

Does fiscal consolidation hurt economic growth? Empirical evidence from Spanish regions

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Abstract

This article provides empirical evidence on the effect of fiscal consolidation in decentralized countries. The focus on Spain is justified for three reasons. First, it is one of the OECD countries that has been the most affected by the Great Recession in terms of both GDP and public deficit. Second, it is one of the most decentralized countries in the world. Third, the compliance with fiscal consolidation targets has been very diverse across regions. Using both time series econometrics and the synthetic control method approach (SCM), the authors show that compliance with fiscal targets at the regional level has not involved lower GDP growth rates in the short run.

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Keywords Fiscal consolidation; regional economic growth; Great recession

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I. MOTIVATION

The Great Recession revived the long-standing debate between Keynesians and “supply-side” scholars (Andrés and Doménech, 2013), and it reopened the discussion on the relevance of fiscal multipliers and the effect of fiscal consolidation on GDP growth in the short run. Researchers are still divided between those who affirm that fiscal consolidation can end up producing expansive effects (Giavazzi and Pagano, 1990; Alesina and Ardagna, 1998 and 2010), especially when based on expenditure cuts (Alesina *et al.*, 2019), and those who maintain that immediate fiscal austerity is counterproductive for economies (Blanchard and Cottarelli, 2010; Blanchard and Leigh, 2013; De Grauwe and Ji, 2013).

A middle position outlines the importance of the initial conditions (economic and fiscal), claiming that the anticipated consolidation is better than a progressive form if the starting value of the debt/GDP ratio is huge (Nickel and Tudyka, 2013) or if the period of consolidation effort follows a financial crisis (Buti and Pench, 2012). Moreover, the cyclical situation of the economy is relevant: fiscal multipliers are significantly higher in turbulent times (Auerbach and Gorodnichenko, 2012; De Mello, 2013; Warmedinger *et al.*, 2015; Hernández de Cos and Moral-Benito, 2016).

As a consequence of this diversity, opposite estimates of fiscal multipliers are reported. Spilimbergo *et al.* (2009) show fiscal multipliers ranging between -1.5 and 5.2, with Corsetti *et al.* (2012) reducing these magnitudes to -0.7 and 2.3, and Gechert and Wil (2012) to -1.3 and 2.8.

The divergence shows the difficulty of isolating the effects of fiscal stimulus policies from those of other factors affecting the economy: the exchange rate, monetary policy, health of public finances, availability of bank lending and so on. In order to control by those factors, the analysis of highly decentralized countries can provide further insights into this empirical question. Comparing the performance of regions that are subject to the same macroeconomic conditions but committed to fiscal consolidation to different degrees makes the analysis much easier than comparing countries.

Insofar as this analysis requires strong expenditure decentralization, a regional capacity to enter into debt and a substantial shock affecting public finances and involving the need for fiscal consolidation, Spain seems to be the best candidate among the OECD members. In short, our analysis is based on the short-run GDP dynamics of the regional

leader in the compliance with fiscal consolidation targets (Galicia) and compares the observed GDP growth rates with what would have happened with softer regional fiscal consolidation. Two complementary analyses are carried out. In section 3, we perform a time-series analysis and compare the observed GDP growth rates with a forecast. In section 4, we rely on the more sophisticated synthetic control method (SCM) approach to make the comparison. Section 5 concludes.

II. THE FISCAL ADJUSTMENT IN SPAIN AND THE CASE OF GALICIA

Spain is one of the most decentralized countries in the world (Lago-Peñas *et al.*, 2017). In terms of the share of sub-national (both local and regional) expenditure of the total, it ranks fifth in the OECD.¹ If the attention is focused on the regional tier, Spain tops the ranking for the European Union (EU), with figures similar to those of Canada and Switzerland. Moreover, the impact of the Great Recession on the deficit and debt in Spain has been huge. Public debt rose from 36% of the GDP in 2007 to 100% (Lago-Peñas, 2017).

While the economic crisis struck the GDP growth rates of all regions (Figure 1) and the deficit expanded in all cases, there are significant differences in the implementation of budget consolidation and thus the meeting of the fiscal targets agreed with the European Commission.

[Insert Figure 1 near here]

Figures 2 and 3 show the evolution of the regional average deficit and debt over the period 2008 to 2017. The regional deficit increased substantially to exceed -3% of the GDP in 2010 and 2011. Correspondingly, public indebtedness rose from less than 7% of the GDP in 2008 to almost 25% in 2017. The figures for Galicia are significantly lower for both deficit and debt.

[Insert Figure 2 near here]

¹ Moreover, according to the Regional Authority Index, computed by Hooghe *et al.* (2016) (<http://garymarks.web.unc.edu/data/regional-authority/>), Spain was second in the last year available (2010). Only Germany shows a higher score. The sample consists of all the EU member states, all the member states of the OECD, all the Latin American countries, ten countries in Europe beyond the EU and eleven countries in the Pacific and South-East Asia.

[Insert Figure 3 near here]

Lago-Peñas and Vaquero (2016) and Lago-Peñas *et al.* (2017) demonstrate that the evolution of deficits and fiscal consolidation efforts differed significantly across regions. Table 1 summarizes the non-compliance over the period 2009–2016 regarding the deficit target, the spending rule and the debt target. In spite of a drop in the total revenues over the average,² Galicia stands out as the region with the highest degree of fulfilment.³

Finally, the available evidence shows that spending cuts account for the lion's share of fiscal consolidation in all the regions (MINAHP, 2012; Cantalapiedra and López, 2013). Taking into account increases in both tax rates and tax benefits, the net average effect is neutral (AIReF, 2016), with some regions in negative figures (especially Madrid and Cantabria, due to tax cuts in wealth taxes). For the case of Galicia, the net effect is positive but small. In 2016, the contribution of net tax increases to fiscal stability was equivalent to 0.2% of the regional GDP.

[Insert Table 1 near here]

When looking for the reasons explaining this better fiscal performance of Galicia, two related factors clearly emerge: the electoral cycle and political will. Regarding the first factor, four Spanish regions enjoy an asymmetrical electoral cycle: Galicia, País Vasco, Cataluña and Andalucía. The acknowledgement by the Spanish central government of the effect of the international economic crisis occurred in summer 2008. In March 2009, elections were held in Galicia and País Vasco. The following elections were in Cataluña in November 2010 and in the remaining regions in May 2011 (and March 2012 in Andalucía). Concerning the second factor, the new conservative Galician incumbent replaced a leftist coalition and made fiscal austerity the main political message of its political campaign. Hence, the new government took advantage of the timing of the election to adapt the regional budget to the new economic scenario. Regional expenditure

² The regions where both the total revenues and the total expenditure dropped more than the regional average are Galicia, Baleares, Castilla y León, Extremadura, Navarra and Andalucía.

