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# The Procyclicality of Political Trust in Spain

**Summary:** Political trust has been considered a necessary condition for good democratic and economic performance over time. The grave economic crisis that started in 2008, which is known as the Great Recession, has deteriorated the level of political trust in several countries. Some authors have shown that those countries with an increasing level of unemployment experienced a sharp decline in political trust. In particular, the political distrust in Spain has suffered a high increase since the Great Recession. This paper tests the procyclicality of political trust in Spain through the analysis and modeling of the relationship between political trust and business cycle in Spain over the period 1996-2015. The cross-correlation analysis, the Granger causality test, and the autoregressive distributed lag (ARDL) bounds testing approach coherently conclude the procyclicality of political trust in Spain. The unemployment rate shows a negative and statistically significant influence on political trust four quarters later.

**Key words:** Political trust, Procyclicality, Economic crisis, Statistical analysis, Spain.

**JEL:** C22, C51, E32, P16.

Political trust has been considered a key factor in social, political, and economic life. The study of trust in political institutions and its determinants has constituted a growing research area. In recent years the Great Recession, the huge economic crisis that started in 2008, has deteriorated the level of political trust in several countries. Economic downturn and political distrust have been two of the main features of the Great Recession. Betsey Stevenson and Justin Wolfers (2011) demonstrated in a cross-country analysis that those countries with a high level of unemployment generated by the Great Recession had experienced a sharp decline in trust in political institutions. This paper studies the procyclicality of political trust in Spain; that is to say, whether there is a relationship between political trust and the business cycle in Spain over the period spanning from the first quarter of 1996 to the first quarter of 2015. The main motivation is to test whether the Spanish case shows a negative relationship between political trust and unemployment using a time series approach, which allows us a detailed analysis that incorporates quarterly information for the period. The reference study that has motivated this research is the time series analysis published by Stevenson and Wolfers (2011) for the U.S. case, which found a negative and statistically significant relationship between trust in public institutions and unemployment.

After this introductory section, Section 1 introduces an overview of this research field. Section 2 presents the data (2.1) and explains the methodology (2.2). Section 3 contains the empirical findings and presents the main results of the different methods that were applied. Section 4 concludes the paper.

## 1. Political Trust, Economic Performance, and the Great Recession: An Overview

Political trust has been defined as “a basic evaluative orientation toward the government founded on how well the government is operating according to people’s normative expectations” (Marc J. Hetherington 1998, p. 791), and it has been shown that trust in different political institutions is an “interrelated” and “unidimensional” concept. Therefore, a low level of political trust in a country usually goes together with low levels of trust in the diverse political institutions of that country (José R. Montero, Sonja Zmerli, and Ken Newton 2008; Mariano Torcal 2014). On the other hand, the existence of a high level of political trust would improve the reliability of the specific political institutions of that nation, which could propel good democratic and economic performance. This is a relevant element to understand the process of institutional change in society (Gonzalo Caballero and David Soto 2015).

The empirical literature has evidenced the relevance of political trust in different ways (Hetherington and Jason A. Husser 2012). In this sense, for example, it has been proven that political trust determines the level of support for law compliance (Sofie Marien and Marc Hooghe 2011), conditions the perception of corruption (Andrew Wroe, Nicholas Allen, and Sarah Birch 2013), and affects citizens’ evaluation of public officials (Ben Seyed 2015). In essence, the evidence shows that political trust matters.

Political trust has declined in several countries in the years since the Great Recession, and the economic crisis seems to be a relevant determinant of this decline (Stevenson and Wolfers 2011). Moreover, recent literature has shown that citizens’ trust in the European Central Bank has significantly declined throughout the European area during the economic crisis (Felix Roth, Daniel Gros, and Felicitas D. Nowak-Lehmann 2014). The economic crisis has also implied high levels of mistrust in public institutions in the United States, particularly in government institutions such as Congress (Stevenson and Wolfers 2011). In the Irish case, a relevant impact of the crisis on political trust and legitimacy has been observed since 2008 (Siobhan O’Sullivan, Amy Erbe Healy, and Michael J. Breenc 2014).

The study of the cyclicity of political trust matters because maintaining good performance of the political, social, and economic systems requires a certain level of trust, and the world economic crisis has been undermining political trust in national governments and politics. The Spanish case is a relevant object of study because it combines a huge economic crisis and a sharp decline in political trust. A brief presentation of the Spanish economic and social performance requires some comments on the macroeconomic landscape and the social dissatisfaction. First, after almost a decade of strong economic growth, the Spanish economy has fallen into a deep crisis since 2008, with a slight and temporary recovery in 2010-2011. The do-

mestic imbalances of the Spanish economy have implied an unemployment rate that grew beyond 25% in 2012. A macroeconomic recovery began in 2014. A new scenario of macroeconomic recovery has arrived since 2014. Second, the economic crisis and the restrictive political measures that were applied by the different Spanish governments have affected the welfare perceptions and political attitudes of the Spanish society (Marcos Álvarez-Díaz et al. 2015; Caballero and Álvarez-Díaz 2015), and political dissatisfaction has emerged through several social movements and general strikes in Spain (Caballero 2014). The result has been that, between 2008 and 2012, “the increase of distrust among citizens in Spain rose from 22.9% to 51.1% for the national parliament, from 53.8% to 77.7% for political parties, from 52.8% to 76.4% for politicians” (Torcal 2014).

