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MARCOS ÁLVAREZ-DÍAZ
GONZALO CABALLERO
BALTASAR MANZANO
JOSÉ M. MARTÍN-MORENO

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Marcos Álvarez-Díaz*
Gonzalo Caballero**
Baltasar Manzano*
José M. Martín-Moreno*

Abstract

The Great Recession has implied a strong increase of the unemployment rate in Spain that surpassed 25% in 2012, the highest rate in western economies. At the same time, trust in political institutions has greatly deteriorated. The goal of this research is to study how trust in political institutions has moved along the business cycle in Spain over the last twenty years by using a battery of standard statistical methods. Moreover, this study also investigates the existence of a long-run relationship applying the autoregressive distributed lag (ADRL) bounds testing approach to cointegration. Once the existence of a long-run relationship is evidenced, we construct a model that allows us to quantitatively evaluate the impact of the business cycle on Spanish political trust. The empirical findings reveal that the unemployment rate has had a significant lagged impact on trust in political institutions.

Key words: Economic crisis, trust, political institutions, Spain, cross-correlation, Granger causality, the ADRL bounds testing approach.

JEL classification: C51, E02, E32, P16.

Corresponding author: Marcos Álvarez Díaz, Dept. of Economic Analysis, Faculty of Economics and Business , University of Vigo, Lagoas-Marcosende s/n, Vigo (36310), Spain. E-mail: marcos.alvarez@uvigo.es.

*Department of Economic Analysis, **Department of Applied Economics –Faculty of Economics and Business--University of Vigo

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1 **Introduction**

The World economy is living times of change. The Great Recession is affecting the levels of economic growth, employment and welfare around the world and, as a consequence of all this, citizens are modifying their trust in political and economic institutions. Economic downturn and political dissatisfaction are the two faces of the worst crisis since the Great Depression of 1930s. Modern political economy has a relevant research agenda on the study of the relationships between economic and political variables (Schofield and Caballero, 2011; Schofield, Caballero and Kselman, 2013), which are even more interesting now, in the midst of the Great Recession. Maintaining a good performance of the political, social and economic system requires a certain level of trust, but the world economic crisis is undermining political assessment and trust in national governments and politics. People tend to trust in governments that are able to generate economic growth and create jobs (Fiorina, 1978; Mackuen et al., 1992), so it follows that a high level of unemployment would imply a sharp decline of trust in political institutions.

Public trust in government and political institutions has been declining across most advanced industrial democracies in recent decades (Dalton, 2005). Van de Walle *et al.* (2008) considered that these falls were simple fluctuations rather than a stable trend, and rejected the hypothesis of a universal decline of trust in public sector. Nevertheless, the current financial and economic crisis is undermining systemic or institutional trust in government (Roth, 2009). In a cross-country analysis, Stevenson and Wolfers (2011) show that trust in national governments declined more dramatically in those countries in which unemployment has risen most sharply during the Great Recession. However, these authors only worked with a single pre-financial and post-financial crisis observation. Therefore, their time span was very limited, and a longer time-series would have added more value to the different case studies.

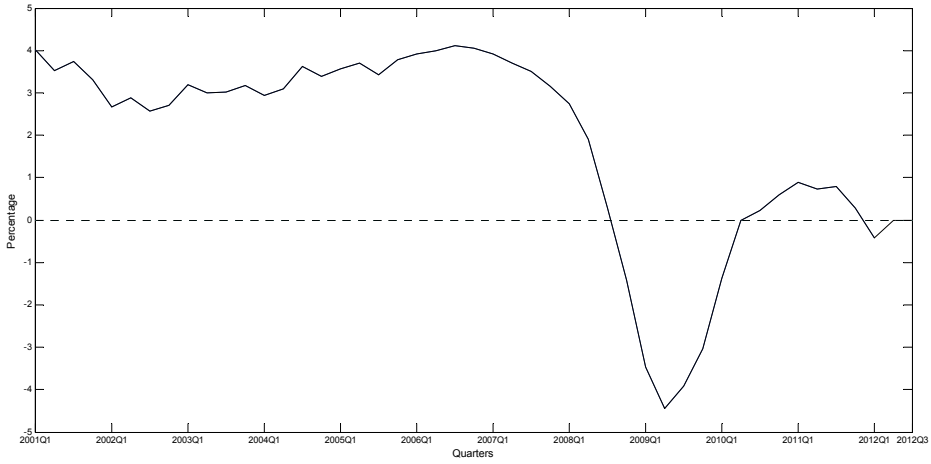
Roth *et al.* (2011) studied the evolution of European citizens´ confidence levels, concluding that during the crisis, citizens do not worry much about inflation but rather about the effects of a recession on employment. They also find that a large unemployment rate decreases trust in national governments of the EU-15 countries. On the other hand, Grosjean *et al.* (2013) analyze how the 2008

economic crisis has re-shaped individual support for democracy and market liberalization in post-transition countries; they thereby showed the sensitivity of political attitudes to the business cycle.