³ Lago-Peñas and Vaquero (2016) identify several clusters according to the dynamics of deficit. The members of the leader group are Galicia, Madrid and Canarias. In contrast, the regions in the cluster with the worst results are Murcia, Comunidad Valenciana, Cataluña and Baleares.

cuts started in 2009 and intensified in 2010. Since then, austerity has been the cornerstone of political will of the regional president and ministers, including more exigent measures than in most regions, like the cut in civil servants' wages approved in 2013 and extended until 2017. Surprisingly, and in sharp contrast to the electoral results in other regions and countries, the political support for the Galician incumbent increased in the 2012 and 2016 elections.

To analyse the effect on growth of the stronger fiscal consolidation process carried out in Galicia, two complementary methodologies are used: a standard econometric approach based on a dynamic time-series model (section 3) and the synthetic control method originally proposed by Abadie and Gardeazabal (2003) in section 4. In both cases, we compare two series: the observed GDP growth rate affected by cross-regional asymmetries in the intensity of fiscal consolidation since 2009 and the simulated GDP growth rate from extrapolating the structural relationship before 2009.

III. EMPIRICAL ANALYSIS I: A STANDARD ECONOMETRIC APPROACH

The departure point of the first econometric analysis is the following AR (2) model:

$$GAL_t = \beta_0 + \beta_1 SPAIN_t + \beta_2 GAL_{t-1} + \beta_3 GAL_{t-2} + \varepsilon_t \quad (1)$$

In Equation (1), the variables *GAL* and *SPAIN* are the gross domestic product (GDP) and the interannual real growth rate of Galicia and Spain, respectively. The data for the former are from the Galician Institute of Statistics (www.ige.eu), and the data for Spain are from the National Institute of Statistics (www.ine.es). In both cases, we rely on the quarterly seasonally adjusted data provided on the websites. We use Eviews 10.5 for the econometric estimates.

The estimation period is 1996:Q1 to 2008:Q4. The selection of the starting point is based on the evidence provided by Lago-Peñas (2001), who shows that the synchrony of the Spanish and Galician business cycles has substantially converged since the early 1990s. Therefore, the goodness of fit will tend to be significantly higher, while the sample size is large enough to perform estimates. Two lags for the variable *GAL* are enough to

capture the dynamics.⁴ To rule out specification problems, we perform two complementary tests on the specification. First, a Hausman test on the endogeneity of the variable *SPAIN*'s p-value of the corresponding Wald test is high (p-value=0.25) and thus the null hypothesis of exogeneity is not rejected.⁵ Second, a Granger causality test is performed to verify the causation order. The results in Table 2 clearly show that we can reject the null hypothesis of no causation from *SPAIN* to *GAL* (p-value<0.001) but not the opposite causation (p-value=0.88).

[Insert Table 2 near here]

Table 3 reports the ordinary least squares (OLS) estimate of Equation (1). The fit is good ($R^2=0.853$). The null hypothesis of no autocorrelation cannot be discarded according to the Breusch–Godfrey serial test (p-value=0.12). The corresponding correlogram yields the same conclusion. Both *SPAIN* and the first lag of *GAL*, but not the second one, are highly significant variables, with coefficients around 0.6.

[Insert Table 3 near here]

Our econometric results allow us to forecast the Galician GDP growth rate from 2009 to 2017. In particular, using observed data for the variable *SPAIN*, we perform a dynamic forecast assuming that the relationship estimated in Table 2 will hold. Figure 4 shows both series. The observed GDP growth is clearly above the forecasted growth throughout the period 2009–2014. The sign of the differential changes at the end of 2014, when the forecasted growth exceeds the observed growth. Hence, in 2015 and 2016, the Galician GDP growth rate was slower than it should be, taking into account the recovery of the Spanish economy. The situation changes again at the end of 2016 when the two series overlap. Moreover, in 2017, the observed GDP growth rate is slightly higher than that forecasted.

⁴ Adding the first lag of *SPAIN* and the third one of *GAL* on the right-hand side does not improve the fitness, reducing the adjusted R^2 . According to a joint Wald test, their coefficients are not significantly different from zero (p-value=0.17).

⁵The test is implemented in two steps. First, *SPAIN* is regressed on its own first two lagged values and the two lagged values of *GAL*. The residuals obtained are included in the original equation. The null hypothesis is that they are not statistically significant.

[Insert Figure 4 near here]

In sum, looking at the whole period, the observed GDP growth rate is significantly above the forecasted rate. Hence, the data do not support the existence of a price to pay for fiscal consolidation in terms of short-run GDP growth.⁶

IV. EMPIRICAL ANALYSIS II: THE SYNTHETIC CONTROL METHOD APPROACH

The synthetic control method (SCM) is based on the seminal contribution by Abadie and Gardeazabal (2003), who analyse the effects of terrorism in the Basque Country. The SCM is refined in subsequent works by Abadie *et al.* (2010) on the effects of the anti-tobacco law in California and Abadie *et al.* (2015) on the costs of reunification in Germany.

The SCM analyses the consequences of a specific event or intervention in a region by comparing the observed data with what would have happened in the absence of the intervention. Insofar as it requires the creation of a counterfactual, the first step of the method is to find other similar regions that remained unaffected by the event (the comparison units) and merge them to create a synthetic region close to the case of interest. More formally, the SCM supposes that there are $J+1$ regions or “units”, where $j=1$ is the “treated unit” and units $j=2$ to $j=J+1$ constitute the “donor pool” (Abadie *et al.*, 2010: 493–505). Following Abadie *et al.* (2010) and Abadie *et al.* (2015), we assume that the sample is a balanced panel and includes a positive number of pre-intervention periods, T_0 , as well as a positive number of post-intervention periods, T_1 , with $T=T_1+T_0$.

The synthetic control is defined as a weighted average of the units in the donor pool represented by a $(J \times 1)$ vector of weights $W=(w_2, \dots, w_{J+1})$, with $0 \leq w_j \leq 1$ for $j=2, \dots, J$ and $w_2 + \dots + w_{J+1} = 1$. Choosing a particular value for W is equivalent to choosing a synthetic control. Let X_1 be a $(k \times 1)$ vector containing the values of the pre-intervention characteristics of the treated unit that we aim to match as closely as possible, and let X_0

⁶ This conclusion holds if we discount the most relevant positive asymmetric shock affecting the Galician economy during the period, the Jacobean year 2010. According to BBVA research (2010), the Galician GDP growth rate would have been 0.5–0.6% higher in 2010, +0.2% higher in 2011 and +0.1% higher in 2012 thanks to the impact of the Jacobean year on tourism.

be the $k \times J$ matrix collecting the values of the same variables for the units in the donor pool. The pre-intervention characteristics in X_1 and X_0 may include the pre-intervention values of the outcome variable.