When studying the determinants of the evolution of political trust, several researchers have pointed out the relevance of changes in economic performance and the evaluation of their social and economic effects; that is to say, the evolution of political trust depends on the institutional capacity to solve citizens’ socioeconomic demands (Jenny Chanley, Thomas J. Rudolph, and Wendy M. Rahn 2001; Stevenson and Wolfers 2011; Javier Polavieja 2013). In the Spanish case, Polavieja (2013) pointed out the weight of the economic crisis in explaining the attitudinal changes and the evolution of political trust. On the other hand, Torcal (2014) did not consider economic stewardship to be the leading cause of political trust; rather, he considered that the increasing institutional distrust in Spain in 2008-2012 was mainly due to citizens’ perceptions that the political system was not responsive to their demands. Nevertheless, if the of political trust is proven, economic performance would appear as the main determinant of political trust in Spain.

## 2. Data and Methodology

### 2.1 Data Description

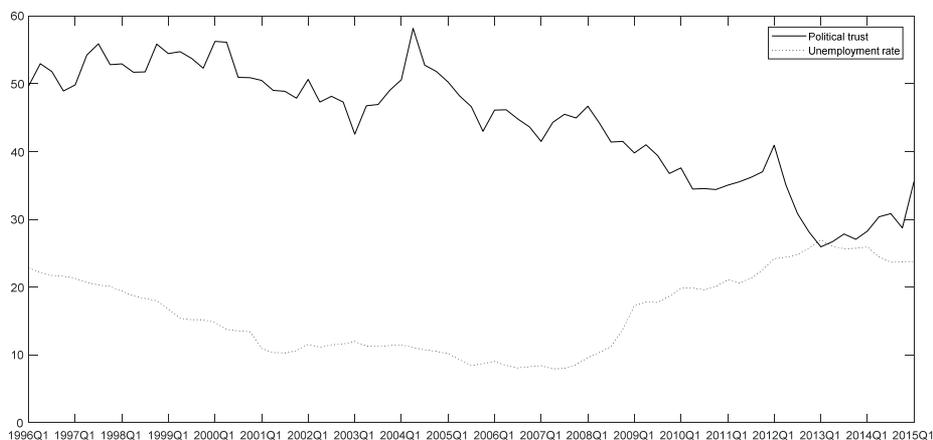
An important point of our study is to define the variables that represent good proxies of the objects of study: the business cycle and the assessment of political trust in Spain. There are many alternative variables to approximate the business cycle, such as oscillations of the gross domestic product (GDP) or the variability in unemployment; both variables are highly negatively correlated and have a strong relationship with the business cycle. Nevertheless, according to the empirical studies by Roth, Gros, and Norwak-Lehmann (2011), Stevenson and Wolfers (2011) and Alejandro Esteller-Moré (2013), we have chosen the unemployment rate as our variable of interest given that employment has the largest and most direct impact on household living standards. The data for this variable were collected from the *Labor Force Survey* (EPA) that is conducted by the Spanish National Statistics Institute (INE 2015)<sup>1</sup>.

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<sup>1</sup> **Spanish National Statistics Institute (INE)**. 2015. Unemployment Rates by Sex and Age Group. <http://www.ine.es/jaxiT3/Tabla.htm?t=4086&L=0> (accessed May 07, 2015).

No data were available to apply a solid time series analysis to the procyclicality of trust in the specific political institutions of the Spanish case, but for the case of political trust, the Spanish Sociological Research Center (CIS 2015)<sup>2</sup> has constructed and offered a measure of this variable. The data and the methodological explanation about how this variable was constructed can be obtained from the webpage of the CIS. Therefore, our study is based on quarterly data on political trust, and the sample period covers the period from 1996Q1, the first date available, to 2015Q1. This period of time includes a whole phase of strong economic growth, a phase of deep economic crisis (the Great Recession), and a phase of economic recovery. The total number of observations available to carry out our study was 77 quarters.

Figure 1 shows the time series plots of the variables political trust and unemployment rate in Spain from 1996Q1 to 2015Q1. As we can see, the unemployment rate underwent a remarkable increase with the economic crisis that started in 2008; meanwhile, the indicator for political trust suffered a decline. This simple plot allows us to observe very roughly that there is a negative relationship between these two variables. Table 1 presents the summary statistics of these variables, and Table 2 reports the results of the conventional nonparametric Phillips-Perron (PP) test, used to check whether series are stationary. The test showed that the variables political trust and unemployment rate are both nonstationary time series. As they are integrated of order one, a common practice to achieve stationariness is to take the first differences. As we can see in Table 2, the first-differenced time series are stationary.



