review of the publicly available information, we identify two key informational gaps in this area of conjunctural analysis, namely: (i) the lack of homogeneous and official quarterly measures of aggregate regional economic activity (in particular, real GDP), and (ii) the limited sample size of time series pertaining to government budgetary developments at the regional level.

The rest of the paper is organized as follows. In the next Section, we provide a brief exposition of some features of Spain's economy from the regional perspective. Next, we discuss in depth the data sources available for regional economic analysis, including macroeconomic indicators, national accounts' data, from national and region-specific sources, and an overview of short-term data to monitor regional governments' budgets. In turn, we present some illustrative applications, focusing on the construction of regional synthetic economic indicators and their links to other available measures of aggregate regional economic activity, the real-time nowcasting of quarterly regional real GDP, and the use of statistical tools for monitoring regional public spending. The paper also contains two annexes in which we provide additional details, as regards the main indicators of regional economic activity (Annex I) and the available information on quarterly regional accounts as published by regional statistical institutes (Annex II).

3 The highest-level legal reference in Spain regarding statistical activity in the Autonomous Communities is to be found in their Statutes of Autonomy, approved by means of organic laws. For more details see: http://www.ine.es/ss/Satellite?L=en_GB&c=Page&cid=1254735904941&p=1254735904941&pagename=INE%2FINELayout#.

4 The *Interterritorial Statistics Committee* is a permanent official body in charge of overseeing the coordination, cooperation and standardization of statistical matters between the Central Government and the CCAA governments. For more details see: http://www.ine.es/en/normativa/leyes/cite/normativa_cite_en.pdf.

2 Some features of Spain's economy from a regional perspective

2.1 Spain's decentralized political system

According to Article 137 of the Spanish Constitution (approved in 1978), Spain is a regionalized State, also referred to as "Estado de las Autonomías". It comprises three levels of governance: central, regional and local (Provinces and Municipalities). As of today, there are 17 CCAA. After a process of political devolution extended over the last forty years, currently all Autonomous Communities enjoy a high degree of self-government and hold significant legislative powers. Under the Constitution, the Statutes of Autonomy of the individual autonomous communities and several complementary laws regulate the vertical division of power[5].

At the regional level, decentralization is asymmetric, with two distinct regimes: the common regime (15 CCAA) and the "foral" regime (the CCAA of Basque Country and Navarra) which is characterized by an almost complete spending and revenue sovereignty. The 15 CCAA under the so-called common regime also present some specificities, as reflected in their individual Statutes of Autonomy, allowing for some idiosyncratic features but, as a general rule, all responsibilities not expressly attributed by the Constitution to the central government are ascribed to the CCAA. In addition, there are also shared competencies between the center and the regions (education; healthcare; social services; universities; municipal and provincial supervision). The CCAA have large responsibilities which typically include organization of regional government institutions, education, healthcare, public order, planning, urbanism and housing, transport (Regional railway and road networks; Regional transport; ports and airports not engaged in commercial activities), environmental protection, agriculture and forestry, culture, and social assistance, among others.

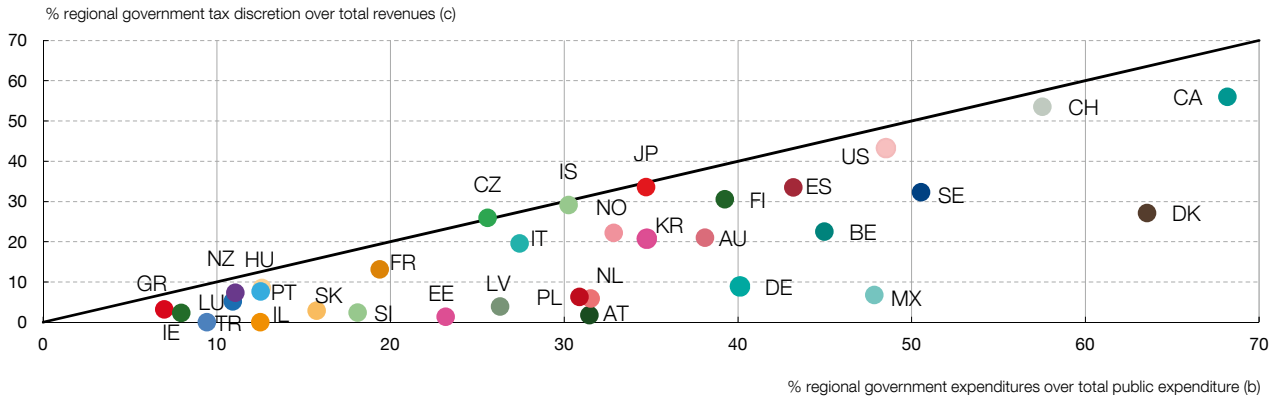
In line with the high degree of political decentralization, the level of devolution of public spending and revenues is also elevated, relative to other industrialized economies, as displayed in Chart 1. This chart shows the weight of public spending and resources managed by the different levels of government, for a group of OECD countries, for 2016. Regional and local governments are grouped, given the heterogeneous decentralization arrangements among countries.

From the perspective of public spending, Spain's weight of sub-national to total government expenditure is similar to that of the United States or Belgium, both of them federal countries, and only slightly below Sweden, a country with a paradigmatic level of public goods' provision at the local level. The weight of sub-central public spending is larger in Spain than in Germany and Austria, two reference federal countries in the European Union (EU). The functional allocation of public expenditure is heterogeneous across countries. In Table 1 a number of federal countries (Germany, Austria, Belgium, the United States and Switzerland) are compared with Spain. In the later, for 2016, some 90% of regional government spending in two key welfare state competences,

5 The 17 Spanish Autonomous Communities do correspond to NUTS-2 in the EUROSTAT nomenclature. The regions are: Andalucía (AND), Aragón (ARA), Asturias (AST), Baleares (BAL), Canarias (CAN), Cantabria (CANT), Castilla y León (CYL), Castilla-La Mancha (CLM), Cataluña (CAT), Comunidad Valenciana (CVAL), Extremadura (EXT), Galicia (GAL), Comunidad de Madrid (MAD), Región de Murcia (MUR), Navarra (NAV), País Vasco (PVAS) and La Rioja (LAR).

FISCAL DECENTRALIZATION IN THE OECD COUNTRIES (a)

CHART 1



SOURCES: OCDE and IGAE. Figures do refer to the year 2016.

a Country codes according to ISO 3166. 2015 data for Autralia, Israel, Japan, South Korea,Turkey, Mexico,New Zeland, Switzerland and United States.
b Subcentral government expenditure over total general government expenditure.
c Share of subcentral government revenues over which they have normative power (OECD calculations).

GENERAL GOVERNMENT EXPENDITURE BY LEVEL OF GOVERNMENT AND BY FUNCTION

TABLE 1

BY LEVEL OF GOVERNMENT

Percent of GDP

	1995				2016			
	Central Gov. and Social Socurity	Regional Governments	Local Governments	Total	Central Gov. and Social Socurity	Regional Governments	Local Governments	Total
Spain	28.5	10.1	5.7	44.3	21.4	15.0	5.8	42.2
Germany	33.4	13.3	8.0	54.7	22.9	13.3	8.0	44.2
Austria	37.1	8.2	10.5	55.8	32.5	9.7	8.5	50.7
Belgium	32.2	13.7	6.5	52.4	26.7	19.4	7.1	53.2
United States (a)	22.1	17.7	—	37.2	22.9	18.3	—	37.8
Switzerland	13.6	12.2	8.2	34.0	13.2	13.7	7.4	34.3

BY GENERAL GOVERNMENT EXPENDITURE FUNCTION

	1995				2016			
	Health	Education	Social	Total	Health	Education	Social	Total
Spain, % GDP	5.2	4.3	14.4	44.3	6.0	4.0	16.8	42.2
% regional on total	57.7	58.1	3.5	22.8	93.3	92.5	6.0	35.5
Germany, % GDP	6.1	4.4	20.3	54.7	7.2	4.2	19.3	44.2
% regional on total	3.3	77.3	12.3	24.3	4.2	76.2	15.5	30.1
Austria	6.7	5.5	21.9	55.8	8.0	4.9	21.6	50.7
% regional on total	26.9	32.7	7.3	14.7	33.8	32.7	10.2	19.1
Belgium	5.9	5.8	17.7	52.4	7.4	6.4	20.0	53.2
% regional on total	1.7	91.4	9.6	26.1	10.8	89.1	25.0	36.5
United States (a)	6.5	5.9	7.2	37.2	9.2	6.1	7.8	37.8
% regional on total	64.7	6.8	92.3	47.5	50.3	94.2	11.5	48.4
Switzerland	1.6	5.4	12.2	34.0	2.2	5.6	13.6	34.3
% regional on total	68.8	63.0	15.6	35.9	86.4	62.5	21.3	39.9

SOURCES: EUROSTAT and IMF.

a For the United States, the figure pertaining to the regional goverment also encompasses. Regional government figures includes local government because there is no information at that disaggregated level. Not consolidated data.

namely health and education, was managed by CCAA. In none of the reference countries such a high degree of decentralization is present in both public services simultaneously. For example, in Germany, the United States and Belgium, public education expenditure managed by regions amounts to 76%, 94% and 89%, respectively, while the weight in public health is 4%, 50%, and 11%, respectively. In any case, it is worth mentioning that the Spanish central government keeps significant influence in the design of national-wide health and educational policies.

As regards government revenues, the normative capacity of Spanish regional and local administrations is among the highest in the OECD (see, again, Chart 1). In the case of Spain, over the past four decades, in parallel to the process of devolution of expenditure responsibilities to the CCAA, a financing system was also progressively developed. As regards the two "foral" regions (the Basque Country and Navarre), they have full fiscal autonomy with the exception of customs tariffs. In turn, the common regime regions have been transferred increasing amounts of own resources. The current financing agreement was approved at the end of 2009. This system comprises the transfer of 50% of the personal income tax and VAT, the 58% in the case of excise duties on manufactured production of alcohol, tobacco and hydrocarbons. In addition, CCAAs keep the 100% collection of the hydrocarbon-oil retail sales, electricity tax, property and stamp duty tax, tax of registration of motor vehicles, taxes on gaming, wealth tax and inheritance and gift tax. CCAA have almost full powers to modify their rates in these taxes, with some exceptions (VAT, excise duties and electricity tax) (see Comisión de Expertos para la revision del Modelo de Financiación Autonómica, 2017; and Delgado-Téllez and Pérez, 2018).

As regards fiscal rules, Spain's regional governments have been subject to nominal budget balance targets over the last two decades[6]. Their record in meeting these targets has varied significantly over time and across regions, and so has the rule-based framework used to monitor and enforce compliance with those targets (see Delgado-Tellez et al., 2016), including by the entry into force of an independent fiscal council, the Independent Authority of Fiscal Responsibility (AIReF henceforth)[7] (see Gordo et al., 2015). In addition to fiscal rules, most regions have been subject to market-imposed discipline.

In this context, the short-term monitoring of regional public finances amounts to the real-time evaluation of the probability that regional budget plans are in track[8]. In order to do so, an analysis of monthly and quarterly fiscal data at the regional level is required, which should be coupled with an assessment of macroeconomic developments, also focused on the regional dimension.

2.2 Regional economic structures

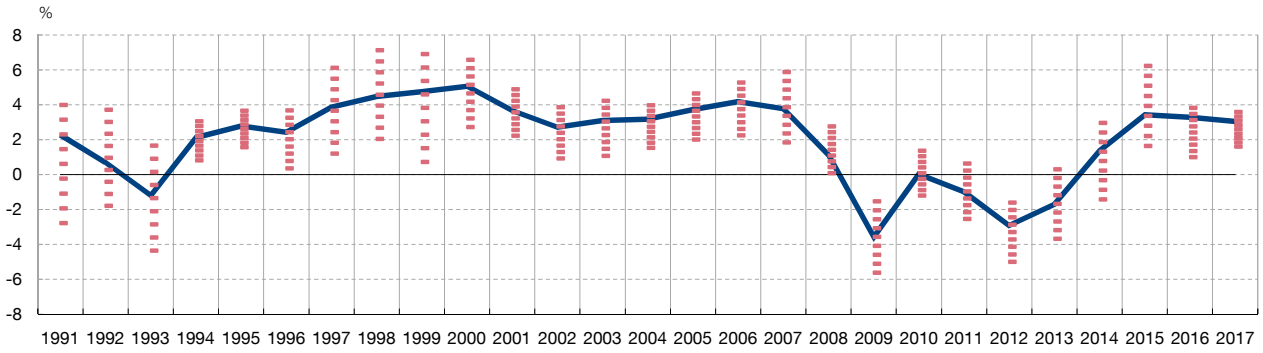
The real GDP growth profile of the cross section of Spanish regions in the past three decades has been relatively similar to the aggregate of the country, even though some dispersion is apparent across CCAA (see Chart 2). To assess the extent of the heterogeneity of economic

6 For a description of the system of fiscal rules in Spain, see Hernández de Cos y Pérez (2013).

7 For the activities of this institutional body as regards the evaluation and regular monitoring of CCAAs budgetary activity, see the multiple reports it publishes, posted at http://www.airef.es.

8 For model-based application for the case of Spain see Leal and Pérez (2005), Fernández Caballero et al. (2012), Pedregal et al. (2014), and the regular reports of the AIReF, as for example AIReF (2018).

SPANISH REAL GDP GROWTH AND REGIONAL HETEROGENEITY (a) CHART 2



SOURCES: INE, Contabilidad Regional de España.

a The dotted lines indicate the distance between the maximum and the mimimum growth rate of each one of the 17 CCAAs.

growth across Spanish regions, in this section we provide a discussion and some basic facts of, on the one hand, regional business cycle properties and, on the other, more structural matters, including a comparison of CCAA according to their income per capita or their economic structure.

As regards the first issue, according to the existing literature, regional business cycles within Spain present a high degree of heterogeneity. Nevertheless, some synchronization is found among groups of regions that share some common features, such as the weight of the industrial sector, or the levels of per capita income, human capital or unemployment[9]. In any case, the literature for the Spanish case is relatively scant, though, in part due to data limitations[10]. In the European context, though, the evidence shows that Spain presents quite a high within-country homogeneity despite its large economic size, meaning that regional business cycles are quite similar, in relative terms, when compared to other EU countries (see Bandrés et al., 2017). From a general point of view, a certain degree of synchronicity of business cycles within a country is often regarded as a desirable property of a well-integrated economy. This is the case, in particular, as regards the effectiveness of country-wide policies, most notably, central government's fiscal policy, or EMU-wide monetary policy, with an impact in all member states (countries) and within them (regions) (see e.g. Kappler and Sachs, 2013). In the absence of a certain degree of synchronicity, common policies may not satisfy the needs of all regions and may even contribute to cyclical divergence. The extent of business cycle convergence is determined by a number of factors, including the degree of symmetry between macroeconomic shocks hitting the different regions, the transmission channels (within each region and among them), some institutional features -including regional fiscal and labor market policies-, as well as the level of economic integration within the country[11].