The difference between the pre-intervention characteristics of the treated unit and a synthetic control is given by the vector $X_1 - X_0W$. As in the research by Abadie *et al.* (2010) and Abadie *et al.* (2015), we select the synthetic control, W^* , that minimizes the size of this difference. This can be operationalized in the following manner. For $m=1, \dots, k$, let X_{1m} be the value of the m -th variable for the treated unit and let X_{0m} be a $1 \times J$ vector containing the values of the m -th variable for the units in the donor pool. Abadie *et al.* (2015) choose W^* as the value of W that minimizes:

$$\sum_{m=1}^k v_m (X_{1m} - X_{0m}W)^2 \quad (2)$$

where v_m is a weight that reflects the relative importance assigned to the m -th variables when we measure the discrepancy between X_1 and X_0W . Of course, it is crucial that the synthetic control closely reproduces the values that the variables with large predictive power over the outcome of interest take for the treated unit. Accordingly, those variables should be assigned large v_m weights. In the empirical application below, we apply a cross-validation method to choose v_m .

Let Y_{jt} be the outcome of unit j at time t . In addition, let Y_1 be a $(T_1 \times 1)$ vector collecting the post-intervention values of the outcome for the treated unit. That is, $Y_1 = (Y_{1T_0+1}, \dots, Y_{1T})'$. Similarly, let Y_0 be a $(T_1 \times J)$ matrix, where column j contains the post-intervention values of the outcome for unit $j+1$. The synthetic control estimator of the effect of the treatment is given by the comparison of post-intervention outcomes between the treated unit, which is exposed to the intervention, and the synthetic control, which is not exposed to the intervention, $Y_1 - Y_0W^*$. That is, for a post-intervention period t (with $t \geq T_0$), the synthetic control estimation of the effect of the treatment is given by the comparison between the outcome for the treated unit and the outcome for the synthetic control in that period:

$$Y_{1t} - \sum_{j=2}^{J+1} w_j^* Y_{jt}$$

The matching variables in X_0 and X_1 are meant to be predictors of post-intervention outcomes. These predictors are themselves not affected by the intervention. To choose the weights v_m in Equation (2), a cross-validation technique is used, following Abadie *et al.* (2015); these weights minimize the root mean square prediction error:

$$RMSPE = \left(\frac{1}{T_0} \sum_{t=1}^{T_0} \left(Y_{1t} - \sum_{j=2}^{J+1} w_j^* Y_{jt} \right)^2 \right)^{1/2}$$

In our case, the variables used for the SCM are reported in Table 4. We include variables on demography, the labour market, human capital, physical capital (both public infrastructure and private), exports and foreign investment inflows, poverty, competitiveness and the sectorial structure. While in most cases we use average values over the pre-treatment period, data for the year 2008 are used for some variables. The sample covers the period 1995–2016 for the 17 Spanish regions. We choose the weights v_m to minimize the root mean square prediction error over the validation period. Table 5 shows the computed weights, which are those used to create the “synthetic Galicia”, for which the values are collected together with the corresponding actual values in Table 6.

[Insert Table 4 near here]

[Insert Table 5 near here]

[Insert Table 6 near here]

Figure 5 shows both the observed and the synthetic growth rates of Galicia for the period 2009 to 2016. Except for the years 2009 and 2011, the negative observed values are lower than those in the counterfactual, and, in the years of growth, the real value is higher than the synthetic one.

[Insert Figure 5 near here]

Figure 6 presents the previous annual growth rates. In both cases, the value is negative, but the actual rate (-2.30%) is clearly lower in absolute terms than that corresponding to the synthetic unit (-3.91%).

[Insert Figure 6 near here]

Figure 7 shows both the actual and the synthetic values of the variation rates of the GDP for Galicia from 1995 to 2016. While most of the actual values are lower before 2008, since then they have been higher than the synthetic estimate of the region's growth. This again supports the idea that fiscal austerity implemented to meet the deficit targets has not involved an evident price in terms of regional economic growth.

[Insert Figure 7 near here]

To check the robustness of the results, we replicate the analysis, constraining the donor regions to those in which the deviation from the fiscal consolidation targets has been wider (Castilla-La Mancha, Cataluña, Comunidad Valenciana and Murcia). The regional weights that minimize the root mean square prediction error ($RMSPE=0.0071$) over the validation period are 0.791 for Cataluña and 0.219 for Castilla-La Mancha. Figure 8 shows the new results. Over the period 2004–2012, the growth of the counterfactual of Galicia is below the actual growth. After 2013, the values are slightly higher, but the positive gap in the counterfactual in recent years does not compensate for the negative gap in 2012.

[Insert Figure 8 near here]

V. CONCLUSIONS

Regional governments provide a convenient field to test whether fiscal consolidation involves a price to pay in terms of the short-run GDP growth rate. Given the high fiscal decentralization in Spain, the depth of the effects of the Great Depression on the public accounts at the regional level in Spain and the diversity of commitments to fiscal targets, this country is the best case study among the OECD members.

To perform the test, we focused our attention on the region showing a better performance in terms of compliance with the fiscal targets agreed with the European Commission. In particular, we compare the observed short-run GDP growth rates with

two simulations. The first one is based on the estimate of a time-series model relating the GDP dynamics of Galicia and Spain over the period 1995–2008. The second one relies on the more sophisticated synthetic control method (SCM) approach. In both cases, we show that stricter fiscal consolidation has not produced a significant reduction in economic growth. Indeed, the economic performance of Galicia would have been slightly better than expected using both methodologies.

Our interpretation of the results is closely related to the traditional theory of fiscal federalism (Musgrave, 1959). According to it, openness and economic integration of regional economies involve fiscal multipliers that tend to fade. A fiscal stimulus would not work on this scale. Our results show that the opposite is also true: the potentially negative demand effects of a stronger regional fiscal consolidation strategy would be exported to other regions.

The most relevant policy implication of our results is that decentralization could indeed contribute to the compliance with fiscal consolidation plans on the national scale, reversing the usual arguments on both the common pool's problem affecting fiscal stability in decentralized countries and the challenge involved by "soft budget constraints" and bailout expectations (Goodspeed, 2017). If the negative demand effects of regional fiscal consolidation are mostly exported to other regions, one of the reasons most often argued to delay deficit cuts and compliance with fiscal targets is deactivated.