Source: Own elaboration based on official statistics (INE 2015 for unemployment and CIS 2015 for political trust).

**Figure 1** Time Evolution of the Variables Political Trust and Unemployment Rate

<sup>2</sup> Centro de Investigaciones Sociológicas (CIS). 2015. <http://www.cis.es/cis/opencms/EN/index.html> (accessed May 07, 2015).

**Table 1** Summary Statistics for the Data

	Political trust	Unemployment rate
Mean	44.20	16.25
Median	46.65	15.40
Maximum	58.16	26.94
Minimum	25.93	7.93

Source: Authors' calculations.

**Table 2** Results of the PP Unit Root Test

PP unit root tests at levels	
$H_0$ : Unit root	
Y	-0.97
X	-1.19
Unit root tests at 1 <sup>st</sup> difference	
$H_0$ : Unit root	
$\Delta y$	-4.74***
$\Delta x$	-9.25***

Notes: The symbol \*\*\* means rejection of the null hypothesis at the 10, 5 and 1 percent, respectively.

Source: Authors' calculations.

## 2.2 Methodology

We propose the use of three time series methods that can be useful in political science to find a statistical relationship between variables. In particular, our analysis is focused on finding a statistical relationship between political trust and unemployment by using the cross-correlation functions, the Granger causality test, and the autoregressive distributed lag (ARDL) bounds testing approach to cointegration. The latter method allows us to check whether there is a long-run relationship between political trust ( $Y$ ) and unemployment ( $X$ ), the variables considered in our study. This method assumes that political trust in a specific quarter  $t$  can be correctly represented by the general model:

$$Y_t = f(X_t, X_{t-1}, \dots, X_{t-p}, E_t) + \varepsilon_t; \quad \forall t = 1, \dots, T, \quad (1)$$

where  $f(\cdot)$  is a linear functional form,  $\{X_t, X_{t-1}, \dots, X_{t-p}\}$  is a vector with the contemporaneous and delay values of the variable unemployment,  $E$  is a dummy variable that takes the value 1 in the quarter if a general election is held in Spain, and  $\varepsilon_t$  is the disturbance term, which is assumed to be an independent and identically distributed (i.i.d.) random variable.

### 2.2.1 A Cross-Correlation Approach

The cross-correlation function (CCF) is a simple method that allows us to check for the existence of a statistical relationship between two time series. It is commonly used in natural science research to detect connections between different climatic, biological, economic, and oceanographic variables (Álvarez-Díaz, M<sup>a</sup> Soledad Otero-Giráldez, and Manuel González-Gómez 2010). Its use has also been notable in finance (Álvarez-Díaz, Shawkat Hammoudeh, and Rangan Gupta 2014).

Formally, the sample cross-correlation at lag  $l$  between two time series  $Y_t$  and  $X_t$  can be calculated by using the expression:

$$\hat{\rho}_{Y,X}(l) = \frac{Cov(Y_t, X_{t-l})}{S_{Y_t} \cdot S_{X_{t-l}}}, \quad (2)$$

where  $Cov$  is the covariance,  $S_{Y_t}$  is the standard deviation of the variable  $Y$  at the moment  $t$ , and  $S_{X_{t-1}}$  is the standard deviation of the variable  $X$  at lag one. The values of the cross-correlation coefficients range from -1 to 1, and they give us information about the intensity and direction of the relationship between both variables at lag  $l$ . Specifically, a value of zero means no relationship; a value close to -1 implies a strong, negative relationship; and a value near 1 involves a strong, positive relationship.

Nevertheless, researchers must be careful with the estimation of cross-correlation coefficients. The reason for this concern is that if the time series has a very high degree of autocorrelation, then the nonzero values of the cross-correlation function do not necessarily imply a true relationship between the two time series (Álvarez-Díaz, Hammoudeh, and Gupta 2014). Therefore, it is necessary to avoid possible fictitious cross-correlations by eliminating all of the autocorrelation in each time series and then cross-correlating what remains. If an identical method of removing autocorrelation is applied to each variable, then the true cross-correlation between variables is preserved.