9 See Gadea et al. (2012), that uses the monthly Industrial Production Index as the proxy for regional cycles.

10 Other contributions to the literature on regional business cycles within Spain are, among others, Cancelo (2004), Bandrés y Gadea (2013), or Ramajo et al. (2015). On related grounds, some studies like Cancelo and Uriz (1999), Sala-Ríos et al. (2014), or Leal et al. (2004), among others, focus on one specific region, and analyze its synchronicity with the cycle of Spain as a whole and/or the one of the European Union.

11 There is an expanding literature on business cycle synchronization within the EMU, and more generally, the EU. While not fully conclusive, this literature tends to support the existence of strong business cycle correlations between individual countries and the euro area aggregates, but also at a global level. At the regional level, a number of studies have look at the business cycle convergence and synchronization between the provinces and states of Canada and the United States, and European regions (see Bandrés et al., 2017, and the references quoted therein).

SOME STYLIZED FACTS ABOUT REGIONAL CYCLES (BASED ON REAL GDP GROWTH RATES) TABLE 2

	Recent crisis duration (number of quarters)		Relative Volatility (c)		Persistence (d)		GDP fall since the recent pre-crisis peak (e)				GDP increase since the recent pre-crisis trough (f)			
							AIReF (a)		Regional Stat. Institute (b)		AIReF (a)		Regional Stat. Institute (b)	
	AIReF (a)	Regional Stat. Institute (b)	AIReF (a)	Regional Stat. Institute (b)	AIReF (a)	Regional Stat. Institute (b)	Cum. fall	Peak date	Cum. Fall	Peak date	Cum. Increase	Peak date	Cum. Increase	Peak date
Andalusia	22	21	1.07	1.10	0.90	0.82	11%	2008Q1	11%	2008Q1	12%	2013Q3	13%	2013Q2
Aragon	19	—	1.18	—	0.75	—	11%	2008Q1	—	—	12%	2012Q4	—	—
Asturias	24	—	1.19	—	0.81	—	14%	2008Q1	—	—	10%	2014Q1	—	—
Balearic Islands	21	—	0.98	—	0.74	—	9%	2008Q2	—	—	14%	2013Q3	—	—
Canary Islands	21	21	1.04	1.05	0.80	0.79	9%	2008Q2	9%	2008Q1	11%	2013Q3	11%	2013Q2
Cantabria	21	23	1.08	—	0.85	0.69	14%	2008Q2	14%	2008Q1	11%	2013Q3	11%	2013Q4
Castilla Leon	23	—	0.94	—	0.85	—	10%	2007Q4	—	—	10%	2013Q3	—	—
Castilla La Mancha	24	—	1.31	—	0.81	—	12%	2008Q2	—	—	11%	2014Q2	—	—
Catalonia	21	20	1.07	1.14	0.83	0.75	10%	2008Q1	10%	2008Q1	15%	2013Q2	16%	2013Q1
Valencian Community	21	—	1.24	—	0.86	—	14%	2008Q1	—	—	14%	2013Q2	—	—
Extremadura	24	24	0.96	1.06	0.83	0.59	8%	2008Q2	8%	2008Q1	9%	2014Q2	9%	2014Q1
Galicia	21	18	1.09	1.05	0.85	0.81	10%	2008Q2	9%	2008Q2	13%	2013Q3	12%	2012Q4
Madrid	21	21	0.93	—	0.89	0.86	5%	2008Q2	3%	2008Q2	14%	2013Q3	16%	2013Q3
Murcia	20	—	1.26	—	0.82	—	11%	2008Q2	—	—	17%	2013Q1	—	—
Navarre	18	18	1.02	0.84	0.81	0.78	9%	2008Q2	3%	2008Q2	14%	2012Q4	13%	2012Q4
Basque Country	22	22	1.00	1.08	0.84	0.62	9%	2008Q2	7%	2008Q1	14%	2013Q3	12%	2013Q3
La Rioja	22	—	1.23	—	0.74	—	13%	2008Q2	—	—	8%	2013Q3	—	—
Spain (INE)	**22**	**21**	**1.00**	**1.00**	**0.91**	**0.91**	**10%**	**2008Q2**	**10%**	**2008Q2**	**13%**	**2013Q3**	**13%**	**2013Q3**

SOURCES: INE, Regional Statistics Institutes, Independent Authority for Fiscal Responsibility (AIReF) and Banco de España.

a Computed on the basis of quarterly figures interpolated by the AIReF.
b Computed on the basis of quarterly figures published by the Regional Statistics Institutes. In the cases of Aragon and Castilla Leon, no numbers are shown due to sample size available /since 2009 and 2010, respectively).
c Standard deviaton of regional quarterly growth rates with respect to that of the Spanish economy taken as a whole.
d Coefficient of an estimated AR(1) process on quarterly real GDP data.
e It refers to the quarter in which GDP reaches its maximum level before the crisis according to the different sources.
f It refers to the quarter in which GDP reaches the minimum level according to the different sources.

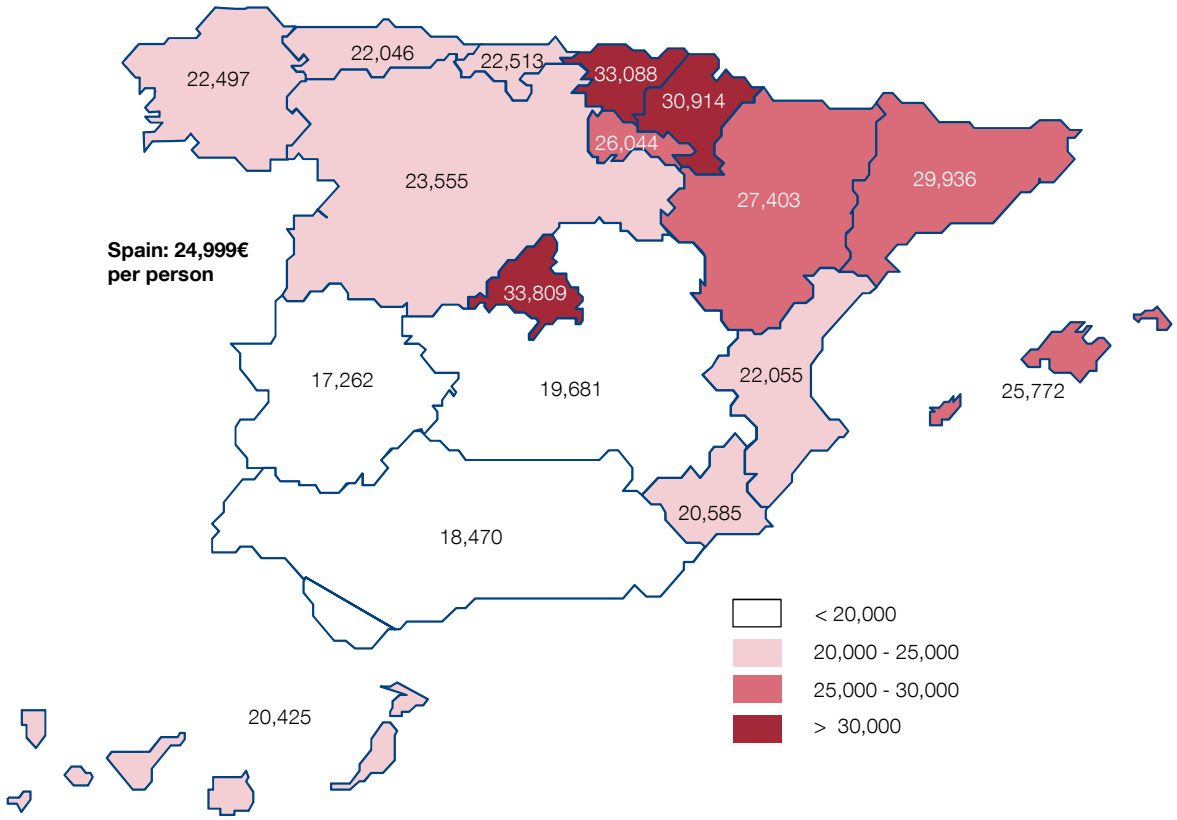
In turn, in Table 2, we show some standard stylized business cycle facts for the Spanish regions. In particular, we report the duration of the most recent economic crisis, the pre-crisis peak and trough, including the cumulative fall since the former, and the cumulative increase since the latter, and the volatility and persistence of regional business cycles (for samples starting as of the beginning of the 2000s). This set of statistics is usually reported in the literature on the basis of quarterly real GDP data. In this regard, it is worth mentioning up front that there is no official, homogeneous quarterly data for Spanish regions produced by the Spanish National Statistical Institute (INE, henceforth). Thus, we use two alternative sources: (i) the series interpolated by the AIReF (see Cuevas and Quillis, 2015); (ii) the series produced by some Regional Statistical Institutes. We will come back to the issue of the alternative sources of quarterly GDP in the next section of the paper.

Some results stand out from Table 2. First, the duration of the crisis (defined as the number of quarters from the pre-crisis output peak to the crisis output trough) in Spain was of 22 quarters, with some regional variability spanning from 18 quarters in Navarra to 24 quarters in Extremadura and Asturias. Second, according to AIReF data, output volatility (measured by the standard deviation of real GDP growth) was larger than the national one in 12 regions, ranging between 18% and 30% in six of them (Aragon, Asturias, La Rioja, Valencian Community, Murcia and Castilla-la-Mancha, respectively), and between 2% and 9% in the others. Somewhat surprisingly, the volatility of regional GDP was lower than the aggregate one in the remaining five regions, most notably in Madrid (7.4% lesser) and Castilla-Leon (6% lower). In turn, when using Regional Statistical Institutes' data, the volatility of output in the seven regions for which data is available exceeds that of the national aggregate, with the exception of Navarre. In three cases, thus, the two sources convey, quantitatively and qualitatively, different signals (Extremadura, Navarre and Basque Country). The third result to be highlighted is that output persistence in all regions is below the national one (according to both data sources). AR(1)-model coefficients estimated with AIReF data are larger in all cases than the one estimated with regional institutes' data. Finally, the dating of the cycle (length; peak; trough) is quite similar with both datasets, and there is some regional heterogeneity as regards the output loss during the crisis (peak to trough) and the GDP posterior recovery (trough to 2017Q4), with 9 pp and 7 pp, of difference between the maximum and the minimum, in the periods, respectively.

Turning now to more structural issues, and taking GDP per capita as a measure of wellbeing, four broad groups of regions appear (see Chart 3). First, the richest regions are Madrid and the Basque Country, with real GDP per capita above 30.000 € in year 2017. Next are the CCAA in the North-East: Navarre, La Rioja, Aragon and Catalonia, where GDP per person exceeds 25.000 €. The third cluster includes regions with an income between 20.000 and 25.000 € per capita, including regions in the North-West and the Valencian Community and Murcia. Finally the CCAA in the South (Andalusia, Extremadura and Castilla-La Mancha) are below the 20.000 € threshold. In order to put into perspective the magnitude of these differences, it is useful to compare them with those seen between regions in other EU countries. In this regard, Puente (2017), using 2014 data and the coefficient of variation as a measure of dispersion, shows that differences in GDP per capita between regions in the four largest euro area countries (Germany, France, Italy and Spain) are slightly above 20% in Spain and Germany, while in France and Italy they are somewhat larger (27%). In terms of productivity, Spain has the lowest regional differences (12%), while the dispersion in France is double than that. Dispersion of the labor force participation rate is very small and broadly homogenous among countries, while unemployment rate dispersion is similar in all the countries with the exception of Spain, which displays, again, a substantially lower coefficient of variation.

From the sectorial point of view, there is a significant degree of heterogeneity among Spanish regions (see Table 3). Agriculture accounts for 3% for Spain as a whole, with Castilla-La Mancha, Extremadura and Andalusia more specialized in relative terms in these activities (9%, 9% and 7% respectively), while at the other end of the spectrum lies Madrid, with less than 0,1% of its production located in primary industries. Almost 20% of Spanish Value Added (VA) is generated in industrial activities including Mining, Manufacturing and Energy. The highest specialization is found in the North-East regions (Navarre, the Basque Country and La Rioja), with

SPANISH PER CAPITA GDP FROM A REGIONAL PERSPECTIVE (2017) CHART 3



SOURCE: INE.

ECONOMIC STRUCTURE OF SPANISH CCAA (2017) TABLE 3

Percent	Agriculture (%) (1)	Industry (%) (2)	Construction (%) (3)	Market services (%) (4)	Non-market services (%) (a) (5)
Andalusia	6.6	12.8	6.5	51.9	22.3
Aragon	5.4	24.9	6.1	44.7	18.8
Asturias	1.6	22.5	6.8	49.5	19.6
Balearic Islands	0.5	7.2	6.2	70.5	15.6
Canary Islands	1.3	7.6	5.4	65.7	20.0
Cantabria	1.6	23.0	6.8	49.5	19.1
Castilla Leon	4.5	22.8	6.3	44.0	22.5
Castilla La Mancha	8.5	21.8	6.9	41.7	21.0
Catalonia	1.1	22.1	5.0	56.8	15.1
Valencian Community	2.4	19.8	6.7	53.5	17.5
Extremadura	8.9	14.5	7.4	41.5	27.7
Galicia	5.6	20.8	6.8	48.0	18.7
Madrid	0.1	10.8	4.5	68.8	15.8
Murcia	5.6	19.8	6.2	48.0	20.5
Navarre	3.5	32.8	5.4	41.0	17.3
Basque Country	5.6	19.8	6.2	48.0	20.5
La Rioja	6.1	28.7	6.0	42.1	17.1
Spain	**2.9**	**18.1**	**5.8**	**55.0**	**18.3**

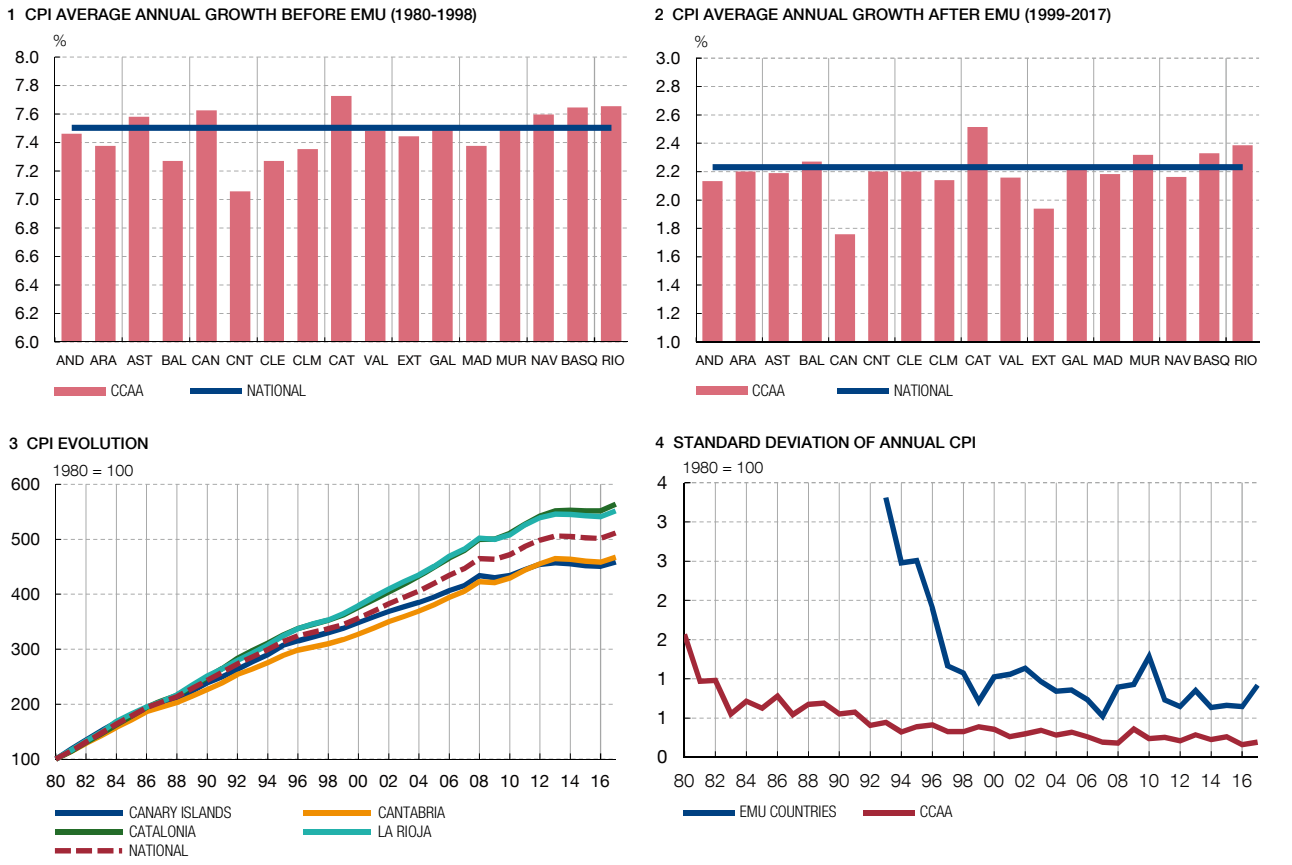
SOURCE: INE.