REFERENCES

- Abadie, A. and Gardezabal, J. (2003). The economic costs of conflict: A case study of the Basque Country. *American Economic Review*, 93(1), 113-132.
<https://www.aeaweb.org/articles?id=10.1257/000282803321455188>
- Abadie, A. Diamond, A and Hainmueller, J. (2015). Comparative Politics and the Synthetic Control Method. *American Journal of Political Science*, 59(2), 495-510.
<https://doi.org/10.1111/ajps.12116>
- Abadie, A., Diamond, A. and Hainmueller, J. (2010). Synthetic control methods for comparative case studies: Estimating the effect of California's tobacco control program. *Journal of the American Statistical Association*, 105(490), 493-505.
<https://doi.org/10.1198/jasa.2009.ap08746>
- AIReF (2016). Informe sobre el establecimiento de los objetivos individuales de estabilidad presupuestaria y deuda pública para las Comunidades Autónomas.
<http://www.airef.es/es/informes-tipo/informe-sobre-el-establecimiento-de-los-objetivos-individuales-de-las-comunidades-autonomas/>
- AIReF (2018). Autoridad Independiente de Responsabilidad Fiscal (www.airef.es).
- Alesina, A., and Ardagna, S. (1998). Tales of fiscal adjustment. *Economic Policy*, 13(27), 488-545. <https://doi.org/10.1111/1468-0327.00039>
- Alesina, A., and Ardagna, S. (2010). Large changes in fiscal policy: taxes versus spending. *Tax Policy and the Economy*, 24(1), 35-68.
<http://doi.org/10.3386/w15438>
- Alesina, A., Favero, C., and Giavazzi, F. (2019). *Austerity. When it works and when it Doesn't*. Princeton University Press, Princeton.
- Andrés, J., and Doménech, R. (2013). Fiscal adjustment and economic growth in Europe. *BBVA Economic Watch Europe, Madrid*.
https://www.bbvaesearch.com/KETD/fbin/mult/130219_Europe_Watch-Fiscal_adjustment_tcm348-374754.pdf
- Auerbach, A.J., and Gorodnichenko, Y. (2012). Measuring the output responses to fiscal policy. *American Economic Journal: Economic Policy*, 4(2), 1-27.
<http://doi.org/10.1257/pol.4.2.1>
- BBVA Research (2010). Impacto del año Xacobeo en la economía gallega
https://www.bbvaesearch.com/KETD/fbin/mult/1003_observatorioregionalespana_tcm348-217035.pdf

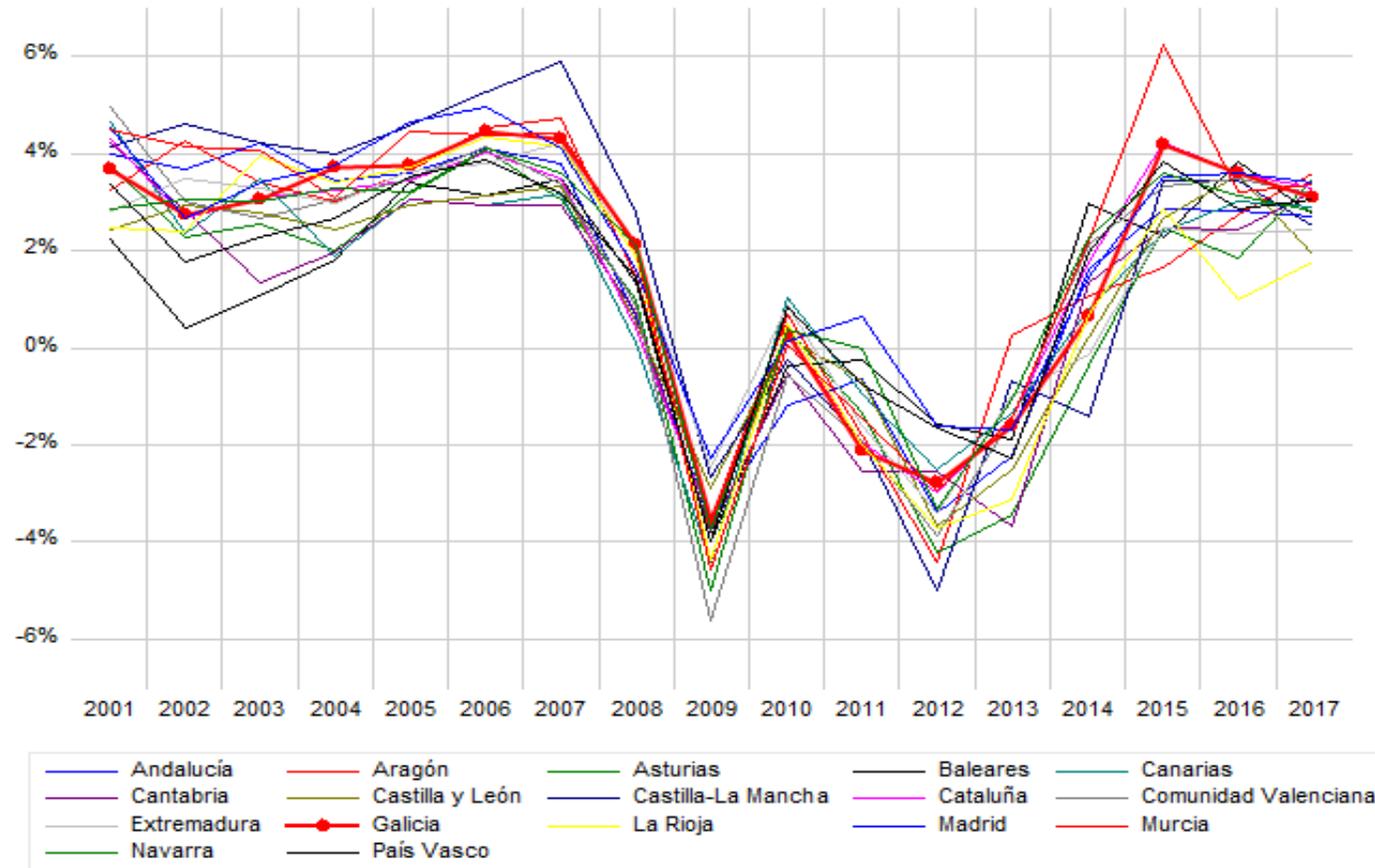
- BEDE (2018). Boletín Estadístico del Banco de España.
<https://www.bde.es/webbde/es/estadis/infoest/bolest.html>
- Blanchard, O.J., and Leigh, D. (2013). Growth forecast errors and fiscal multipliers. *American Economic Review*, 103(3), 117-120.
<http://doi.org/10.1257/aer.103.3.117>
- Blanchard, O., and Cottarelli, C. (2010). Ten commandments for fiscal adjustment in advanced economies. *VoxEU.org*, 28.
<https://voxeu.org/article/ten-commandments-fiscal-adjustment-advanced-economies>
- Buti, M., and Pench, L.R. (2012). Fiscal austerity and policy credibility. In Corsetti, G. (eds.) *Austerity: Too Much of a Good Thing?* 2012, 45-55.
<https://voxeu.org/article/fiscal-austerity-and-policy-credibility>
- Cantalapiedra, C., and Lopez, C. (2013). Las líneas presupuestarias de las comunidades autónomas y el ajuste estructural del gasto. *Cuadernos de Información Económica*, 231, 17-25.
<https://dialnet.unirioja.es/servlet/articulo?codigo=4122955>
- Corsetti, G., Meier, A., and Müller, G. (2012). What Determines Government Spending Multipliers? *Economic Policy*, 27(72), 521-565.
<https://doi.org/10.1111/j.1468-0327.2012.00295.x>
- DataComEx (2018). Estadística de comercio exterior extranjero
http://datacomex.comercio.es/principal_comex_es.aspx
- DataInvEx (2018). Estadísticas de inversión extranjera en España
http://datainvex.comercio.es/principal_invex.aspx
- De Grauwe, P., and Ji, Y. (2013). From Panic-Driven Austerity to Symmetric Macroeconomic Policies in the Eurozone. *JCMS: Journal of Common Market Studies*, 51(S1), 31-41.
<https://doi.org/10.1111/jcms.12042>
- De Mello, L., 2013, "What Can Fiscal Policy Do in the Current Recession? A Review of Recent Literature and Policy Options," *Review of Public Economics* 204-(1/2013), pp. 113-139.
http://www.ief.es/comun/Descarga.cshtml?ruta=~/docs/destacados/publicaciones/revistas/hpe/204_Art5.pdf
- EC (2018). Base de datos de European Commission
http://ec.europa.eu/regional_policy/en/information/publications/working-papers/2011/a-new-regional-competitiveness-index-theory-methods-and-findings