Many authors have recommended the use of autoregressive models to bleach the time series and, thus, remove any autocorrelation (Álvarez-Díaz, Hammoudeh, and Gupta 2014). The bleaching procedure assumes the estimation of the following autoregressive models:

$$y_t = \alpha_0 + \alpha_1 \cdot y_{t-1} + \dots + \alpha_p \cdot y_{t-p} + y_{residual}_t, \quad (3)$$

$$x_t = \mu_0 + \mu_1 \cdot x_{t-1} + \dots + \mu_q \cdot x_{t-q} + x_{residual}_t, \quad (4)$$

where  $\{\alpha_i\}_{i=0}^p$  and  $\{\mu_j\}_{j=0}^q$  are the linear coefficients. The residuals of these autoregressive models ( $y_{residual}$  and  $x_{residual}$ ) will be the series to be cross-correlated, provided that none of them show any serial dependence. The coefficients of the autoregressive models are usually estimated by a least-squares fit, which minimizes the variance of the residuals. The order of the autoregressives  $p$  and  $q$  is commonly selected by minimizing the following generalization of the Akaike information criterion (AIC):

$$AIC(r) = \ln(\sigma_e^2(r)) + 2 \cdot \frac{r}{N}, \quad (5)$$

where  $N$  is the sample size,  $r$  is the number of coefficients, and  $\sigma_e^2(r)$  is the estimated variance of the errors. This generalization of the AIC has been widely used to select the order of the autoregressive when bleaching time series (Álvarez-Díaz, Otero-Giráldez, and González-Gómez 2010; Álvarez-Díaz, Hammoudeh, and Gupta 2014;

among others). It is important to note that the term  $2 \cdot \frac{r}{N}$  is included to penalize the use of extra coefficients that do not significantly reduce the error.

### 2.2.2 The Granger Causality Test

The second procedure employed here to analyze the impact of the economic cycle on the political trust in Spain is based on the causality concept developed by Nobel laureate and econometrician Clive Granger. Granger presented a simple approach for testing causality between two variables that has been widely applied in many economic studies. The procedure starts with the construction of simple causal models:

$$x_t = \alpha_0 + \alpha_1 x_{t-1} + \dots + \alpha_p x_{t-p} + \beta_1 y_{t-1} + \dots + \beta_p y_{t-p} + \varepsilon_t, \quad (6)$$

and

$$y_t = \mu_0 + \mu_1 y_{t-1} + \dots + \mu_p y_{t-p} + \delta_1 x_{t-1} + \dots + \delta_p x_{t-q} + u_t, \quad (7)$$

where  $\Delta$  represents the first-difference operator,  $\Delta x_t$  and  $\Delta y_t$  are two stationary time series, and the residuals of the models  $\varepsilon_t$  and  $u_t$  must be uncorrelated white noise series.

An important question to be solved is how to determine an appropriate lag structure for Equations (6) and (7). In our case, we have selected the optimal number of lags  $p$  and  $q$  by using the AIC defined in (5). The decision rule for the hypothesis testing is that  $y$  will have a casual effect on  $x$  in the sense of Granger if some parameter  $\beta_i$  of Equation (6) is statistically nonzero. In the same way we can say that  $x$  will have a casual effect on  $y$  in the sense of Granger if some parameter  $\delta_i$  of Equation (7) is statistically nonzero. Therefore, the null hypotheses to be contrasted are:

$$H_0 : \beta_1 = \beta_2 = \dots = \beta_p = 0,$$

and

$$H_0 : \delta_1 = \delta_2 = \dots = \delta_q = 0.$$

The statistic used for testing the hypothesis was the conventional  $F$ -test.

### 2.2.3 The ARDL Bounds Testing Approach and the Bootstrap Method

Finding long-run relationships among variables has been a focal point over the last decades. This search has usually been done by using standard cointegration methods such as the two-step, residual-based procedure of Engle and Granger or Johansen's rank regression technique (Frank J. Fabozzi et al. 2014). However, these procedures require that the underlying time series are integrated in the same order. This requirement inevitably incorporates a certain degree of pretesting the order of integration and, therefore, introduces a greater level of uncertainty into the search for level relationships between variables (M. Hashem Pesaran, Yongcheol Shin, and Richard Smith 2001). In order to overcome this restriction, Pesaran, Shin, and Smith (2001)

developed a procedure known as the *ARDL bounds testing approach* to cointegration. This procedure is able to test the existence of a long-run relationship between variables, which is applicable irrespective of whether the underlying variables are  $I(0)$ ,  $I(1)$ , or a mixture of both. However, in spite of this great advantage, it is necessary to check that the variables are not  $I(2)$ . If this was the case, the bounds testing approach could produce spurious results. Another reason to adopt this procedure is that it is more robust and reliable than the traditional cointegration techniques when the sample size is small (Pesaran and Shin 1999).