a Including public administration and defense, education and public health.

a share in VA above or close to 30%. Balearic and Canary Islands are the lowest industrialized regions (less than 10% of VA). Non-market services represent almost 20% of GDP in Spain taken as a whole, with a maximum in Extremadura at almost 30% of GDP, and a minimum in Catalonia at about 15%. Market Services in Spain account for more than half of GDP (55% of GDP in 2017), with larger shares in Madrid and the two insular CCAAs (between 66% and 70%). Finally, the construction sector contributes around 6% of Spanish GDP, with similar shares across regions.

Another source of heterogeneity comes from the evolution of relative prices. Chart 4 includes a description of inflation rates at the regional level. Inflation differentials have been persistent among regions in the past few decades, with a maximum average inflation of 4.9% over 1980-2017 in Catalonia and La Rioja, and a minimum at 4.3% in the Canary Islands (see first panel of the chart). The differences of some 0.5 pp on average, though, when sustained over prolonged periods of time, can lead to significant differences in purchasing power in different regions. For example, between 1980 and 2017, if 1980 is set to 100 and inflation rates are applied subsequently, the differences in the resulting price level indexes between Catalonia and the Canary Islands would have been of the order of some 23% (see second panel of the chart). In any case, it is worth noticing that heterogeneity is lower between regions in Spain than among countries inside de euro area (see third panel of the chart), and cyclical dynamics are quite similar among Spanish regions, showing strong co-movement patterns.

INFLATION FROM A REGIONAL PERSPECTIVE **CHART 4**



SOURCES: INE, EUROSTAT and Banco de España.

3 Main data sources for regional economic analysis

As indicated in the Introduction, in the CCAA have exclusive jurisdiction over statistics for Autonomous Community purposes. In turn, the Statistical system of the Central Government is in charge of the compilation of official statistics for the purposes of this level of the public administration, as well as the official statistics of the European Statistical System (European Statistics). In this framework, regional and central government agencies do cooperate with each other through institutional channels, including in the development of statistics, and the exchange of experiences and methodologies[12].

3.1 Short-term macroeconomic indicators

The availability of standard economic indicators at the regional level is significant in the case of Spain, and a fair subset of them is available in a homogeneous fashion for all (or most of) the CCAA, as reflected by the group of 22 indicators selected in Table 4. Out of the 22 indicators, 19 are available at the monthly frequency, and the rest are sampled quarterly. The indicators cover

12 On these issues see, in particular, the annual reports of the *Interterritorial Statistics Committee*.

SELECTED SHORT-TERM INDICATORS OF REGIONAL ECONOMIC ACTIVITY TABLE 4

Indicator (a)	Frequency	Period	Publication (b)	Downloaded from the web page of
Deposits	Quarterly	Since 1986q3	t+90	Banco de España
Total credit	Quarterly	Since 1987q1	t+90	Banco de España
Freight transport	Quarterly	Since 1993q1	t+58	Ministerio de Fomento
Consumer Price Index (CPI)	Monthly	Since 1980m1	t+14	INE
Social Security registrations	Monthly	Since 1982m1	t+3	Ministerio de Empleo y Seguridad Social
Public works procurement	Monthly	Since 1989m1	t+53	Ministerio de Fomento
Industrial production index	Monthly	Since 1991m10	t+37	INE
Car registrations	Monthly	Since 1992m4	t+15	Ministerio del Interior (DGT)
Commercial motor vehicles registrations	Monthly	Since 1992m4	t+15	Ministerio del Interior (DGT)
Mortgages constituted on dwellings	Monthly	Since 1994m1	t+57	INE
Merchantings of dwellings	Monthly	Since 2007m1	t+57	INE
Exports	Monthly	Since 1995m1	t+50	Ministerio de Industria, Comercio y Turismo
Imports	Monthly	Since 1995m1	t+50	Ministerio de Industria, Comercio y Turismo
Social Security Businesses registrations	Monthly	Since 1996m4	t+33	Ministerio de Empleo y Seguridad Social
Registered unemployment	Monthly	Since 1996m1	t+3	Ministerio de Empleo y Seguridad Social
Gasoline, gasoil and fuel oil consumption	Monthly	Since 1997m1	t+42	CORES (c)
Overnight stays	Monthly	Since 1999m1	t+22	INE
Travelers	Monthly	Since 1999m1	t+22	INE
Retail trade index	Monthly	Since 2003m1	t+28	INE
Services Sector Activity Indicator (IASS)	Monthly	Since 2002m1	t+50	INE
Industrial New Orders Received Indices	Monthly	Since 2002m1	t+50	INE
Industrial Turnover Indices	Monthly	Since 2002m1	t+55	INE

SOURCES: INE, Ministerio de Fomento, Ministerio de Empleo y Seguridad Social, Ministerio del Interior (DGT), Ministerio de Industria, Empleo y Turismo y Cores.

a For a detalied description of each indicator see Annex I.
b It refers to the lag (in days) of indicators release date.
c CORES: "Corporación de Reservas Estratégicas de Productos Petrolíferos", Public Law Corporation of the Spanish Ministry for the Ecological Transition.

a variety areas, including real economic activity, demand, prices, or the financial situation of the Spanish regions. The selected indicators for all (or most of) the CCAA were downloaded from a single source in each case, as indicated in the label of the last column of Table 4, which it is not necessarily the original or only source of the data, as in many cases the regional statistical institutes, and/or other institutional agencies, are involved in the production process of some of these statistics. Further information on the definition of the selected group of indicator is included in Annex I[13].

For the purposes of real-time, short-term economic analysis, though, a number of indicators pose some technical difficulties which had to be tackled before the time series are in shape for the analyst. Let us highlight three. First, and unlike data pertaining to the country as a whole, in many cases the published time series are not adjusted for calendar and seasonal effects (a prominent example being the Industrial Production Index), so it is necessary to resort to methodologies, like TRAMO-SEATS, to adjust the raw, original data. Second, the time coverage of some statistics is shorter than the available for the national indexes. Finally, some series present breaks or missing observations over the available time span for which they are published, typically following methodological changes or changes in the scope of the statistic.

3.2 National accounts' macroeconomic data

3.2.1 ANNUAL AND QUARTERLY REGIONAL ACCOUNTS

The INE elaborates the so-called Spanish Regional Accounts (SRA). The data published under this statistical operation are annual, and cover the sample period that starts in 1980. The main objective of the SRA is to provide a quantified, systematic and as complete a description as possible of the regional economic activity in Spain (Autonomous Communities and provinces), during the considered reference period. The regional accounts are integrated in the conceptual and quantitative framework of the Spanish National Accounts (SNA). In this regard, the SRA are fully consistent with the nation-wide statistics for all covered variables. In particular, these accounts provide a homogeneous and consistent measure of Gross Domestic Product (GDP) and its demand and supply components (in volume and value term basis), compensation of employees (by branches), gross operating surplus (by branches), gross fixed capital formation (by branches) and employment (by branches), consistent with the SNA.

Nonetheless, the INE does not elaborate neither by itself nor in cooperation with regional statistical institutes a companion set of quarterly regional accounts. In this regard, the statistical agencies of eleven regions (Andalusia, Aragon, Canary Islands, Cantabria, Castilla-Leon, Catalonia, Extremadura, Galicia, Madrid, Navarre and the Basque Country) compile their own quarterly GDP charts, including some demand and/or supply-side breakdown (see Table 5 and Annex II). Interestingly, seven of these eleven CCAA produce their own annual "national" accounts, which do not necessarily coincide with the annual charts of the SRA. Although all of them share the general principles contained in the European System of National Accounts, they

13 See also Sánchez-Godino (2009) for a broad review of sources of economic data for the CCAA of Andalusia, Catalonia, Galicia, Madrid, and the Basque Country.

QUARTERLY REGIONAL ACCOUNTS PUBLISHED BY REGIONAL STATISTICS INSTITUTES TABLE 5

	Regional Statistics Institute (link to web page)	Availability	Consistency with Spanish Regional Annual Accounts (SRA) elaborated by INE (a)
Andalusia	IECA	Yes	QRA elaborated on the basis of own Annual Accounts of Andalusia
Aragon	IAEST	Yes	QRA elaborated on its own basis (b)
Asturias	SADEI	No	—
Balearic Islands	IBESTAT	No	—
Canary Islands	ISTAC	Yes	QRA elaborated on the basis of SRA
Cantabria	ICANE	Yes	QRA elaborated on the basis of SRA
Castilla Leon	ECL	Yes	QRA elaborated on the basis of own Annual Accounts of Castilla-Leon
Castilla La Mancha	IES	No	—
Catalonia	IDESCAT	Yes	QRA elaborated on the basis of own Annual Accounts of Catalonia
Valencian Community	PEGV	No	—
Extremadura	IEEX	Yes	QRA elaborated on the basis of SRA
Galicia	IGE	Yes	QRA elaborated on the basis of own Annual Accounts of Galicia
Madrid	IEM	Yes	QRA elaborated on the basis of own Annual Accounts of Madrid
Murcia	CREM	No	—
Navarre	NASTAT	Yes	QRA elaborated on the basis of own Annual Accounts of Navarre
Basque Country	EUSTAT	Yes	QRA elaborated on the basis of own Annual Accounts of the Basque Country
La Rioja	IER	No	—

SOURCE: Regional Statistics Institutes.

a Consistency measured at the cut-off date of this document (15th July, 2018).
b They elaborate the QRA using QNA data produced by INE and a set of Aragon indicators related to economic growth evolution. They apply OLS and use the parameters obtained to estimate the growth for the region.

are not fully homogeneous in their methodology, selection of sources, operational procedures and time coverage. The comparison between real GDP annual growth rates according to INE's SRA and the regional statistics institutes, for those regions, is depicted in Annex II's Chart 1. The differences between the two sources are generally limited, with some exceptions, though, in some specific periods of time and regions. As regards quarterly GDP charts produced by the regional statistics institutes, they are consistent in this seven cases with their own annual GDP charts. In the other three cases (Canary Islands and Extremadura), their estimated quarterly GDP is fully consistent with INE's SRA.

As regards the breakdown of GDP, Table 6 contains a description of its (public) availability at the quarterly frequency[14]. In all cases for which quarterly regional accounts are available, they contain a value added breakdown of GDP, with at least four main sectors (Agriculture, Industry, Construction and Services), as well as an estimation of net taxes on products. For three regions (Canary Islands, Cantabria and Extremadura) this is the only available breakdown. For the remaining seven regions, a breakdown of GDP from the demand side is also available, accounting at least for estimations of Households' Final Consumption Expenditure, Government Consumption, and Gross Fixed capital Formation. Only Castilla-Leon, Catalonia and Navarre

14 It is worth mentioning that the information provided in this paragraph is based on authors' searches through the web pages of the corresponding regional statistical agencies, at the time of elaboration of this document.

QUARTERLY REGIONAL ACCOUNTS BREAKDOWN TABLE 6

	Supply	Demand	Income
Andalusia	Since 1995-Q1	Since 1995-Q1	Since 1995-Q1
Aragon	Since 2009-Q1	Since 2009-Q1	No
Asturias	No	No	No
Balearic Islands	No	No	No
Canary Islands	Since 2000-Q1	No	No
Cantabria	Since 2000-Q1	No	No
Castilla Leon	Since 2010-Q1	Since 2010-Q1	No
Castilla La Mancha	No	No	No
Catalonia	Since 2001-Q1	Since 2001-Q1	No
Valencian Community	No	No	No
Extremadura	Since 2001-Q1	No	No
Galicia	Since 1995-Q1	Since 1995-Q1	Since 1995-Q1
Madrid	Since 2002-Q1	Since 2002-Q1	No
Murcia	No	No	No
Navarre	Since 2000-Q1	Since 2000-Q1	Since 2000-Q1
Basque Country	Since 1995-Q1	Since 1995-Q1	No
La Rioja	No	No	No

SOURCE: Regional Statistics Institutes.

provide a breakdown of the later between Construction and Capital Goods. Finally, only three CCAA publish a GDP breakdown from the Income side (Andalusia, Galicia and Navarre).