- FEDEA (2018). Documentos de Economía Regional y Urbana. <https://www.fedea.net/documentos-economia-regional-y-urbana/>
- Gechert, S., and Will, H. (2012). Fiscal multipliers: A meta regression análisis. *Working Paper 2012/97, Institut für Makroökonomie und Konjunkturforschung (IMK), Hans-Böckler-Stiftung.* http://www.boeckler.de/pdf/p_imk_wp_97_2012.pdf
- Giavazzi, F., and Pagano, M. (1990). Can severe fiscal contractions be expansionary? Tales of two small European countries. *NBER Macroeconomics Annual*, 5, 75-111. <http://doi.org/10.3386/w3372>
- Goodspeed, T. J. (2017). Bailouts and Soft Budget Constraints in Decentralized Government: A Synthesis and Survey of an Alternative View of Intergovernmental Grant Policy. *Hacienda Pública Española / Review of Public Economics* 220: 113-134. http://www.ief.es/docs/destacados/publicaciones/revistas/hpe/221_Art5.pdf
- Hernández de Cos, P., and Moral-Benito, E. (2016). Fiscal multipliers in turbulent times: the case of Spain. *Empirical Economics*, 50(4), 1589-1625. <https://link.springer.com/article/10.1007/s00181-015-0969-0>
- Hooghe, L., Marks, G., Schakel, A., Chapman-Osterkatz, S., Niedzwiecki, S., and Shair-Rosenfield, S. (2016). *Measuring Regional Authority: A Postfunctionalist Theory of Governance: Volume I.* Oxford University Press, Oxford.
- INE (2012). Base de datos del Instituto Nacional de Estadística. <https://www.ine.es/>
- IVIE (2018). Base de datos de capital humano y desarrollo humano https://www.ivie.es/es_ES/bases-de-datos/capital-humano-y-desarrollo-humano/capital-humano/base-de-datos-capital-humano/
- Lago-Peñas, S. (2001). Crecimiento y convergencia: apuntes para un balance de la economía gallega en las dos últimas décadas. *Revista de Estudios Regionales*, 61, 191-214. <https://dialnet.unirioja.es/servlet/articulo?codigo=252077>
- Lago-Peñas, S. (2017). Fiscal consolidation: Favorable economic conditions threatened by political uncertainty. *SEFO*, 6(6), 21-29. <https://www.funcas.es/Publicaciones/Detalle.aspx?IdArt=23383>
- Lago-Peñas, S., and Vaquero-García, A. (2016). El comportamiento del déficit y la deuda en las Comunidades Autónomas en el período 2005-2015. *Mediterráneo Económico*, 30, 429-445. <http://www.publicacionescajamar.es/publicaciones-periodicas/mediterraneo-economico/mediterraneo-economico-30-financiacion-autonomica-problemas-del-modelo-y-propuestas-de-reforma/760/>

- Lago-Peñas, S., Fernández-Leiceaga, X., and Vaquero-García, A. (2017). Spanish fiscal federalism: A successful (but still unfinished) process. *Environment and Planning C: Politics and Space*, 35(8), 1509-1525.
<https://doi.org/10.1177%2F2399654417704663>
- Lago-Peñas, S., Martínez-Vázquez, J., and Sacchi, A. (2017). The Impact of Fiscal Decentralization: A Survey. *Journal of Economic Surveys*, 31(4), 1095-1129.
<https://doi.org/10.1111/joes.12182>
- MINHAP (2018). Database of Ministry of the Treasury and Public Administrations
<https://serviciostelematicos.minhap.gob.es/cimcanet/aspx/consulta/consulta.aspx>
- MINHAP (2012). Actualización del Programa de Estabilidad 2012-2015.
<http://www.hacienda.gob.es/Documentacion/Publico/CDI/Programas%20de%20Estabilidad/Programa%20de%20Estabilidad%202012-2015.pdf>
- Musgrave, R. (1959). *The Theory of Public Finance: A Study in Public Economy*. McGraw-Hill, New York.
- Nickel, C., and Tudyka, A. (2013). Fiscal stimulus in times of high debt: Reconsidering multipliers and twin deficits. *Journal of Money, Credit and Banking*, 46(7), 1313-1344. <https://doi.org/10.1111/jmcb.12148>
- Spilimbergo, M.A., Symansky, M.S.A., Cottarelli, M.C., and Blanchard, O.J. (2009). *Fiscal policy for the crisis*. International Monetary Fund.
<https://www.imf.org/external/pubs/ft/spn/2008/spn0801.pdf>
- Warmedinger, T., Westphal, C., and De Cos, P.H. (2015). Fiscal multipliers and beyond. *Hacienda Pública Española / Review of Public Economics*, 215, 139-168.
http://www.ief.es/docs/destacados/publicaciones/revistas/hpe/215_Art6.pdf