The bounds testing approach is based on the specification of the ARDL model. Specifically, to empirically investigate the existence of an equilibrium relationship between the variables political trust and unemployment, the general model specified in Equation (1) can be represented by the following conditional unrestricted error correction model (UECM):

$$\Delta y_t = \alpha_0 + \phi T + \sum_{j=1}^p \alpha_j \cdot \Delta y_{t-j} + \sum_{j=1}^p \psi_j \cdot \Delta x_{t-j} + \rho y_{t-1} + \theta x_{t-1} + \delta E_t + \varepsilon_t, \quad (8)$$

where the symbol  $\Delta$  stands for the first-difference operator,  $y_t$  is the variable political trust,  $x_t$  is the unemployment rate, and  $T$  is a linear trend variable. The variable  $E$  is a dummy variable that takes the value 1 if a general election is held in Spain in the quarter. The inclusion of this variable into the model is justified to capture a recurrent peak in the political trust that coincides with the celebration of general elections in Spain. The consideration of this dummy variable allows us to enhance and enrich our model. In turn,  $\alpha_j$  and  $\psi_j$  are the short-run parameters, and  $\theta$  is the long-run parameter. The parameter  $\rho$  deserves a special comment since it can be understood as a representation of the speed of adjustment to the long-run equilibrium in the face of a shock. As mentioned above,  $\varepsilon_t$  is the disturbance term of the model. Finally, the optimal number of lags of the UECM is determined by using a specific criterion of selection, which in our case was the AIC.

According to the specification of the UECM represented in Equation (8), the testing procedure is based on two  $F$ -statistics and one  $t$ -statistic to check the null hypothesis that the variables are not cointegrated (Pesaran, Shin, and Smith 2001). The first  $F$ -statistic ( $F_{IV}$ ) is associated with the hypothesis testing  $H_0 : \phi = \rho = \theta = 0$ , the second  $F$ -statistic ( $F_V$ ) checks the hypothesis  $H_0 : \rho = \theta = 0$ , and the  $t$ -statistic ( $t_V$ ) tests the hypothesis  $H_0 : \rho = 0$ . The problem is that the asymptotic distributions of the  $F$ -statistics and the  $t$ -statistic are nonstandard under the null hypothesis that there is no level relationship between the included variables regardless of whether the regressors are  $I(0)$ ,  $I(1)$ , or mutually cointegrated (Basher Balg and Hugh Metcalf 2010). However, Pesaran, Shin, and Smith (2001) derived their asymptotic distributions and proposed critical value bounds for different scenarios. These critical values allow us to statistically determine the acceptance or rejection of the null hypothesis. That is, under the null hypothesis, if the value of the different tests falls above the respective critical upper bound, then we reject the null hypothesis and have evidence of a long-run relationship. On the other hand, if the value is below the respective crit-

ical lower bound, then we cannot reject the null hypothesis of no cointegration and cannot confirm the existence of a long-run relationship between variables. Finally, if the value of the test lies between the upper and lower critical bounds, then the inference is inconclusive.

Since the bounds testing approach to cointegration allows us to verify the existence of a long-run equilibrium, then it is possible to estimate the long-run impact of unemployment on political trust by using the UECM represented in Equation (8). However, Pesaran, Shin, and Smith (2001) advised the use of a more parsimonious specification so as to save degrees of freedom and avoid problems of overparameterization. It is for that reason that in our study we have followed a general-to-specific modeling procedure. That is, the insignificant variables in Equation (8) are removed one by one, starting with the most insignificant ones, until all remaining coefficients are statistically significant at a concrete level of significance. Once all surviving variables of this process are statistically significant, the long-run impact can be estimated by means of the expression:

$$\hat{\gamma} = -\frac{\hat{\theta}}{\hat{\vartheta}}, \quad (9)$$

where  $\hat{\theta}$  is the speed of adjustment to the long-run equilibrium and  $\hat{\vartheta}$  is the estimated long-run coefficient associated with the variable unemployment. However, several problems arise at this point. First,  $\hat{\gamma}$  is a point estimation; that is, it only provides a single value to quantify the long-run effect, but it does not give information about the degree of variability associated with it. The second problem is that we do not know anything about the statistical significance of  $\hat{\gamma}$ . A possible solution to solve these problems would be to construct confidence intervals for each  $\hat{\gamma}$ . An interval for each estimated long-run effect allows us to approximate its variability and know its statistical significance: if zero is contained in the interval, then the effect is not statistically significant.

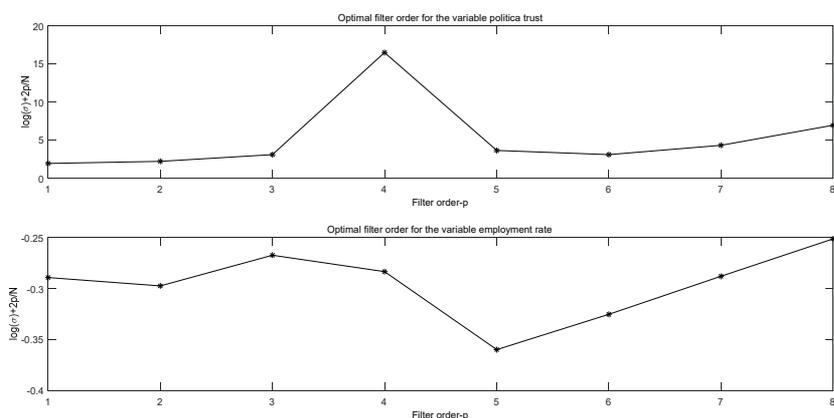
Most of the studies using the ARDL approach have focused on point estimation, obviating the importance of the interval estimation. The most likely reason for this neglect is the problem that  $\gamma$  does not follow a normal distribution since it is estimated as a quotient of two normal variables. Consequently, the traditional statistical inference methods to construct confidence intervals do not work in this case. In order to overcome this difficulty, we have made use of the bootstrap method. Bootstrapping is a nonparametric and computationally intensive methodology that allows us to calculate confidence intervals empirically without assuming a specific distribution of  $\gamma$ . An important characteristic of the bootstrap method is that it allows us to get more accurate intervals, and these intervals can be asymmetric (David Brownstone and Robert Valletta 2001). It is important to remark that the use of the bootstrap technique is relatively new in political economy. A detailed explanation of the computational procedure to implement the bootstrapping employed in this study can be found in Wendy Martínez and Ángel R. Martínez (2008).