3.2.2 NON-OFFICIAL DATASETS

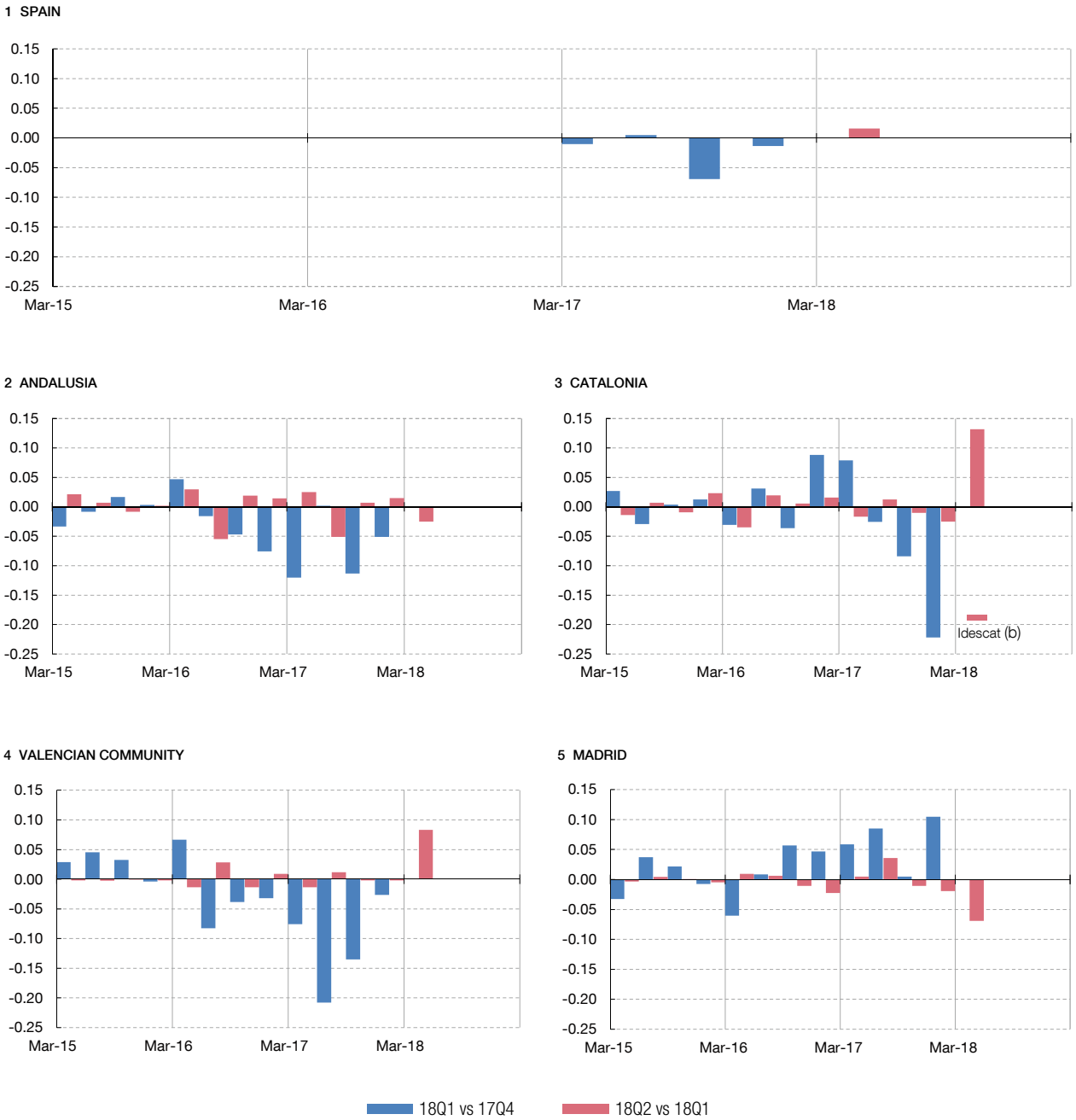
The lack of homogeneous quarterly national accounts' data for all the Spanish regions, in a situation in which there is a relatively fair number of short-term economic indicators, from comparable sources, has led some economic institutions and researchers in Spain to engage in the hurdle of producing their own datasets. This is done by means of statistical methods that tend to be commensurate to standard tools used by statistical institutes (see the contributions in chapter 5 of Cabrer-Borras, 2001, in particular, Pulido et al, 2001, or Trujillo et al., 2000, among others).

Of particular note is the dataset of Cuevas and Quilis (2015), given its methodological soundness and the fact that it is freely available from AIReF's webpage. The authors obtain quarterly estimates of real GDP for all the Spanish regions, derived in a consistent way with the official data provided by the National Accounts, both SRA and Quarterly National Accounts. Following this methodology, the AIReF is able to release early (or flash) estimates of quarterly regional GDP almost synchronized with the publication by the INE of the quarterly national GDP. Quite importantly, the methodology ensures that transversal consistency is compliant with the chain-linking procedures, circumventing its non-additive features in the balancing step. As exemplified by the information in Table 2, differences among the quarterly real GDP series produced by the AIReF and those of the regional statistical institutes are not major, but are not negligible either. In Annex II (Chart 2 of the Annex) we provide some additional, visual comparison of the two datasets.

3.2.3 DATA REVISIONS

The statistical properties of subsequent data revisions of annual SRA regional accounts are deemed to be informative and well-behaved, according to the usual statistical measures, as shown in Cañal-Fernández (2012). Nevertheless, to our knowledge, there are no papers dealing with the study of the properties of revisions to the two measures of quarterly regional GDP described in subsections 3.2.1 and 3.2.2.

REVISIONS OF QUARTERLY GDP GROWTH ESTIMATES (a) **CHART 5**



SOURCES: INE, Independent Authority for Fiscal Responsibility and Idescat.

a The bars show the difference between the quarterly growth rate estimation for each quarter with information up to Q and up to Q-1.
b Revisions according to the data of the regional institute of statistics (Idescat).

Absent a dataset of real-time vintages of data, in Chart 5 we provide an illustration of revisions of AIReF data based on three rounds of published charts: 2017Q4, 2018Q1 and 2018Q2, for the four largest regional economies in Spain, namely Andalusia, Catalonia, Valencian Community and Madrid. Revisions are defined as the difference between two consecutive vintages of data, i.e. the charts available at the time of the publication of 2018Q1 for the period 2015Q1-2017Q4, minus the ones available for the same quarters at the time of the publication of the first release of 2017Q4 (blue bars in Chart 5), and those available for the period 2015Q1-2018Q1 at the time of the first publication of 2018Q2 minus those available at the time of the publication of 2018Q1 for the first time (red bars in Chart 5). Surprisingly enough, as it is apparent from the chart, limited revisions in Spanish quarterly GDP charts (panel 1 of Chart 5) get translated into significant revisions of the corresponding charts for the selected regions (panels 2 to 5 of the chart).

3.3 Short-term regional fiscal data

Monitoring regional public finances in the short-run is crucial for the analysis of national macroeconomic developments in real-time, given the incidence of fiscal policies on economic activity, including via the effects derived from the (lack of) credibility of achieving annual budgetary targets. The short-term scrutiny of public finances is needed to ascertain the adherence of fiscal data to fiscal targets, also in real-time, in order to detect deviation early in advance so that corrective measures can be applied[15]. This is a key aspect of the national fiscal rules' framework, given the highly fiscally decentralized nature of the country.

The extant Law on Budgetary Stability and Financial Sustainability (LBSFS, in place since 2012) sets three types of restrictions on regional governments' conduct: on the structural budget deficit, on public spending growth, and on the public debt-to-GDP ratio. The LBSFS establishes a very detailed procedure for the annual setting of budgetary objectives, in particular, for the regional governments, and details the mechanisms for the monitoring of the fulfilment of these objectives, including in terms of transparency of public finances' data, regular monitoring reports, and instruments to prevent fiscal slippage or to redress it should it arise (see Hernández de Cos and Pérez, 2013).

Up to 2010, the analysis of fiscal policy developments in Spain was typically confined to the examination of central government's accounts and central government's fiscal policy decisions. In this context, there were sharp differences between available high-quality, easy-to-access short-term fiscal statistics pertaining to the central government, and poor sub-national governments' short-term fiscal statistics[16]. Aiming at increasing the transparency of fiscal charts, the Spanish authorities engaged since 2010 in a process of increased publication and coverage of quarterly and monthly public revenue and expenditure data for regional

15 For Spain, see Pedregal et al. (2014), Fernández-Caballero et al. (2012), or Hernández de Cos and Pérez (2014).

16 The following quotation from the Financial Times may be helpful in framing market concerns in 2010: "Is a 6 percent 2011 deficit realistically within reach for Spain? […] the part of the deficit which is apparently reducing at this point is the central government one: we are simply not being given the necessary information on the state of Autonomous Community and Local Authority finances to know whether their deficits are reducing, or even if they are increasing" (4 October 2010).

AVAILABILITY OF SHORT-TERM REGIONAL FISCAL DATA TABLE 7

	Before 2010Q4	As of 2012-2014			
Quarterly and monthly data for the aggregate of CCAA					
Frequency	—	Quarterly-Monthly		Quarterly-Monthly	
Data availability		Starting date is 2010Q3; regular publication frequency	Monthly as of August 2012; regular publication frequency	Starting date is 2004Q1; regular publication frequency	Monthly as of July 2012; regular publication frequency
Accounting framework		Cash (Budgetary Accounts)		National Accounts	
Quarterly and monthly data by individual autonomous community					
Frequency	Scatered sources: see table 1 of Fernandez Caballero et al. (2012)	Quarterly-Monthly		Quarterly-Monthly	
Data availability		Starting date is 2010Q3; regular publication frequency	Monthly as of August 2012; regular publication frequency	Starting date is 2012Q1; regular publication frequency	Monthly as of January 2013; regular publication frequency
Accounting framework		Cash (Budgetary Accounts)		National Accounts	

SOURCES: IGAE and Secretaría General de Administración Autonómica y Local.

governments (see Table 7)[17]. Nevertheless, the time coverage of monthly and quarterly individual regional data is nowadays still confined to the past few years (period starting in January 2013, for monthly indicators, and 2012Q1, for quarterly accounts), while data for the aggregate of all CCAAs is available for a longer time period (time series start in 2004Q1).

As regards public debt, three sources of data are key. First, the Bank of Spain publishes at the quarterly frequency the debt of each of the regional governments, as well as its composition (see Gordo et al., 2013). Time series are available for each region since the mid-1990s. Second, along the same lines, the Bank of Spain publishes other types of public debt on a quarterly basis, in particular, trade credits and the debt of public corporations controlled by the regional governments. Finally, the Ministry of Finance publishes, for each region, the so-called average supplier payment period, as a form of measuring the delay in the payment of trade debt, which is published monthly[18].

17 See https://serviciostelematicos.minhap.gob.es/cimcanet/aspx/consulta/consulta.aspx.

18 The information is available since September 2014, from the web page of the "Secretaría General de Coordinación Autonómica y Local".

4 Some applications of real-time regional economic monitoring

4.1 Construction of composite economic indicators

As an illustration, in this section, we develop composite indicators for the Spanish regions. Typically, the main reason for developing composite economic indicators at the monthly frequency has been to anticipate movements of a reference variable that the indicator aim to measure, mainly GDP. In the Spanish case, given the absence of a unique, official and generalized anchor of quarterly regional GDP, composite indicators can be used as an alternative way of measuring the underlying situation of the economy. A number of papers have dealt with the issue of building synthetic economic indicators for the Spanish regions: see, among others, Meriguete and Pérez-García (2014), Pérez-Suárez et al. (2009), the contributions to chapter 4 of Cabrer-Borras (2001), López y Castro Núñez (2004), Trujillo et al. (1999), and the references quoted therein.

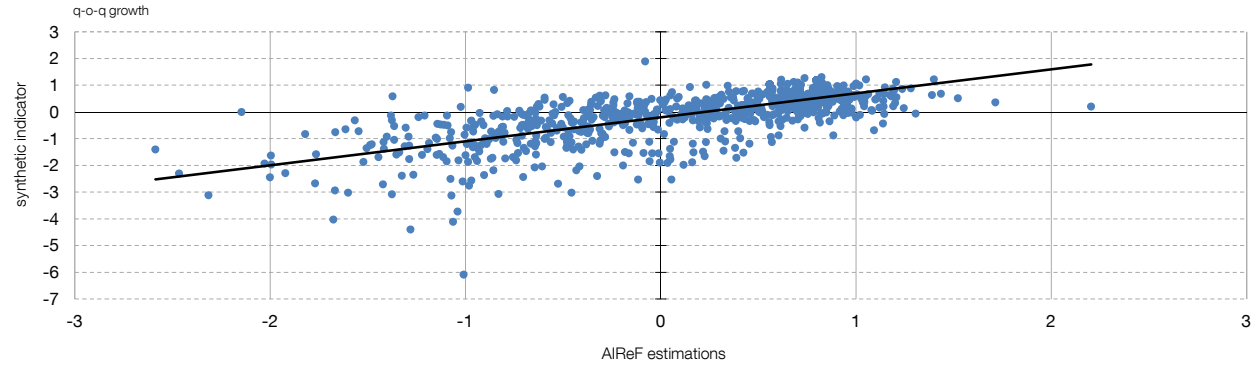
As it is standard in the literature, for each region, we aggregate a set of indicators using principal components' analysis, in order to obtain a factor that summarizes the information contained in that given set of indicators. The so-obtained variable can be interpreted as a measure of aggregate economic activity, for each CCAA. In particular, we focus on the following variables: social security registrations, retail trade index, commercial motor vehicles registrations, industrial production index, services sector activity index, exports, imports, and overnight stays (both of residents in Spain and abroad). In Chart 6 we display quarter-on-quarter growth rates of the composite indicators for all regions (converted from the monthly to the quarterly frequency) against the corresponding quarterly regional GDP estimates, as provided by the AIReF (first panel) and the regional statistical institutes (second panel of the chart), for the period 2007Q4-2017Q4. As it is clear by visual inspection, the correlation between all these measures of economic activity is quite high, being the simple correlation coefficient between the synthetic indicators and the two GDP measures of 0.71 and 0.72, respectively, for AIReF's and regional statistical institutes' measures.

Despite the fact that the correlation among the different measures of economic activity is very high, there seems to be information in the composite indicators that is not fully reflected in the quarterly GDP series. This is illustrated in Table 8, where we present the results of running statistical regressions of each measure on its own lag and the other sources (lagged). This is a sort of Granger Causality test. Some results are worth highlighting: (i) as regards regressions for regional statistical institutes, its own lagged values convey information only in five cases out of eleven, meaning that persistence is lower than in the other two cases (columns 5 and 9 versus column 1); (ii) AIReF GDPs lagged values do contain information not present in regional institutes GDPs in most cases, but add very little anticipatory power to the composite indicators; (iii) Regional statistical institutes' GDPs, in turn, present in less cases that anticipatory power on AIReF's GDPs, and almost none as regards the composite indicators; (iv) interestingly, synthetic indicators do anticipate quarterly GDP dynamics in almost all cases (columns 3 and 6 of the table). The latter result is particularly relevant, as it seems to be the case that the two measures of quarterly regional GDP described in subsections 3.2.1 and 3.2.2 might not be capturing information about the business cycle that is present in existing economic indicators.

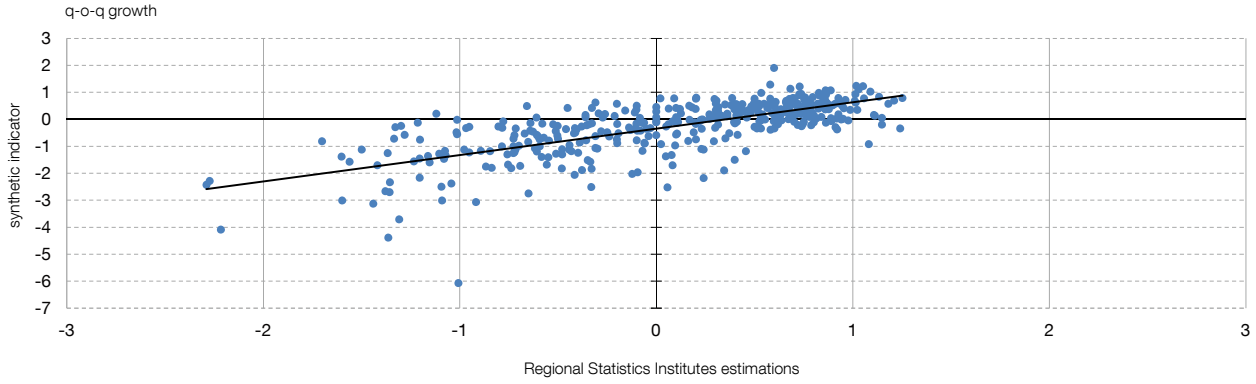
QUARTERLY REAL GDP GROWTH (REGIONAL STATISTICS INSTITUTES AND AIReF) VERSUS COMPOSITE ECONOMIC INDICATORS

CHART 6

1 AIReF ESTIMATIONS COMPARED TO COMPOSITE INDICATORS



2 REGIONAL STATISTICS INSTITUTES ESTIMATIONS COMPARED TO COMPOSITE INDICATORS



SOURCES: INE, Regional Statistics Institutes and own elaboration.