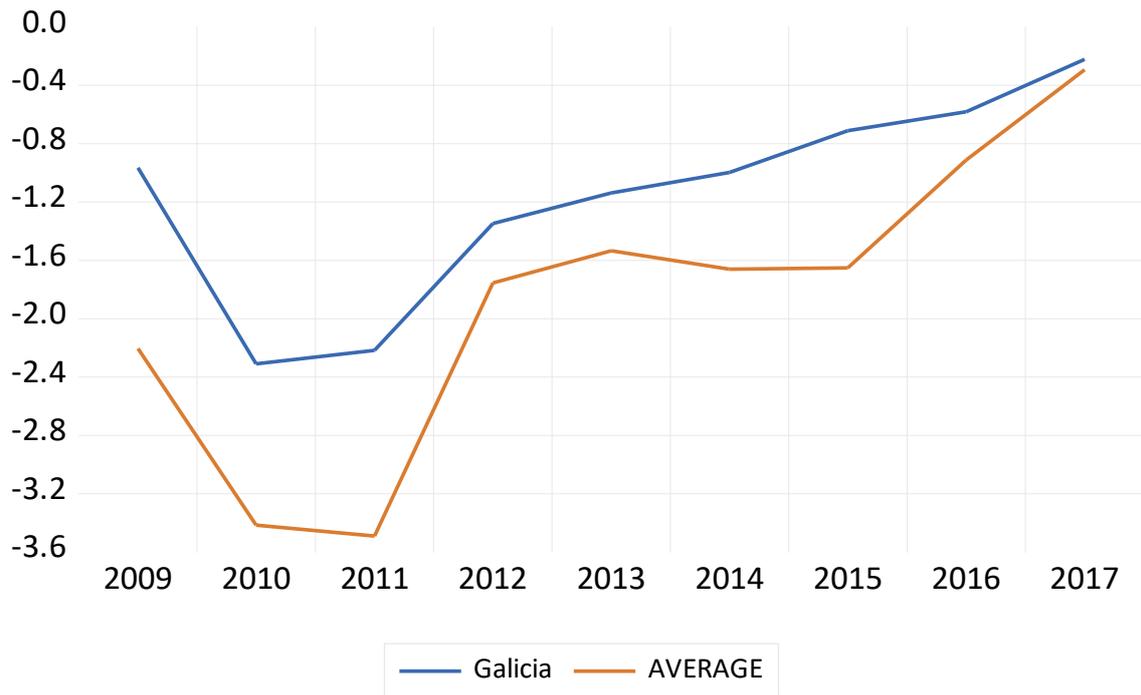
FIGURES AND TABLES

Figure 1: GDP real growth rates



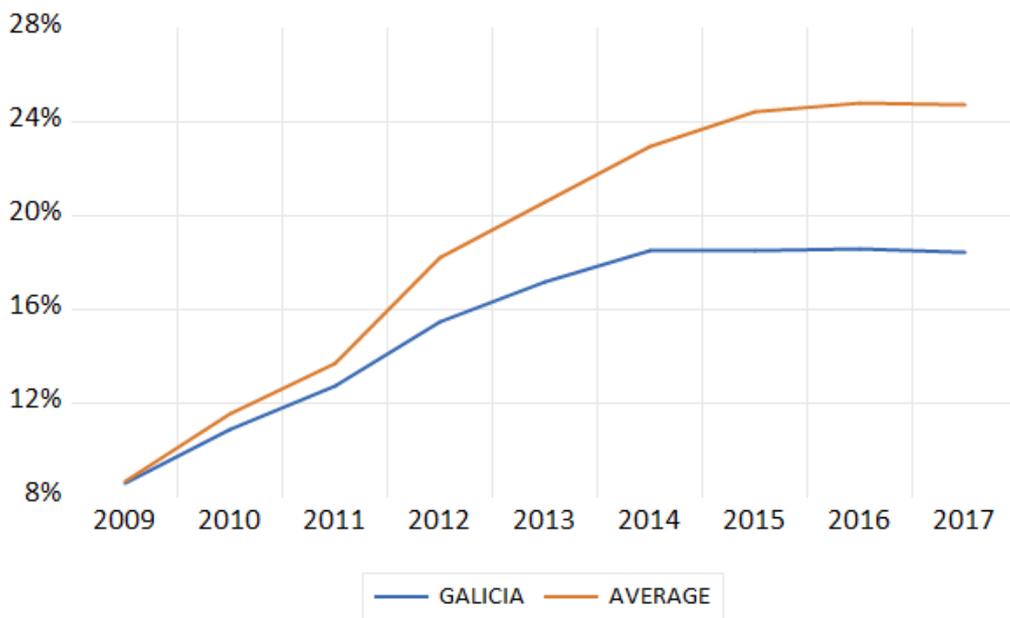
Source: Authors' elaboration using data from the INE (2018).

Figure 2: Regional public deficit dynamics. Values in percentage of GDP



Source: Authors' elaboration using data from the IGAE (2018)

Figure 3: Regional debt stock. Values in percentage of GDP



Source: Authors' elaboration using data from the Bank of Spain (2018)

Figure 4: Observed and forecasted Galician GDP growth rates using specification (1)