### 3. Empirical Results

#### 3.1 Cross-Correlation Analysis

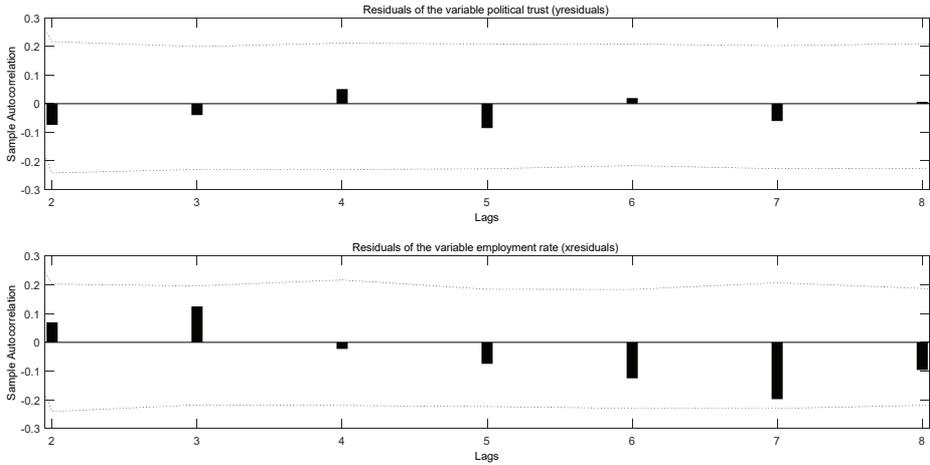
As mentioned in the methodological section, it is necessary to filter the original series through an  $AR(p)$  model. This preprocessing of the data allows us to remove all the existing autocorrelation and, therefore, guarantee that our cross-correlation estimates are not spurious. Figure 2 shows the optimal order of the autoregressives for each series. The optimum order that minimizes the AIC for the variable political trust is  $p = 1$ , and for the unemployment rate it is  $q = 5$ . Figure 3 shows the sample autocorrelation function for the filtered series  $yresiduals$  and  $xresiduals$ , as well as their respective intervals of confidence, empirically constructed by means of the surrogate method (James Theiler et al. 1992). As we can observe in this figure, none of the sample autocorrelation coefficients is statistically significant. Therefore, the autocorrelation analysis points to the absence of a linear structure for both series. As a result, the residual of political trust and unemployment can be used in the analysis to detect significant cross-correlations not due to co-temporality. Specifically, the residuals of the variable political trust ( $yresidual$ ) can be cross-correlated with each of the residuals of the unemployment rate ( $xresidual$ ).

Figure 4 shows graphically the sample cross-correlation function between these filtered variables ( $yresidual$  and  $xresidual$ ). Moreover, this figure also displays the intervals of confidence necessary to examine the statistical significance of the cross-correlation coefficients. The intervals are empirically constructed by a Montecarlo simulation, as was done in Álvarez-Díaz, Otero-Giráldez, and González-Gómez (2010). Analyzing the cross-correlation coefficients, we can observe that the unemployment has a statistically significant influence on the political trust at lag  $\tau = 4$ , but no significant cross-correlations are detected at other lags. It seems, therefore, that there is a statistically significant relationship between the assessment of political trust and the level of unemployment four quarters ago.



Source: Authors' calculations.