REGRESSION OF EACH SOURCE OF REGIONAL GDP ON ITS OWN LAG AND OTHER SOURCES (LAGGGED) P-VALUES (a)

TABLE 8

Dependent variable	Regional Stat. Institute						AIReF						Synthetic indicators					
Independent (lagged)	Regional Stat. Institute		AIReF		Synthetic indicators		Regional Stat. Institute		AIReF		Synthetic indicators		Regional Stat. Institute		AIReF		Synthetic indicators	
Andalusia (b)	0.778		0.000	***	0.000	***	0.066	*	0.000	***	0.000	***	0.923		0.712		0.000	***
Aragon (c)	0.001	***	0.641		0.029	**	0.670		0.001	***	0.014	**	0.690		0.018	**	0.572	
Canary Islands (b)	0.095	*	0.298		0.000	***	0.003	***	0.842		0.000	***	0.902		0.730		0.000	***
Catalonia (b)	0.673		0.000	***	0.000	***	0.076	*	0.002	***	0.000	***	0.095	*	0.376		0.001	***
Cantabria (b)	0.440		0.000	***	0.000	***	0.017	**	0.012	**	0.000	***	0.993		0.690		0.000	***
Castilla Leon (d)	0.512		0.006	***	0.119		0.465		0.000	***	0.002	***	0.766		0.043	**	0.691	
Extremadura (b)	0.209		0.000	***	0.000	***	0.139		0.000	***	0.000	***	0.560		0.248		0.001	***
Galicia (b)	0.010	***	0.046	**	0.000	***	0.070	*	0.000	***	0.000	***	0.688		0.817		0.001	***
Madrid (b)	0.009	***	0.010	**	0.000	***	0.000	***	0.000	***	0.000	***	0.818		0.721		0.000	***
Navarre (b)	0.012	**	0.004	***	0.000	***	0.232		0.000	***	0.000	***	0.691		0.439		0.086	*
Basque Country (b)	0.682		0.000	***	0.000	***	0.022	**	0.001	***	0.000	***	0.067	*	0.300		0.001	***

SOURCES: INE, Regional Statistics Institutes, Independent Authority for Fiscal Responsibility (AIReF) and Banco de España.

a Statistically significant at: *** 1%, ** 5%, * 10%
b Sample: 2003Q1 - 2017Q4.
c Sample: 2009Q3 - 2017Q4.
d Sample: 2010Q3 - 2017Q4.

4.2 Model-based monitoring of regional economic activity

In addition to synthetic indicators, recent conjunctural information could be read through the lens of a statistical model, and transformed into an aggregate measure of economic activity, like GDP. In this section we present some results based on dynamic factor models, taken from Gil et al. (2018) (for technical details, please check this paper). The later econometric approach is quite popular, given its ability to synthetize diverse information contained in different indicators into a single index, which turns out to be useful to compute accurate forecasts of a given target variable, in our case GDP growth for the different regions of Spain. We focus on the results for the four largest regions of Spain (Andalusia, Catalonia, Valencian Community and Madrid). The nowcasting models include the following monthly indicators: Social Security Registrations, Industrial Production Index, Retail Trade Index, Services Sector Activity Indicator, and commercial motor vehicles registrations. Other approaches to nowcast Spanish regional economic activity are described in López (2016) or Gasulla et al. (2016), and the references quoted therein.

To illustrate the usefulness of the proposed framework, we report its real-time performance when producing nowcasts in real time for real GDP in the fourth quarter of 2017. The two measures of quarterly regional GDP are used, when available (in the cases of Andalusia, Catalonia and Madrid). The forecasts are computed on a daily basis, five months before the date of the first release of GDP growth is published by the corresponding agency. We summarize the main results in two charts: (i) Chart 7A displays the results for a pseudo-real-time exercise: this means that we take GDP charts as available, ex post, on early September 2018; (ii) Chart 7B, in turn, adopts a real-time perspective, given the potential relevance of data revisions (see subsection 3.2.3), and compares results for AIReF's GDPs when nowcasting is performed on two vintages of data: the available on early September 2018 one, and the 2017Q4, real-time one.

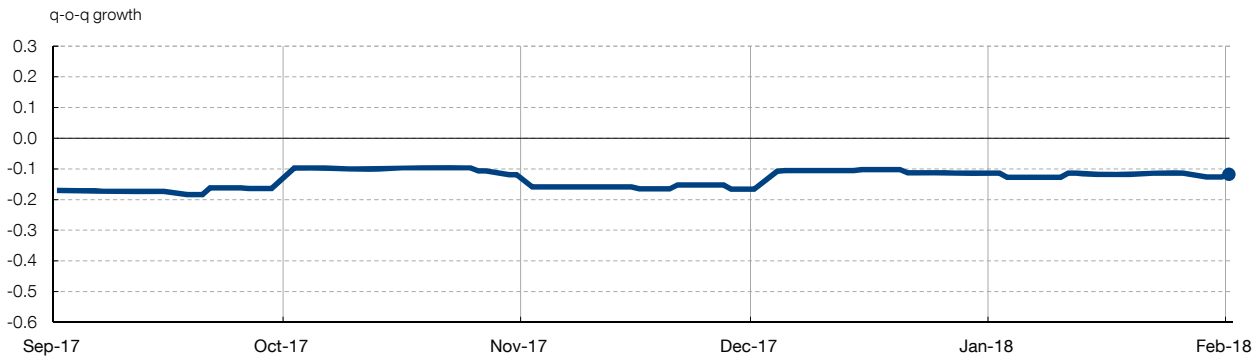
Two results are worth highlighting from Chart 7A. First, in real-time, the reference quarterly GDP series used (either from the AIReF or the regional statistical institutes) can provide a different signal on the underlying situation of economic activity. Take for example the case of Catalonia (panel 3 of the chart): using AIReF's GDP, nowcasts produced with data made available in the months of November and December pointed to a deceleration of activity of some 0.1 pp, while with the IDESCAT measure, the estimates would have signaled a much larger deceleration, of around 0.4 pp. With information up to February 2018, the now-casted deceleration was still significantly different. The second result to be stressed from Chart 7A is that initial GDP data releases according to different data sources can differ substantially, as in the case of Madrid (see panel 5), leaving the user of these statistics with a decision to be made: which data producer to follow and quote?

As regards Chart 7B, it illustrates, as in Chart 5 above, the potential distortion associated with ex-post data revisions when drawing inferences about the real-time behavior of the national accounts' aggregates of reference.

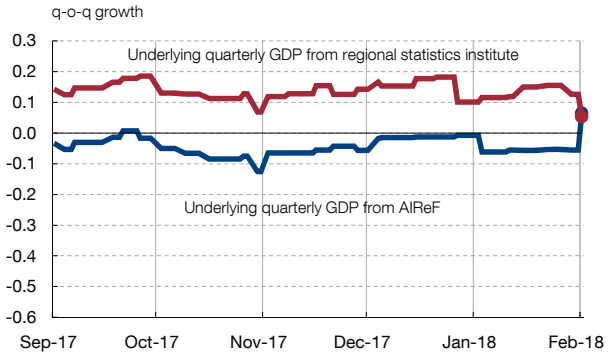
ACCELERATION/DECELERATION OF REAL GDP GROWTH: PSEUDO REAL-TIME ESTIMATES FOR 2017-Q4 (a)

CHART 7A

1 SPAIN



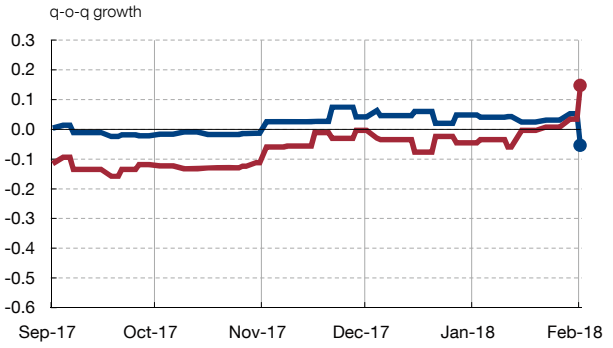
2 ANDALUSIA



3 CATALONIA

4 VALENCIAN COMMUNITY

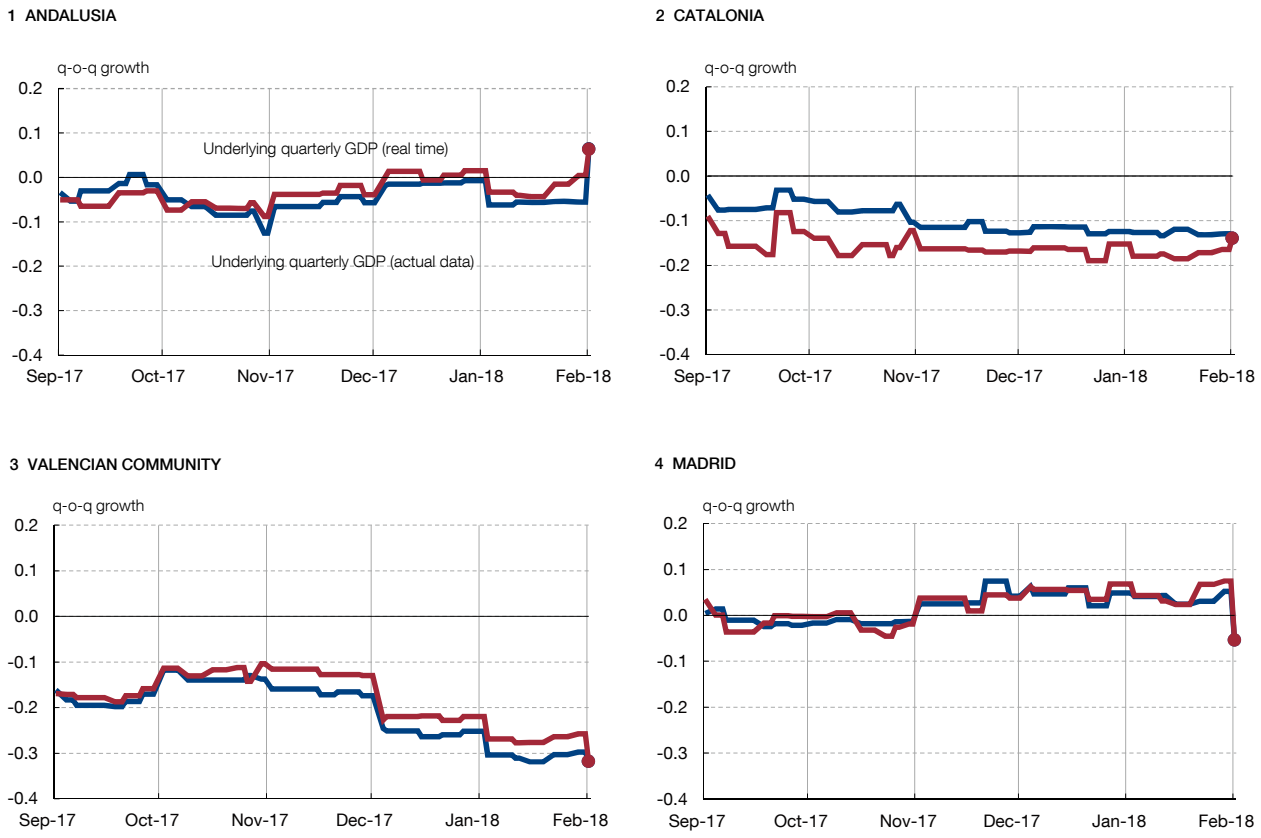
5 MADRID



SOURCES: INE, Independent Authority for Fiscal Responsibility and own elaboration.

a Computed as the difference between the point real-time nowcast for 2017Q4 and the 2017Q3 estimate. In the case of the estimates based on AIReF data, the exercise is based on the vintage off data available on 25 September 2018. As regards estimates based on regional statistical institutes' data, the exercise is performed on the vintage of data available online on 15 July 2018.

ACCELERATION/DECELERATION OF REAL GDP GROWTH: PSEUDO REAL-TIME VS. REAL-TIME ESTIMATES FOR 2017-Q4 (AIReF DATA) (a) CHART 7B



SOURCES: INE, Independent Authority for Fiscal Responsibility and own elaboration.

a Computed as the difference between the nowcast for 2017Q4 and the 2017Q3 estimate.The blue line show the results of the exercise based on the vintage of data available on 27 September 2018; and the red line show the results of the exercise performed on real-time data, as available in the fourth quarter of 2017.

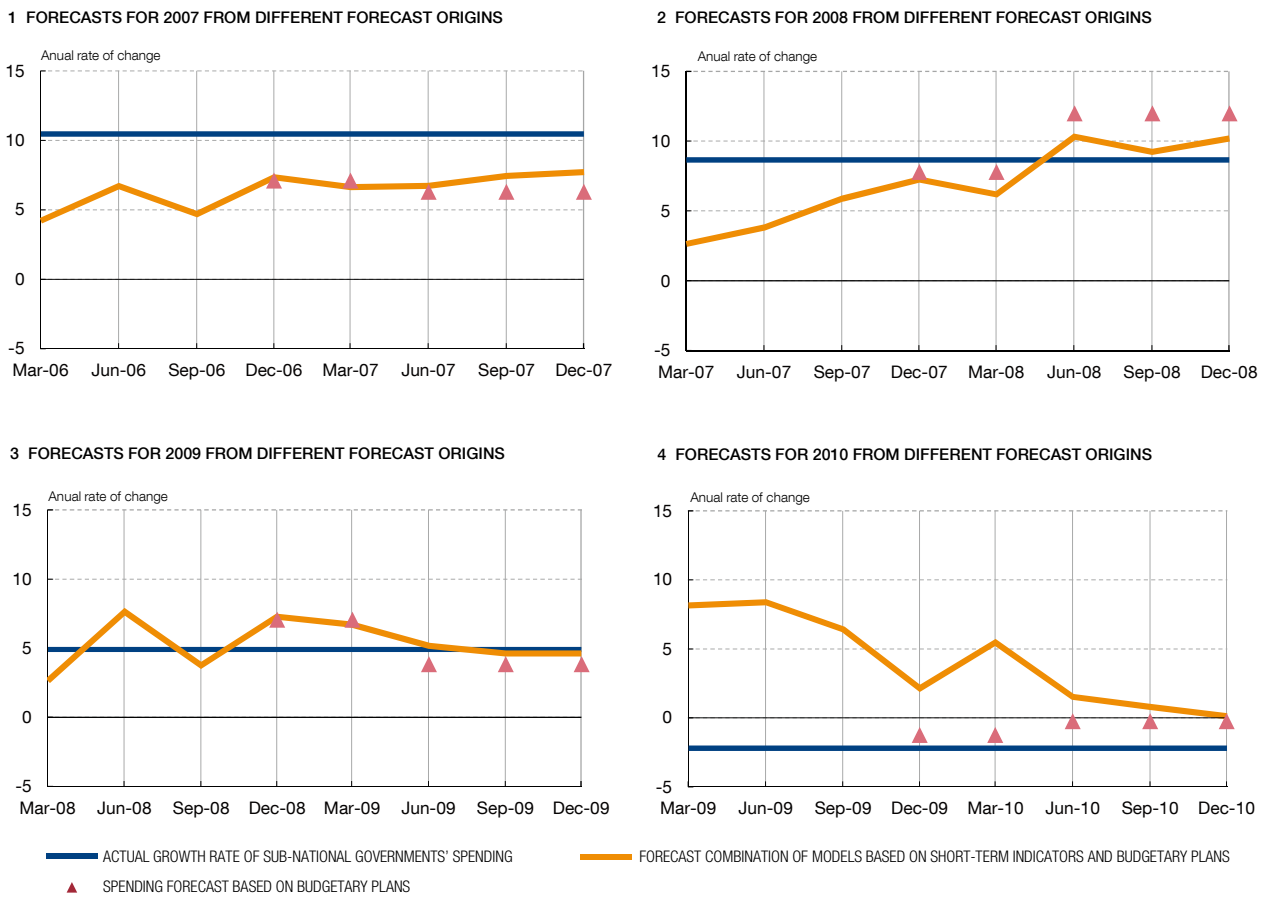
4.3 Monitoring regional public spending

As indicated above, monitoring public finances in real-time is a relevant task in the case of Spain, given the significant weight of, in particular, regional spending in overall public expenditure in the country. The use of monthly and quarterly indicators pertaining to sub-central government units offer an opportunity to do so, even though the data shortages described above limit their usefulness.