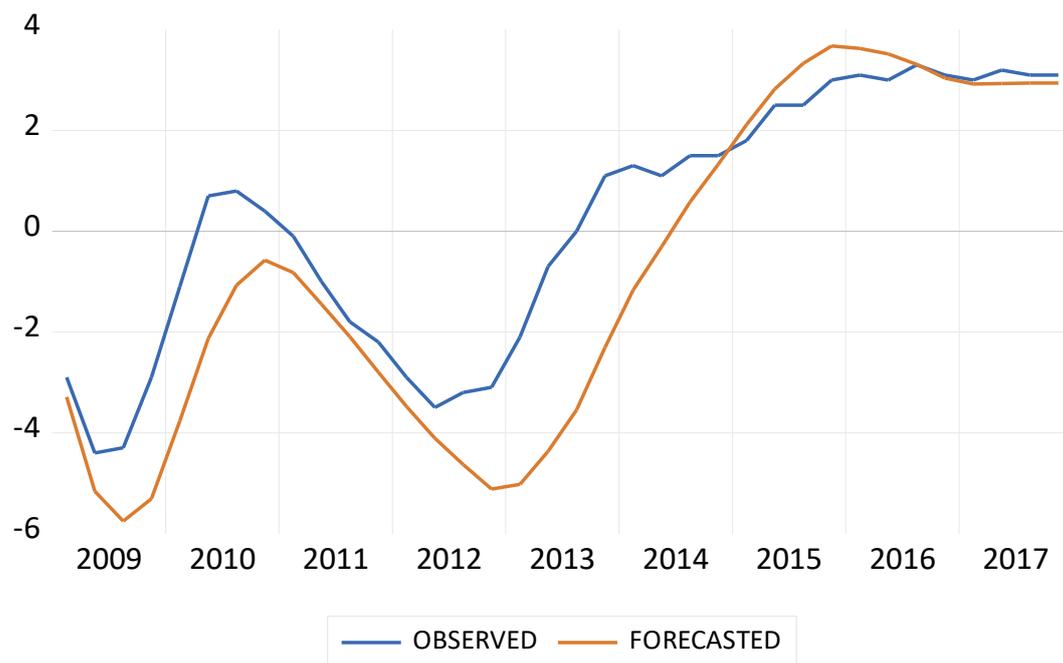


Figure 5: Observed and SCM forecasted Galician GDP growth rates

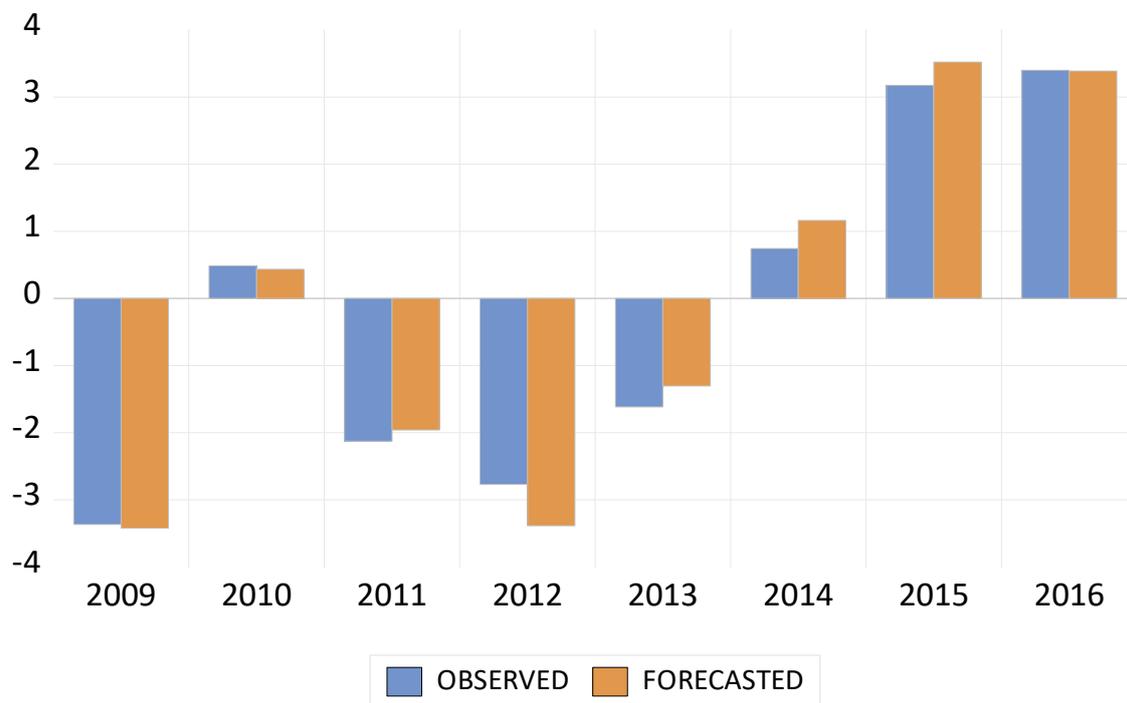


Figure 6: Cumulative observed and forecasted GDP growth rates

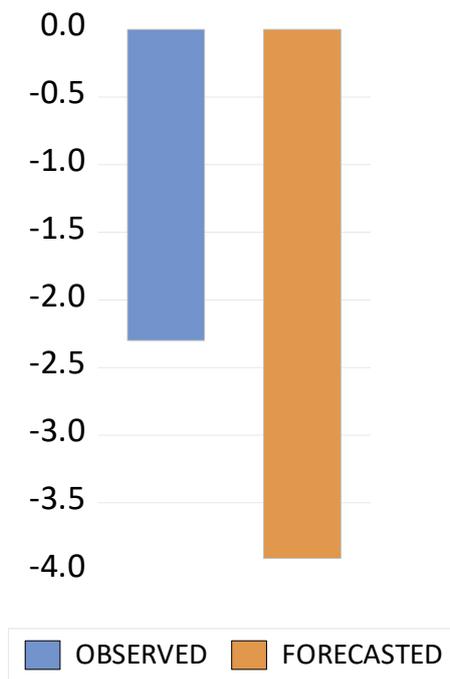


Figure 7: Observed and SCM GDP growth rates over the period 1995-2016

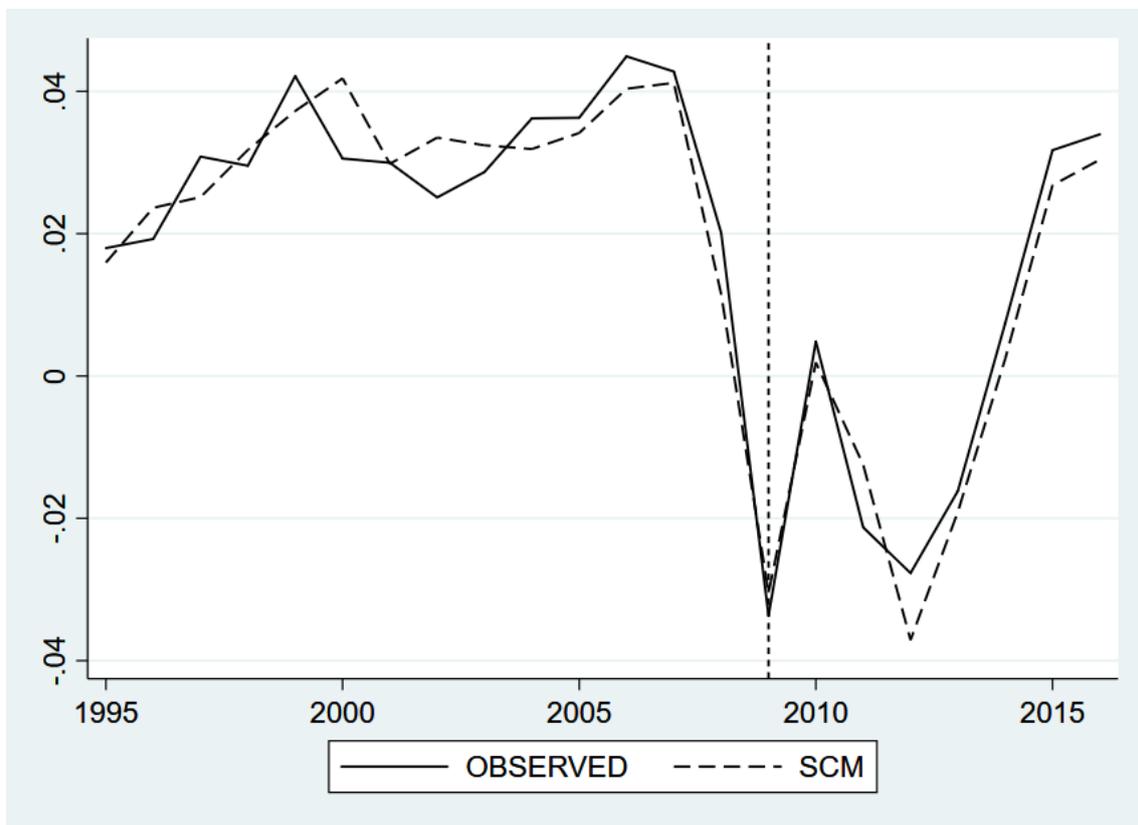


Figure 8: Observed and constrained SCM GDP growth rates over the period 1995-2016