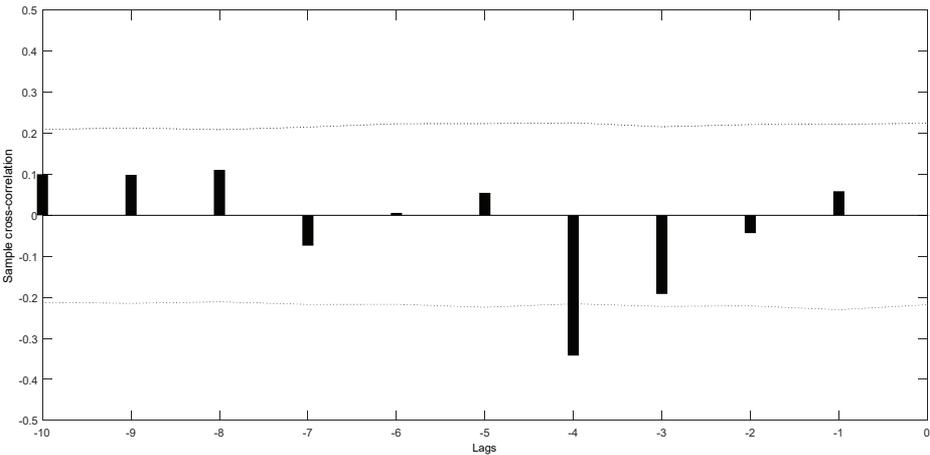
**Figure 2** Choice of the Optimum  $p$ -order of the Autoregressive for the Time Series



Notes: The confidence intervals are constructed using the surrogate method with a 99 percent significance level.

Source: Authors' calculations.

Figure 3 Sample Autocorrelation Function (ACF) of the Filtered Time Series



Source: Authors' calculations.

Figure 4 Sample Cross-Correlation between the Residuals of Unemployment Rate and the Residuals of Political Trust

### 3.2 The Granger Causality Test

A prior requirement to be able to apply the Granger causality test is to verify that the time series are stationary. As we can see in Table 2, the results of the Phillips-Perron test (PP) revealed that the variables political trust and unemployment rate are both nonstationary time series, but their first differences are stationary. Given this fact, it is feasible to apply the Granger causality test.

Table 3 shows the null hypothesis to be contrasted and the values and  $p$ -values of the test. It can be seen that the test shows a  $p$ -value of 0.03. Therefore, the null hypothesis that the unemployment rate does not have a causal effect on political trust can be rejected. Moreover, an analysis of the sensitivity of the results reveals that the choice of the lag length is not a critical issue; that is, the test is robust to different number of lags considered in the analysis. Therefore, the Granger test verifies statistically that the business cycle, represented by the fluctuation in unemployment, has a Granger causal relationship with the political trust.

**Table 3** Results of the Granger Causality Test

Null hypothesis	Lags	F-statistic	p-value
Unemployment rate does not Granger cause political trust ( $H_0 : \delta_1 = \delta_2 = \dots = \delta_p = 0$ )	4	2.51	0.03

**Notes:** The lag length is based on the Akaike information criterion. The residuals show no serial autocorrelation.

**Source:** Authors' calculations.

### 3.3 The ARDL Bounds Testing Approach

As we have already seen in Table 2, the order of integration of the variables is not greater than one; consequently, it is possible to apply the bounds testing approach to cointegration proposed by Pesaran, Shin, and Smith (2001). Following these authors, the AIC was used in selecting the optimum lag length ( $p$ ) in the UECM specified in Equation (8).

Table 4 shows the values of the  $F$ -statistics ( $F_{IV}$  and  $F_V$ ), the  $t$ -statistic ( $t_V$ ), and the different critical bounds calculated by Pesaran, Shin, and Smith (2001). As we can observe, the computed  $F$ -statistics and  $t$ -statistic are  $F_{IV} = 9.50$ ,  $F_V = 13.92$ , and  $t_V = -5.13$ , which are in all cases above their respective critical bounds at the 1 percent significance level. Therefore, the null hypotheses of no cointegration are rejected and we get conclusive evidence of a long-run relationship between political trust and unemployment. This finding is important since it allows us to go one step further and estimate the impact of unemployment on the assessment of the political trust in Spain. The starting point to assess this impact is the estimated UECM. A more parsimonious specification could be achieved through a general-to-specific approach. The final model will be one in which all coefficients are statistically significant at a concrete level of significance, which in our case will be 10 percent.

Table 5 displays the estimated long-run coefficient of the unemployment rate ( $\hat{\theta}$ ). The sign of this coefficient confirms our *a priori* expectations. Specifically, the value of the unemployment rate ( $x$ ) shows a negative and highly significant impact on the assessment of political trust ( $y$ ). The estimate of the speed of adjustment ( $\hat{\vartheta}$ ) informs us that any deviation from the long-run equilibrium induced by a shock is corrected by nearly 55 percent over the following quarter. Moreover, the negative sign and the high significance of the coefficient corroborate the finding of the existence of a long-run relationship (Simon P. Burke and John Hunter 2005). The estimated coefficient associated with the variable general elections ( $\hat{\delta}$ ) is also highly significant and shows a positive sign.