Despite that fact, a number of papers have tried to overcome those limitations by focusing on modelling approaches that combine data sources available at different sampling frequencies, as Pedregal et al. (2014) or Fernández-Caballero et al. (2012). In addition, the later paper also constructs indicators of regional public spending by resorting to non-standard data sources of each individual regions, instead of only focusing on data disseminated by the General State Comptroller (IGAE), the regular source for fiscal information in Spain. In Chart 8, we focus on an example taken directly from Fernández-Caballero et al. (2012). In each panel of the Chart 8 we replicate the following pseudo-real-time forecasting exercise done by these authors: plot the forecasts for a given year (2007, 2008, 2009 and 2010, respectively) produced from eight consecutive forecast origins (the 10 quarters right before the end of the year being forecast), with two forecasting methods, and

RECURSIVE FORECASTS OF SUB-NATIONAL GOVERNMENTS' SPENDING IN 2007, 2008, 2009 AND 2010, USING ALTERNATIVE FORECASTING METHODS

CHART 8



SOURCE: Fernández-Caballero et al. (2012).

compare it with the observed data (horizontal line in each panel). The two forecasting methods are, on the one hand, a mixed-frequencies time series model that exploits infra-annual information and, on the other, official, regional governments' budgetary plans.

The first panel of Chart 8 shows the forecasts for 2007 computed on the basis of the information available in 2006Q1 up to 2007Q4. The model-based forecasts show adaptation over time as new information becomes available to nowcast the ex-post actual chart of close around 10%, from a 4% forecasts in the 2006Q1, one-year-ahead forecast, to the 9% of the 2007Q4, current-year, forecast. In turn, the forecasts based on official budgetary targets, significantly underestimated the ex-post, actual chart from all origins. For the year 2008, short-term-indicators-based forecast presented a similar adaptive profile, while current year budgetary plans overestimated spending, maybe due to the outburst of the economic crisis (second panel of the chart), while forecasts for 2009 are similarly accurate with both methods. Finally, panel 4 presents forecasts for 2010. Interestingly, model projections only captured the severe change in policy witnessed in 2010 (linked to the outburst of euro area's sovereign debt crisis) at the very end of the year, while forward looking projections embedded in budgetary targets prepared at the end of 2009 anticipated part of the deceleration in spending.

REFERENCES

AUTORIDAD INDEPENDIENTE DE RESPONSABILIDAD FISCAL (AIREF) (2018), "Monthly stability target monitoring: E. Autonomous Regions". Available at: www.airef.es.

BANCO DE ESPAÑA (2017), "The economic impact of uncertainty arising from potitical tensions in Catalonia", Box 1.1 in Banco de España Financial Stability Report, 11/2017.

— (2018), "Economic impact of the political tensions in Catalonia", Box 1.1 in Chapter 1 of the Banco de España Annual Report 2017, May 2018.

BANDRÉS, E., M. D. GADEA-RIVAS, and A. GÓMEZ-LOSCOS (2017), "Regional business cycles across Europe", Bank of Spain Occasional Paper, n. 1702.

BANDRÉS, E., Y M. D., GADEA (2013), "Crisis Económica y Ciclos Regionales en España". Papeles de Economía Española, 138, pp. 2-30.

CABRER-BORRÁS, B. (Ed.) (2001), "Analisis regional: el proyecto Hispalink", Ediciones Mundi-prensa.

CANCELO, J.R. and P. URIZ (1999), "El ciclo del empleo en Andalucía: caracterización, relaciones intersectoriales y correspondencia con los principales indicadores de coyuntura", Boletín Económico de Andalucía, 26, pp. 81101.

CANCELO, J. R. (2004), "El ciclo del empleo en España: un análisis regional", CLMEconomía, n. 4, primer semestre de 2004, pp. 107-138.

CANUTO, O. and LIU, L. (2010), "Subnational debt Finance: Make it sustainable". In Canuto, O.and Giugale, M., editors, The Day After Tomorrow - A Handbook on the Future of Economic Policy in the Developing World, chapter 13, pp. 219-237. World Bank, Washington, DC.

CAÑAL FERNÁNDEZ, V. (2012), "Accuracy and reliability of Spanish regional accounts (CRE-95)", Empirical Economics 43, pp. 1299–1320.

COMISIÓN DE EXPERTOS PARA LA REVISIÓN DEL MODELO DE FINANCIACIÓN AUTONÓMICA (2017), "Informe de la Comisión de Expertos para la revisión del Modelo de Financiación Autonómica", July 2017.

CUEVAS, A. and E. QUILLIS (2015), "Quarterly Regional GDP Flash Estimates for the Spanish Economy (METCAP model)", AIReF Working Paper 2015/3.

DELGADO-TÉLLEZ, M., V. LLEDO and J. J. PÉREZ (2016), "On the determinants of fiscal non-compliance: an empirical analysis of Spains regions", Working Paper 1632, Banco de España.

DELGADO-TÉLLEZ, M., P. HERNÁNDEZ DE COS, S. HURTADO, and J. J. PÉREZ (2017), "The macroeconomic impact of delayed government payments: a case study", Public Finance and Management, 17, pp. 152-169.

EUROPEAN COMMISSION (2012), "Fiscal decentralisation in the EU - main characteristics and implications for fiscal outcomes", Part IV in Public Finances in EMU - 2012.

FERNÁNDEZ-CABALLERO, L., D. J. PEDREGAL, and J. J. PÉREZ (2012), "Monitoring sub-central government spending in Spain", Hacienda Pública Española - Review of Public Economics, 202, pp. 77-104.

GADEA, M. D., A. GÓMEZ-LOSCOS, and A. MONTAÑÉS (2012), "Cycles inside cycles: Spanish regional aggregation", SERIEs Journal of the Spanish Economic Association, 3, pp. 423-456.

GASULLA, M., J. JORBA, J. MUÑOZ, and S. PLAZA. (2016), "Métodos de nowcasting para la estimación del PIB: una aplicación para la economía catalana", Institut d'Estadística de Catalunya.

GIL, M., D. LEIVA-LEÓN, J. J. PÉREZ and A. URTASUN (2018), "An application of dynamic factor models to nowcast regional economic activity in Spain", Banco de España, mimeo.

GORDO, L., HERNÁNDEZ DE COS, P., and J. J. PÉREZ (2013), "Developments in Spanish Public Debt since the start of the crisis", Economic Bulletin Bank of Spain, July 2013.

GORDO, E., HERNÁNDEZ DE COS, P., and J. J. PÉREZ (2015), "Instituciones fiscales independientes en España y en la UEM", Economic Bulletin Bank of Spain, February 2015.

HENZEL, S., R. LEHMANN, and K. WOHLRABE (2015), "Nowcasting regional GDP: the case of the Free State of Saxony", MPRA Paper no 63714.

HERNÁNDEZ DE COS, P., and J. J. PÉREZ (2013), "The new budgetary stability law", Economic Bulletin Bank of Spain, April.

— (2014), "El seguimiento en tiempo real de los presupuestos autonómicos y locales", Presupuesto y Gasto Público, 77, pp. 101-112.

KAPPLER, M., and A. SACHS (Eds) (2013), "Business Cycle Synchronisation and Economic Integration: New Evidence from the EU", ZEW Economic Studies, 45.

KOOP, G., S. MCINTYRE, and J. MITCHELL (2018), "UK regional nowcasting using a mixed frequency vector autoregressive model", Working Papers 1805, University of Strathclyde Business School, Department of Economics.

KOPOIN, A., K. MORAN, and J-P. PARÉ (2013), "Forecasting regional GDP with factor models: How useful are national and international data?", Economics Letters, 121, pp. 267-270.

LEAL, T., J. J. PÉREZ, and J. RODRÍGUEZ-LÓPEZ (2004), "Pautas cíclicas de la economía andaluza en el período 1984-2000: un análisis comparado", Chapter 3 in Economía y sociedad andaluza, J. Aurioles, E. Manzanera (Eds.). Ed. Comares, Granada, Spain.

LEAL, T., and J. J. PÉREZ (2005), "Monitorización de objetivos fiscales anuales: una aplicación con datos regionales", Investigaciones Regionales - Journal of Regional Research, 7, pp. 53–67.

LEHMANN, R. and K. WOHLRABE (2013), "Forecasting gross value-added at the regional level: Are sectoral disaggregated predictions superior to direct ones?", IFO Working Paper Series 171, IFO Institute - Leibniz Institute for Economic Research at the University of Munich.

— (2014), "Regional economic forecasting: state-of-the-art methodology and future challenges". Economics and Business Letters, 3, pp. 218-231.

— (2016), "Boosting and Regional Economic Forecasting: The Case of Germany". CESifo Working Paper Series No. 6157.

LÓPEZ, A. M. (2016). "El papel de la información económica como generador de conocimiento en el proceso de predicción: comparaciones empíricas del crecimiento del PIB regional". Estudios de Economía Aplicada, 34, pp. 553-582.

LÓPEZ, A. M. and R. CASTRO NÚÑEZ (2004). "Valoración de la actividad económica regional de España a través de indicadores sintéticos". Estudios de Economía Aplicada, 22, pp. 631-655.

PEDREGAL, D. J., J. J. PÉREZ, and A. J. SÁNCHEZ (2014), "A toolkit to strengthen government budget surveillance", Hacienda Pública Española - Review of Public Economics, 211, pp. 117-146.

MERIGUETE, D. and J. PÉREZ-GARCÍA (2014), "Indicadores de alta frecuencia para el crecimiento regional". Instituto L. R. Klein – Centro Stone/CEPREDE.

PÉREZ-SUÁREZ, R., A. J. LÓPEZ, B. MORENO, S. RODRÍGUEZ, F. J. CALLEALTA, A. M. LÓPEZ, and J. D. BUENDÍA (2009), "Predicción económica regional: experiencias de la red Hispalink", Información Comercial Española, 848, pp. 141-158.

PUENTE, S. (2017), "Regional convergence in Spain: 1980-2015", Bank of Spain Economic Bulletin 3/2017. Analytical Articles.

PULIDO, A., J. M. PAVÍA, Y. MONTEJO, A. M. LÓPEZ, and B. CABRER-BORRÁS (2001), "Estimación del VAB trimestral de las Comunidades Autónomas", pp. 407-422 en Cabrer-Borrás (2001).

RAMAJO, J., M. A. MÁRQUEZ, and G. J. D. HEWINGS (2015), "Spatiotemporal Analysis of Regional Systems: A Multiregional Spatial Vector Autoregressive Model for Spain", International Regional Science Review, 40, pp. 75-96.

SALA-RÍOS, M., T. TORRES-SOLÉ, and M. FARRÉ-PERDIGUER (2014), "El ciclo económico de Cataluña: Un análisis comparativo con la Unión Económica y Monetaria", Cuadernos de Economía, 37, pp. 169-180.

SÁNCHEZ-GODINO, F. J. (2009), "Un análisis comparado sobre la idoneidad del uso del IPI como proxy de la actividad económica y la existencia de un ciclo común para el caso de las regiones españolas", Tesina 3/2009, Msc Economía y Evaluación del Bienestar, Universidad pablo de Olavide de Sevilla.

TRUJILLO, F., M. D. BENÍTEZ and P. LÓPEZ (1999): "Indicadores Sintéticos Trimestrales de la Actividad Económica No Agraria en Andalucía", Revista de Estudios Regionales, 53, pp. 97-128.

TRUJILLO, F., M.D. BENÍTEZ and P. LÓPEZ (2000): "Trimestralización de los Valores Añadidos Sectoriales mediante Indicadores. Aplicación al Caso de Andalucía", Revista de Estudios Regionales, 57, pp. 59-97.

ANNEX I. Additional details on a selection of indicators of regional economic activity

Deposits

Deposits of resident sectors (General Government and other resident sectors).

- Starting date: 1986Q3.
- Frequency: quarterly.
- Source: Banco de España ("Bank of Spain").
- Units: millions of euros.
- Link (Table 4.31).

Loans

Loans to resident sectors (General Government and other resident sectors).

- Starting date: 1988Q1.
- Frequency: quarterly.
- Source: Banco de España.
- Units: millions of euros.
- Link (Table 4.30).

Freight Transportation

Total amount of goods that is transported in the region by heavy vehicles, measured in thousands of tons. The data is disaggregated by total transported, received and sent within the region as well as to other regions and countries. For the historical series (1993-2010) there is not a disaggregation for the intra-municipalities level or international trade. Data starting in 2002 include these additional statistics.

- Starting date: 1993Q1.
- Frequency: quarterly.
- Source: Ministerio de Fomento ("Development Ministry").
- Units: thousands of tons.
- Link (starting 2002) // Link (1993-2010).

Consumer Price Index (CPI)

Conjunctural indicator that measures the evolution of the prices of goods and services consumed by the population that reside in family dwellings in Spain. The combination of goods and services that conform the shopping basket is basically obtained from the consumption of families, and the importance of each one of these within the calculation of the CPI is determined by said consumption.

- Starting date: 1978.
- Frequency: monthly.
- Source: INE (Instituto Nacional de Estadística).
- Units: Index.
- Link (starting 2002) // Link (1993-2001) // Link (1978-1992).

Social Security Registrations

Total of workers affiliated to Social Security under different frameworks. Monthly average affiliations are available since 2001. Before that, the available data are referred to the last day of the month, so we calculate an approximation to monthly average data as the average of last day month data of the reference month and the previous month.