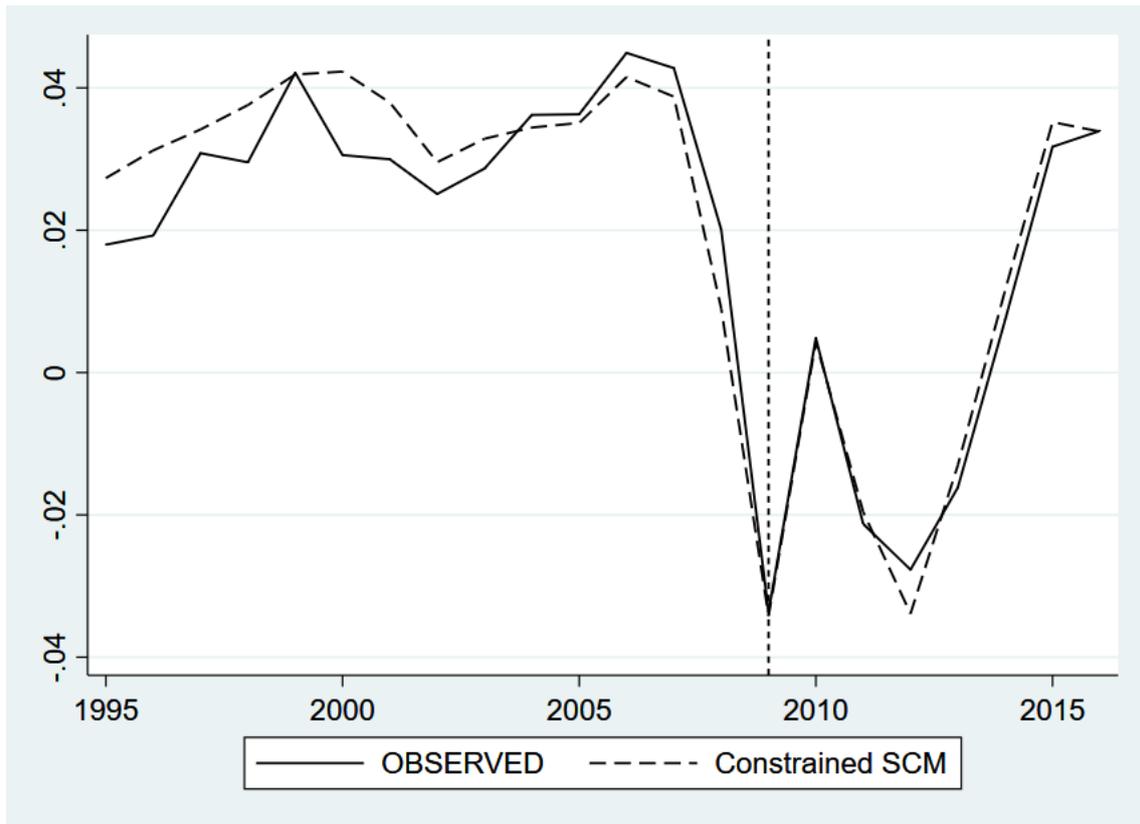


Table 1: Regional non-compliance with fiscal targets (2009-2016)

Regions	Non-compliance with deficit targets								Non-compliance with the spending rule			Non-compliance with the debt target			
	2009	2010	2011	2012	2013	2014	2015	2016	2014	2015	2016	2013	2014	2015	2016
Andalucía	x	x	x	x		x	x			x	x				
Aragon	x	x	x		x	x	x	x		x		x	x		
Asturias	x	x	x			x	x			x				x	
Baleares	x	x	x	x		x	x	x	x						
Canarias	x		x						x		x				
Cantabria	x	x	x	x	x	x	x	x		x					
Castilla-La Mancha	x	x	x	x	x	x	x	x		x		x			
Castilla y Leon	x		x			x	x			x			x		
Cataluña	x	x	x	x	x	x	x	x	x	x					
Comunidad Valenciana	x	x	x	x	x	x	x	x	x	x					
Extremadura	x		x			x	x	x	x	x					
Galicia			x								x				
Madrid			x			x	x		x	x					
Murcia	x	x	x	x	x	x	x	x		x	x				
Navarra	x	x	x	x	x		x			x		x			
País Vasco	x		x						x		x				
La Rioja		x	x			x	x			x			x		

Source: AIReF (2018)

Table 2: Granger causality test. Period 1996Q1-2008Q4.

Null hypothesis	p-value
<i>SPAIN</i> does not Granger cause <i>GAL</i>	0.0002***
<i>GAL</i> does not Granger cause <i>SPAIN</i>	0.89

Notes: 2 lags included. *** p-value < 0.01

Table 3: Econometric estimate of Equation (1)

<i>SPAIN</i>	0.65*** (6.55)
<i>GAL</i> ₋₁	0.60*** (4.45)
<i>GAL</i> ₋₂	-0.11 (-0.91)
R ²	0.853
Endogeneity Hausman test (p-value)	0.25
B-G serial correlation LM test (p-value)	0.12
Number of observations	50

Notes: t-statistics in parenthesis. *** p-value < 0.01

Table 4: SCM variables

<i>Variable</i>	Definition	Database	Year
<i>Per capita GDP</i>	Regional per capita GDP expressed in % of Spanish per capita GDP	FEDEA	2018
<i>Population</i>	Share of regional population over total Spanish population	INE	2018
<i>Variation of population</i>	Annual variation rate of regional population	INE	2018
<i>Population over 64</i>	Share of population over 64 years old	INE	2018
<i>Secondary education</i>	Share of active population with secondary level studies	INE; IVIE	2018; 2018
<i>Superior education</i>	Share of active population with higher level studies	INE; IVIE	2018; 2018
<i>Employment</i>	Employed over population between 16 and 64	FEDEA	2018
<i>Unemployment</i>	Unemployment rate	FEDEA	2018
<i>AROPE</i>	Rate of risk of poverty or social exclusion	INE	2018
<i>Private capital stock</i>	Stock of private productive capital in 2008. Figures in thousands of constant euro base 2010 per employee.	IVIE	2018
<i>Public capital stock</i>	Stock of public productive capital in thousands of constant 2005 base euro per employee.	IVIE	2018
<i>Primary sector</i>	Share of primary sector over total GDP	INE	2018
<i>Industry</i>	Share of industry over total GDP	INE	2018
<i>Construction</i>	Share of construction over total GDP	INE	2018
<i>Services</i>	Share of services over total GDP	INE	2018
<i>Exports</i>	Exports over GDP	DataComEx	2018
<i>Foreign Investment</i>	Foreign investment received over GDP	DataInvEx	2018
<i>RCI</i>	Regional competitiveness index in 2008 computed by the European Commission	EC	2018

Source: Authors' elaboration.

Table 5: SCM regional weights

Region	Weight
Andalucía	0.005
Aragón	0
Asturias	0.008
Baleares	0
Canarias	0
Cantabria	0.033
Castilla y León	0.513
Castilla-La Mancha	0.156
Cataluña	0.144
Comunidad Valenciana	0
Extremadura	0.141
Madrid	0
Murcia	0
Navarra	0
País Vasco	0
La Rioja	0

Source: Authors' elaboration.

Table 6: SCM Estimation results

	Galicia	Synthetic Galicia
<i>Per capita GDP</i>	0.87	0.91
<i>Population</i>	0.065	0.065
<i>Variation of population</i>	0.00083	0.0049
<i>Population over 64</i>	0.21	0.20
<i>Secondary education</i>	63.03	64.96
<i>Superior education</i>	8.52	8.97
<i>Employment</i>	0.58	0.60
<i>Unemployment</i>	0.079	0.079
<i>AROPE</i>	25.10	24.03
<i>Private capital stock</i>	83,012	94,985
<i>Public capital stock</i>	3,345	3,396
<i>Primary sector</i>	0.051	0.063
<i>Industry</i>	0.20	0.19
<i>Construction</i>	0.11	0.10
<i>Services</i>	0.64	0.64
<i>Exports</i>	0.11	0.11
<i>Foreign Investment</i>	0.0070	0.0067
<i>RCI</i>	45.20	43.65

Source: Authors' elaboration.

Please note:

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