**Table 4** Results of the Bounds Testing Approach and Critical Values

Scenario	F-statistic	Lower bound critical value	Upper bound critical value	Long-run relationship
Model with unrestricted intercept and restricted trend ( $H_0 : \phi = \rho = \theta = 0$ )	$F_{IV} = 9.50$	6.10	6.73	YES
Model with unrestricted intercept and unrestricted trend ( $H_0 : \rho = \theta = 0$ )	$F_V = 13.92$	8.74	9.63	YES

**Notes:** Critical values for  $F$  and  $t$  statistics are as taken from Pesaran, Shin, and Smith (2001) assuming a significance of 1 percent.

**Source:** Authors' calculations.

**Table 5** Results of the Estimated Restricted Error Correction Model

Variable	Estimated coefficient	p-value
Intersection	33.62	0.00
$T$	-0.17	0.00
$y_{t-1}$	-0.55	0.00
$x_{t-1}$	-0.16	0.01
$E$	4.26	0.00
$\Delta y_{t-2}$	0.17	0.11
$\Delta y_{t-3}$	0.16	0.11
$\Delta x_{t-3}$	0.71	0.03
Diagnostic checking		
		Value
$R^2$ -adjusted		0.35
F-statistic		7.62
	Breusch-Godfrey test	
	LM(1)	0.65
	LM(4)	0.69
Autocorrelation		
	White test	1.33
Heteroskedasticity		
	Harvey test	0.94
Misspecification		
	Ramsey test	0.12
		p-value
		-
		0.00
		0.42
		0.59
		0.19
		0.48
		0.73

**Source:** Authors' calculations based on econometric analysis.

Table 5 also offers a battery of diagnostic tests that reveal the adequacy of the estimation procedure from an econometric point of view. The estimated model has a goodness of fit that is relatively high (adjusted  $R^2 = 0.35$ ) and statistically significant ( $F$ -statistic = 7.62). Moreover, it passes all the diagnostic tests commonly used in the literature to detect problems of serial correlation and heteroscedasticity of the residuals at 1 percent significance. Following Pesaran and Bahram Pesaran (1997), we also examine the stability of the long-run coefficients using the cumulative sum of the recursive residuals (CUSUM) and the cumulative sum of squares (CUSUMQ) test. The plots of the CUSUM and CUSUMQ indicate the stability of the long-run coefficients of the model since the residuals lie within the upper and lower bounds of the critical values.

Even though the estimates  $\hat{\theta}$ ,  $\hat{\rho}$ , and  $\hat{\delta}$  are useful to know the sign of the long-run impact of the variables unemployment and general elections on political trust, they cannot be used to directly quantify these impacts. To do so it is necessary to use these estimates and the expression given in (9). According to this, Table 6 reflects the estimated long-run impacts of these variables on political trust. Specifically, if the

unemployment rate increases one point, then the index of political trust decreases by about 0.30 points. The bootstrap confidence interval is [-0.43, -0.14], which implies that this estimated impact is statistically significant at 10 percent. On the other hand, the holding of general elections in Spain leads to an increase of 7.77 points in the index of political trust. In this case, the estimated confidence interval is also significant at 10 percent since the bootstrap interval is [1.81, 15.88].

**Table 6** Point and Bootstrap Interval Estimation of the Long-Run Effects

Coefficient	Estimated effect (percentage)	Bootstrap confidence interval
$\gamma$	-0.30	[-0.43, -0.14]
Elections	7.77	[1.81, 15.88]

**Notes:** The bootstrap confidence interval is constructed using the accelerated bias-corrected method considering 10,000 replications and a confidence interval of 90%.

**Source:** Authors' calculations.

## 4. Conclusion

This paper has empirically proven and shown the procyclicality of political trust in Spain; that is, all the different methods that were applied in this paper concluded the procyclicality of political trust (i.e., the cross-correlation analysis, the Granger causality test, and the ARDL bounds testing approach showed the negative effect of unemployment on political trust). Additionally, the results showed that unemployment rate has a negative and statistically significant influence on political trust four quarters later (i.e., the unemployment rate has a statistically significant influence on the political trust one year later), and no significant cross-correlations were detected at other lags. This relationship was corroborated by the different methods. Another important finding of this study is that the null hypothesis of no cointegration was rejected; therefore, the presence of a relationship between political trust and unemployment rate was supported, and we modeled this relationship. The estimated model allowed us to conclude that the coefficient of unemployment was -0.30; therefore, if the unemployment rate increases one point, then political trust will worsen by 0.3 four quarters later. The absence of serial correlation was indicative that there was no omission of relevant explanatory variables. If we had forgotten to include influencing variables, then the residuals would have exhibited problems of autocorrelation because they would have been capturing the effect of the omitted variables, but this did not happen in our case study.

The empirical results support the idea that the economic effects of the Great Recession have caused a statistically significant decline in political trust. These results are in line with those of Stevenson and Wolfers (2011) for the U.S. case and Polavieja (2013) for the Spanish case. Our study examined the importance of the political-economic paradigm to explain the decline in political trust in Spain, but other factors could have also influenced this decline. Further research is needed in order to uncover other possible driving factors of political trust.

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