- Starting date: 1982.
- Frequency: monthly.
- Source: Ministerio de Empleo y Seguridad Social.
- Units: individuals.
- Link (since 1982).
- Link (02_m1 Afi. Med 2001-2011 // 02_m2 Afi. Med 2012-2017).
- Link (2018).

Public works procurement

Total value of the official public works carried out for different administrations such as central government, regional administrations, municipalities, universities, entities associated with Social Security and any other public office.

- Starting date: 1989.
- Frequency: monthly.
- Source: Ministerio de Fomento.
- Units: thousands of euros.
- Link (starting 2008) // Link (1989-2007).

Industrial Production Index (IPI)

Conjunctural indicator that assesses the evolution of the production level of the secondary sector measuring the Gross Value Added generated by the industry (excluding construction). It measures the changes in production without considering the effect of prices. There are no regional data for the year 2001.

- Starting date: 1991m10.
- Frequency: monthly.
- Source: INE.
- Units: index.
- Link (since 2002) // Link (1991m10-2000).

Car Registrations

Number of vehicles that are registered in order to circulate. The series are only partially available at the DGT website.

- Starting date: 1992m4.
- Frequency: monthly.
- Source: Ministerio del Interior (DGT).
- Units: number of vehicles.
- Link (starting 2010).

Commercial motor vehicles registrations

These indicator includes the registration of trucks, vans and industrial tractors. The series are only partially available at the DGT website.

- Starting date: 1992m4.
- Frequency: monthly.
- Source: Ministerio del Interior (DGT).
- Units: number of vehicles.
- Link (starting 2010).

Mortgages constituted on dwellings

Number of mortgages constituted on real estate over a reference month. INE also provides information about average amount and average interest rates of these loans.

- Starting date: 1994.
- Frequency: monthly.
- Source: INE.
- Units: number of mortgages.
- Link (since 2003) **//** Link (1994-2003).

Exports

Total value of exports over the reference month.

- Starting date: 1995.
- Frequency: monthly.
- Source: Ministerio de Industria, Comercio y Turismo (DataComex).
- Units: thousands of euros.
- Link

Imports

Total value of imports over the reference month.

- Starting date: 1995.
- Frequency: monthly.
- Source: Ministerio de Industria, Comercio y Turismo (DataComex).
- Units: thousands of euros.
- Link

Registered Unemployment

Total number of unemployed individuals, for all ages and both genders.

- Starting date: 1996.
- Frequency: monthly.
- Source: Ministerio de Empleo y Seguridad Social.
- Units: total number of unemployed individuals.
- Link

Social Security Businesses Registrations

Total number of firms affiliated to the Social Security including different frameworks, except for the Public Administration. There is a methodological change in 2013. Data from 1996 to 2013 is not publicly available.

- Starting date: 1996m4.
- Frequency: monthly.
- Source: Ministerio de Empleo y Seguridad Social.
- Units: total number of firms.
- Link (starting 2013).

Gasoline, Gasoil and Fuel Oil Consumption

Total aggregated consumption of gasoline, gasoil and fuel oil, representing the total consumption of oil-bearing products and combustibles.

- Starting date: 1997.
- Frequency: monthly.
- Source: CORES (Corporación de Reservas Estratégicas de Productos Petrolíferos – "Corporation of Strategic Reserves of Oil-bearing Products").
- Units: tons.
- Link (fourth link of "Últimos archivos históricos" [Consumos Productos petrolíferos CCAA y provincias]).

Overnight Stays

Total number of nights that a traveler stays at a given establishment. Data are retrieved from the Hotels Occupancy Survey.

- Starting date: 1999.
- Frequency: monthly.
- Source: INE.
- Units: number of overnight stays.
- Link

Travelers

Total number of individuals that stay one or more nights at the same establishment. Data is retrieved from the Hotels Occupancy Survey.

- Starting date: 1999.
- Frequency: monthly.
- Source: INE.
- Units: number of individuals.
- Link

Service Sector Activity Indicators (SSAI)

The SSAI measure the short-term evolution of the activity of companies belonging to non-financial market Services, through two variables: turnover and employed personnel. Turnover comprises the amounts invoiced by the company for the provision of services and the sale of goods. Employed personnel includes both wage-earning and unpaid personnel. In order to obtain this data, an ongoing survey is conducted, every month researching more than 28,000 companies that operate in this sector. Results are presented as indices so as to measure variations as compared to base year 2015.

- Starting date: 2002.
- Frequency: monthly.
- Source: INE.
- Units: Index.
- Link

Industrial New Orders Received Index

The Industrial New Orders Received Indices are short term indicators whose objective is to measure the monthly evolution of future demand directed at industrial branches. The information necessary for its elaboration started to be collected in January 2002 via the setting up of a continuous survey that investigates each month more than 11.000 industrial establishments distributed all over the country.

- Starting date: 2002.
- Frequency: monthly.
- Source: INE.
- Units: Index.
- Link

Business Turnover Index

The Business Turnover Index (BTI) is a synthesis statistical operation which allows obtaining a short-term indicator that measures the short-term evolution of turnover, as a whole, for non-financial economic sectors: Extractive and manufacturing industries, Electrical energy and water, Trade and Non-financial services. In order to obtain this indicator, the information from three surveys carried out by INE is used. These surveys are the following: Industrial Turnover Indices (ITI), Services Sector Activity Indicators (SSAI) and Retail Trade Indices (RTI). For the rest of sectors not researched by INE, the information is completed with data provided by the Tax Agency.

- Starting date: 2002.
- Frequency: monthly.
- Source: INE.
- Units: Index.
- Link

Retail Trade Index

This indicator measures the evolution of the gross total sales of the retail trade sector, except of motor vehicles and motorcycles. Total gross sales represent the total billed by the firm as sold products including taxes.

- Starting date: 2002.
- Frequency: monthly.
- Source: INE.
- Units: Index.
- Link (since 2005) **//** Link (2003-2005).

Merchanting of dwellings

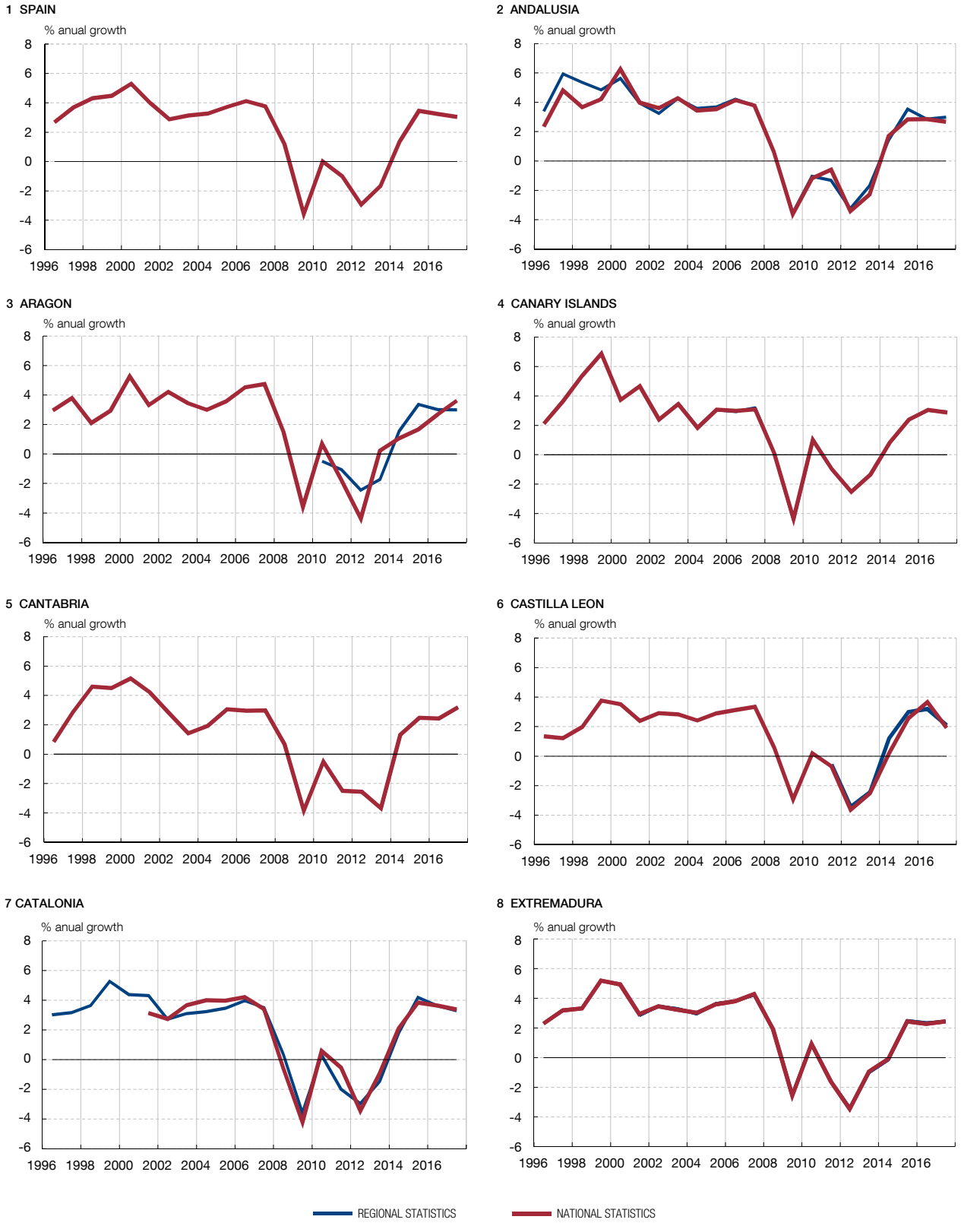
The Statistics on transfer of property rights provide information on the number of rights on transfers of property during the reference month, on a national level, by province and Autonomous Community. All information on transfers of property is taken from the information contained in the Land Registers for the whole country.

- Starting date: 2007.
- Frequency: monthly.
- Source: INE.
- Units: number of transfers of dwellings.
- Link

ANNEX II. Additional charts on quarterly regional accounts

EVOLUTION OF ANNUAL REGIONAL REAL GDP ACCORDING TO THE NATIONAL AND THE REGIONAL STATISTICS INSTITUTES

CHART 1. ANNEX II



EVOLUTION OF ANNUAL REGIONAL REAL GDP ACCORDING TO THE NATIONAL AND THE REGIONAL STATISTICS INSTITUTES

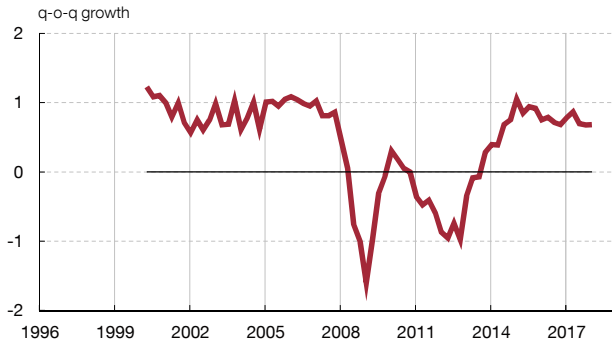
CHART 1. ANNEX II (cont.)

SOURCES: National and regional statistics institutes.

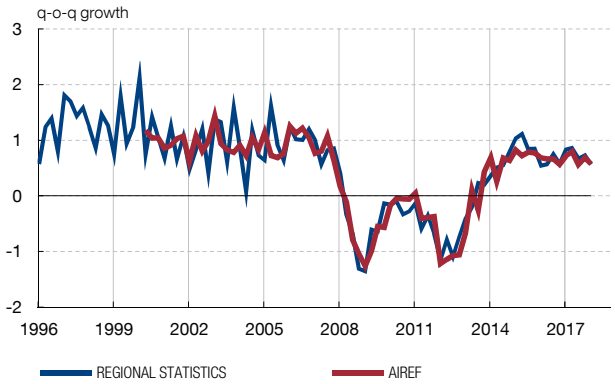
EVOLUTION OF REGIONAL REAL GDP ACCORDING TO THE REGIONAL STATISTICS INSTITUTES AND THE AIReF

CHART 2. ANNEX II

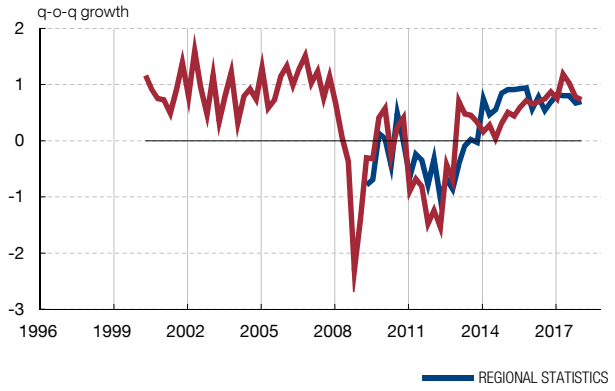
1 SPAIN



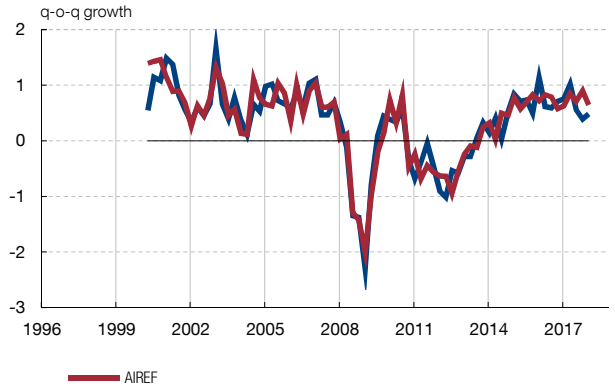
2 ANDALUSIA



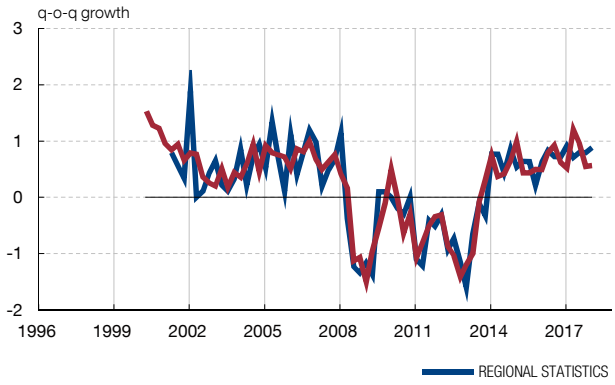
3 ARAGON



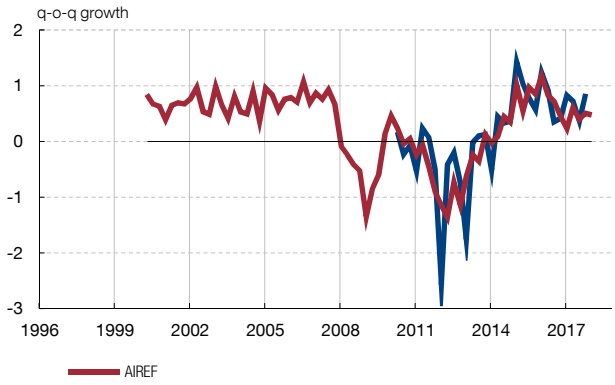
4 CANARY ISLANDS



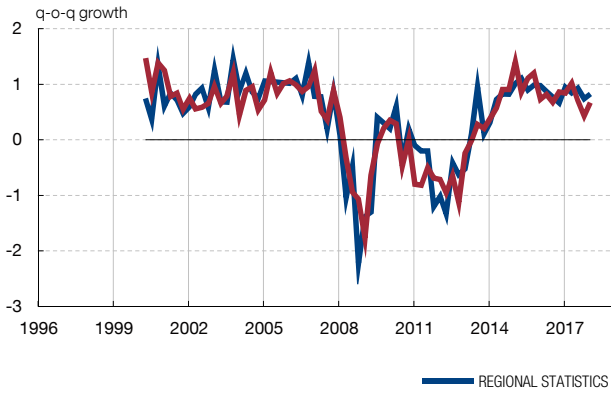
5 CANTABRIA



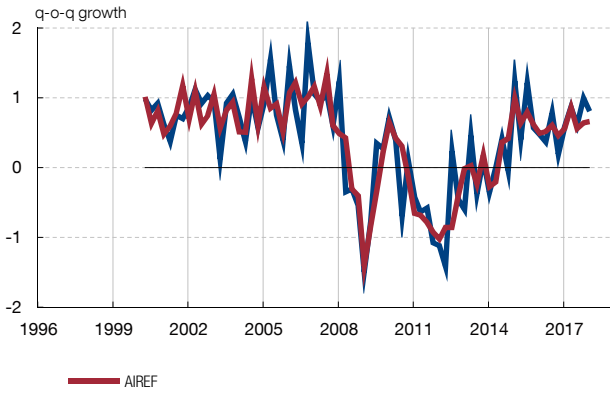
6 CASTILLA LEON



7 CATALONIA

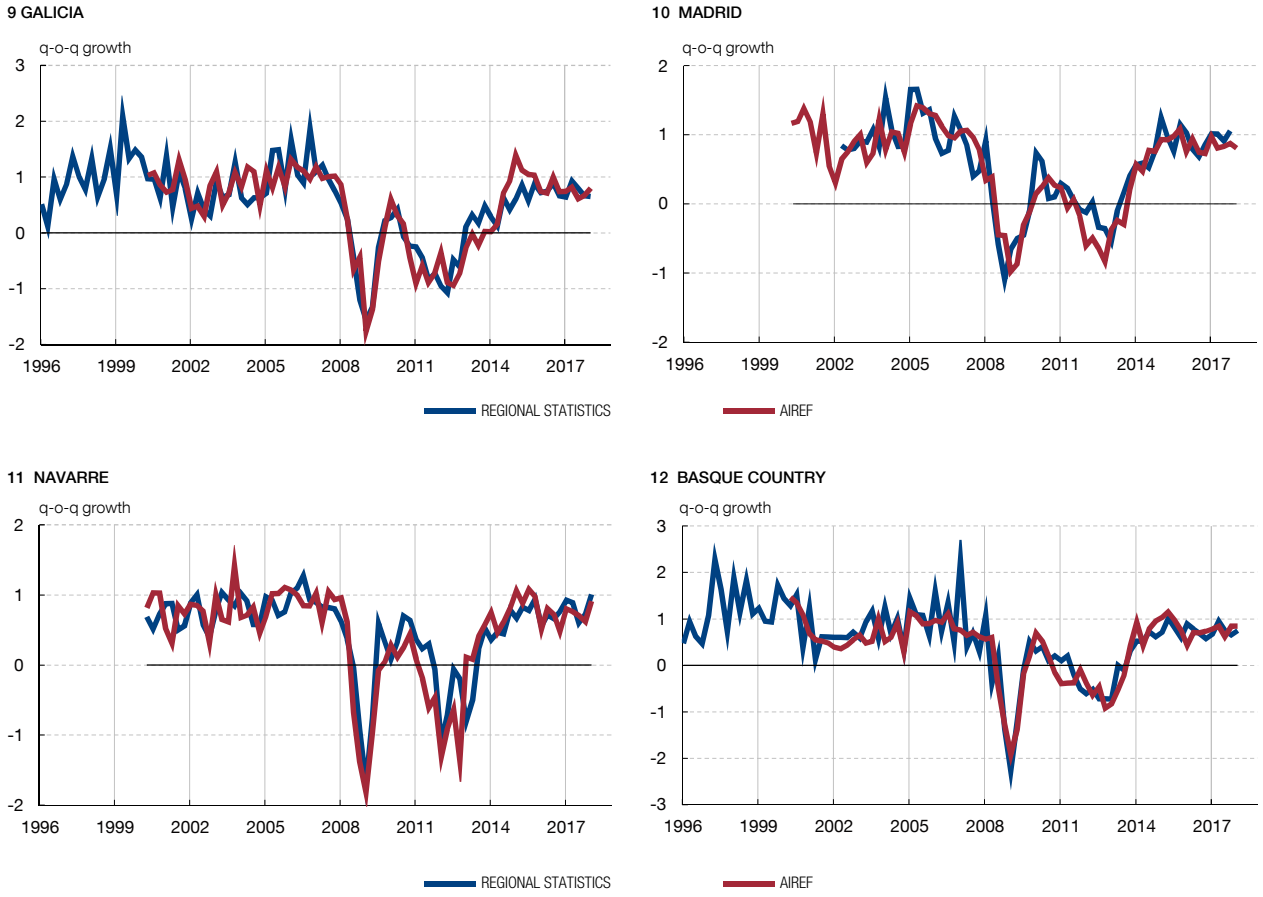


8 EXTREMADURA



EVOLUTION OF REGIONAL REAL GDP ACCORDING TO THE REGIONAL STATISTICS INSTITUTES AND THE AIReF

CHART 2. ANNEX II (cont.)



SOURCES: Regional statistics institutes and Independent Authority for Fiscal Responsibility.

BANCO DE ESPAÑA PUBLICATIONS

OCCASIONAL PAPERS

1201 ELOÍSA ORTEGA and JUAN PEÑALOSA: The Spanish economic crisis: key factors and growth challenges in the euro area. (There is a Spanish version of this edition with the same number).
1202 MARÍA J. NIETO: What role, if any, can market discipline play in supporting macroprudential policy?
1203 CONCHA ARTOLA and ENRIQUE GALÁN: Tracking the future on the web: construction of leading indicators using internet searches. (There is a Spanish version of this edition with the same number).
1204 JOSÉ LUIS MALO DE MOLINA: Luis Ángel Rojo en el Banco de España.
1205 PABLO HERNÁNDEZ DE COS and CARLOS THOMAS: El impacto de la consolidación fiscal sobre el crecimiento económico. Una ilustración para la economía española a partir de un modelo de equilibrio general.
1206 GALO NUÑO, CRISTINA PULIDO and RUBÉN SEGURA-CAYUELA: Long-run growth and demographic prospects in advanced economies.
1207 IGNACIO HERNANDO, JIMENA LLOPIS and JAVIER VALLÉS: Los retos para la política económica en un entorno de tipos de interés próximos a cero.
1208 JUAN CARLOS BERGANZA: Fiscal rules in Latin America: a survey.
1209 ÁNGEL ESTRADA and EVA VALDEOLIVAS: The fall of the labour income share in advanced economies.
1301 ETTORE DORRUCCI, GABOR PULA and DANIEL SANTABÁRBARA: China's economic growth and rebalancing.
1302 DANIEL GARROTE, JIMENA LLOPIS and JAVIER VALLÉS: Los canales del desapalancamiento del sector privado: una comparación internacional.
1303 PABLO HERNÁNDEZ DE COS and JUAN F. JIMENO: Fiscal policy and external imbalances in a debt crisis: the Spanish case.
1304 ELOÍSA ORTEGA and JUAN PEÑALOSA: Algunas reflexiones sobre la economía española tras cinco años de crisis.
1401 JOSÉ MARÍA SERENA and EVA VALDEOLIVAS: Integración financiera y modelos de financiación de los bancos globales.
1402 ANTONIO MONTESINOS, JAVIER J. PÉREZ and ROBERTO RAMOS: El empleo de las Administraciones Públicas en España: caracterización y evolución durante la crisis.
1403 SAMUEL HURTADO, PABLO MANZANO, EVA ORTEGA and ALBERTO URTASUN: Update and re-estimation of the Quarterly Model of Banco de España (MTBE).
1404 JUAN CARLOS BERGANZA, IGNACIO HERNANDO and JAVIER VALLÉS: Los desafíos para la política monetaria en las economías avanzadas tras la Gran Recesión.
1405 FERNANDO LÓPEZ VICENTE and JOSÉ MARÍA SERENA GARRALDA: Macroeconomic policy in Brazil: inflation targeting, public debt structure and credit policies.
1406 PABLO HERNÁNDEZ DE COS and DAVID LÓPEZ RODRÍGUEZ: Tax structure and revenue-raising capacity in Spain: A comparative analysis with the UE. (There is a Spanish version of this edition with the same number).
1407 OLYMPIA BOVER, ENRIQUE CORONADO and PILAR VELILLA: The Spanish survey of household finances (EFF): description and methods of the 2011 wave.
1501 MAR DELGADO TÉLLEZ, PABLO HERNÁNDEZ DE COS, SAMUEL HURTADO and JAVIER J. PÉREZ: Extraordinary mechanisms for payment of General Government suppliers in Spain. (There is a Spanish version of this edition with the same number).
1502 JOSÉ MANUEL MONTERO y ANA REGIL: La tasa de actividad en España: resistencia cíclica, determinantes y perspectivas futuras.
1503 MARIO IZQUIERDO and JUAN FRANCISCO JIMENO: Employment, wage and price reactions to the crisis in Spain: Firm-level evidence from the WDN survey.
1504 MARÍA DE LOS LLANOS MATEA: La demanda potencial de vivienda principal.
1601 JESÚS SAURINA and FRANCISCO JAVIER MENCÍA: Macroprudential policy: objectives, instruments and indicators. (There is a Spanish version of this edition with the same number).
1602 LUIS MOLINA, ESTHER LÓPEZ y ENRIQUE ALBEROLA: El posicionamiento exterior de la economía española.
1603 PILAR CUADRADO and ENRIQUE MORAL-BENITO: Potential growth of the Spanish economy. (There is a Spanish version of this edition with the same number).
1604 HENRIQUE S. BASSO and JAMES COSTAIN: Macroprudential theory: advances and challenges.
1605 PABLO HERNÁNDEZ DE COS, AITOR LACUESTA and ENRIQUE MORAL-BENITO: An exploration of real-time revisions of output gap estimates across European countries.
1606 PABLO HERNÁNDEZ DE COS, SAMUEL HURTADO, FRANCISCO MARTÍ and JAVIER J. PÉREZ: Public finances and inflation: the case of Spain.

1607 JAVIER J. PÉREZ, MARIE AOURIRI, MARÍA M. CAMPOS, DMITRIJ CELOV, DOMENICO DEPALO, EVANGELIA PAPAPETROU, JURGA PESLIAKAITĖ, ROBERTO RAMOS and MARTA RODRÍGUEZ-VIVES: The fiscal and macroeconomic effects of government wages and employment reform.

1608 JUAN CARLOS BERGANZA, PEDRO DEL RÍO and FRUCTUOSO BORRALLO: Determinants and implications of low global inflation rates.

1701 PABLO HERNÁNDEZ DE COS, JUAN FRANCISCO JIMENO and ROBERTO RAMOS: The Spanish public pension system: current situation, challenges and reform alternatives. (There is a Spanish version of this edition with the same number).

1702 EDUARDO BANDRÉS, MARÍA DOLORES GADEA-RIVAS and ANA GÓMEZ-LOSCOS: Regional business cycles across Europe.

1703 LUIS J. ÁLVAREZ and ISABEL SÁNCHEZ: A suite of inflation forecasting models.

1704 MARIO IZQUIERDO, JUAN FRANCISCO JIMENO, THEODORA KOSMA, ANA LAMO, STEPHEN MILLARD, TAIRI RÕÕM and ELIANA VIVIANO: Labour market adjustment in Europe during the crisis: microeconomic evidence from the Wage Dynamics Network survey.

1705 ÁNGEL LUIS GÓMEZ and M.ª DEL CARMEN SÁNCHEZ: Indicadores para el seguimiento y previsión de la inversión en construcción.

1706 DANILO LEIVA-LEON: Monitoring the Spanish Economy through the Lenses of Structural Bayesian VARs.

1707 OLYMPIA BOVER, JOSÉ MARÍA CASADO, ESTEBAN GARCÍA-MIRALLES, JOSÉ MARÍA LABEAGA and ROBERTO RAMOS: Microsimulation tools for the evaluation of fiscal policy reforms at the Banco de España.

1708 VICENTE SALAS, LUCIO SAN JUAN and JAVIER VALLÉS: The financial and real performance of non-financial corporations in the euro area: 1999-2015.

1709 ANA ARENCIBIA PAREJA, SAMUEL HURTADO, MERCEDES DE LUIS LÓPEZ and EVA ORTEGA: New version of the Quarterly Model of Banco de España (MTBE).

1801 ANA ARENCIBIA PAREJA, ANA GÓMEZ LOSCOS, MERCEDES DE LUIS LÓPEZ and GABRIEL PÉREZ QUIRÓS: A short-term forecasting model for the Spanish economy: GDP and its demand components.

1802 MIGUEL ALMUNIA, DAVID LÓPEZ-RODRÍGUEZ and ENRIQUE MORAL-BENITO: Evaluating the macro-representativeness of a firm-level database: an application for the Spanish economy.

1803 PABLO HERNÁNDEZ DE COS, DAVID LÓPEZ RODRÍGUEZ and JAVIER J. PÉREZ: The challenges of public deleveraging. (There is a Spanish version of this edition with the same number).

1804 OLYMPIA BOVER, LAURA CRESPO, CARLOS GENTO and ISMAEL MORENO: The Spanish Survey of Household Finances (EFF): description and methods of the 2014 wave.

1805 ENRIQUE MORAL-BENITO: The microeconomic origins of the Spanish boom.

1806 BRINDUSA ANGHEL, HENRIQUE BASSO, OLYMPIA BOVER, JOSÉ MARÍA CASADO, LAURA HOSPIDO, MARIO IZQUIERDO, IVAN A. KATARYNIUK, AITOR LACUESTA, JOSÉ MANUEL MONTERO and ELENA VOZMEDIANO: Income, consumption and wealth inequality in Spain. (There is a Spanish version of this edition with the same number).

1807 MAR DELGADO-TÉLLEZ and JAVIER J. PÉREZ: Institutional and economic determinants of regional public debt in Spain.

1808 CHENXU FU and ENRIQUE MORAL-BENITO: The evolution of Spanish total factor productivity since the Global Financial Crisis.

1809 CONCHA ARTOLA, ALEJANDRO FIORITO, MARÍA GIL, JAVIER J. PÉREZ, ALBERTO URTASUN and DIEGO VILA: Monitoring the Spanish economy from a regional perspective: main elements of analysis.

BANCO DE **ESPAÑA**
Eurosistema

Unidad de Servicios Auxiliares
Alcalá, 48 - 28014 Madrid
E-mail: publicaciones@bde.es
www.bde.es