The Great Recession is affecting the entire world economy, but the growth of unemployment has been much more intense in those countries that had a real-estate bubble. This was the case of the US and Spain, among others. The US economy was in recession and the unemployment rate peaked at 10% in October 2009, a very high rate from a historical perspective. Recent literature has shown how the Great Recession has implied high levels of mistrust in public institutions in the U.S., particularly in government institutions such as Congress. Stevenson and Wolfers (2011) analyzed the sharp decline in the confidence that American citizens have in the main institutions of the country, and show that much of the decline in trust may be attributed to the economic recession.

If the US is a relevant case study, the Spanish economy is also very interesting. The world economic crisis that started in 2008 is affecting Spain notably. After almost a decade of vigorous growth, since the end of 2008 the Spanish economy has fallen into a deep crisis, with only a slight and temporary recovery in 2010-2011. As Figure 1 shows, the macroeconomic landscape has largely deteriorated. The latest available data shows that the Spanish Gross Domestic Product (GDP) is decreasing at an annual rate of 2% and, as the International Monetary Fund and other institutions have pointed out, a recovery is not soon to be expected. This state of affairs depicts a situation of huge economic crisis and extends to the whole Spanish economy, including the banking, industry and service sectors. Therefore, Spain is suffering a painful economic recession, and the domestic imbalances of the Spanish economy have implied an unemployment rate that has grown beyond 25% in 2012. This is the highest level of unemployment in all of the advanced economies around the world.

Figure 1: Interannual growth rate of the Spanish GDP: from the rise to the crisis.



The increase in public spending caused by automatic stabilizers along with the decrease in tax revenues and the bailout of the Spanish economy have been putting public finances at stake. Whilst the risk premium for the Spanish sovereign debt was high after the onset of the crisis, the government turned to cuts in public spending, focusing mainly on health and education programs as well as on unemployment benefits. All these restrictive political measures have notably affected the welfare perceptions of the Spanish society. Moreover, the European Union and the European Central Bank have required Spain to undertake severe structural reforms in the labor market, the financial sector and the pension system to receive their financial support. All these reforms have not only caused political dissatisfaction but have also had a negative impact on living standards.

This bleak picture is a constant threat to social cohesion and undermines the institutional basis of the Spanish economy profoundly. By way of this, trust and confidence in political institutions and government have sharply fallen in Spain and several social movements and general strikes evidence how political institutions have greatly dissatisfied society. As an example of this, there have been a large number of pacific protests organized by civilian platforms such as “Movimiento 15-M” or “Indignados”, and more recently by platforms related to the problems of eviction and preferential shares (Likki, 2012; Calvo *et al.* 2012).

In spite of the depth of the economic and social crisis in Spain, no empirical research has studied the impact of the economic crisis on the decline of trust in the Spanish political institutions. To bridge this gap in research, this study aims to investigate whether there is a relationship between political trust and the Spanish business cycle. Specifically, our main motivation is to test if the Spanish case corroborates the negative and statistically significant relationship found between trust in public institutions and unemployment by Stevenson and Wolfers (2001) for the US economy. To this end, however, this paper employs a more complete and robust statistical analysis.

The empirical procedure is as follows. We first use a cross-correlation analysis to test the existence of co-movements between political trust and unemployment rate and obtain a lagged negative cross-correlation. As cross-correlation does not imply causation, further research is needed to better characterize the nature of the relationship between the variables. Thus, we carry out the test proposed by Granger (1969) to check if the variable unemployment has a causal effect on political trust. Going a step further, we explore the existence of a long-run relationship by using the Autoregressive Distributed Lag (ARDL) model and the bounds testing approach to cointegration proposed by Pesaran *et al.* (2001). According to this methodology, we can obtain an estimation of how trust in political institutions responds to changes in the unemployment rate. We also construct confidence intervals by using bootstrapping techniques to check the statistical significance of the estimated long-run impact.

The remainder of this article is structured as follows. Section two describes the variables used in our study to approximate the business cycle and the political trust in Spain. Section three contains the main results of the different methods applied. Section four concludes.

2. Data Description

We begin our study by defining the variables that allow us to approximate the political trust and business cycle conditions in Spain appropriately. For political trust, we use information contained in the surveys conducted by the Spanish Sociological Research Center (*CIS*), and specifically the information related to the question: *How do you assess the present political situation in Spain?* This measure shows the evolution through time of the proportion of the public who answer that they assess the political situation in Spain as "good" or "very good". This variable is assumed to be a good proxy of trust in political institutions because people have confidence in political institutions when the political situation is positively valued.

Regarding the business cycle, the fluctuations of the GDP and the unemployment rate are usually the most common variables to approximate the business cycle. Both variables are highly and negatively correlated, and provide the same kind of information on the business cycle conditions. Following Stevenson and Wolfers (2011) and Roth *et al.* (2011), we use the unemployment rate since it is the macroeconomic variable that has the largest and more direct impact on household living standards.

We have 82 quarterly observations for each variable, covering a period of time from the second quarter of 1992 to the third quarter of 2012. Our sample includes two decades with periods of economic booms and busts. This time length provides a detailed description of the business cycle in Spain. Figure 2.a represents the evolution of the variables *Political Trust (TR)* and *Unemployment Rate (U).* Table 1 summarizes the main descriptive statistic.

Figure 2.a: Time evolution of the variables Political Trust and Unemployment Rate.

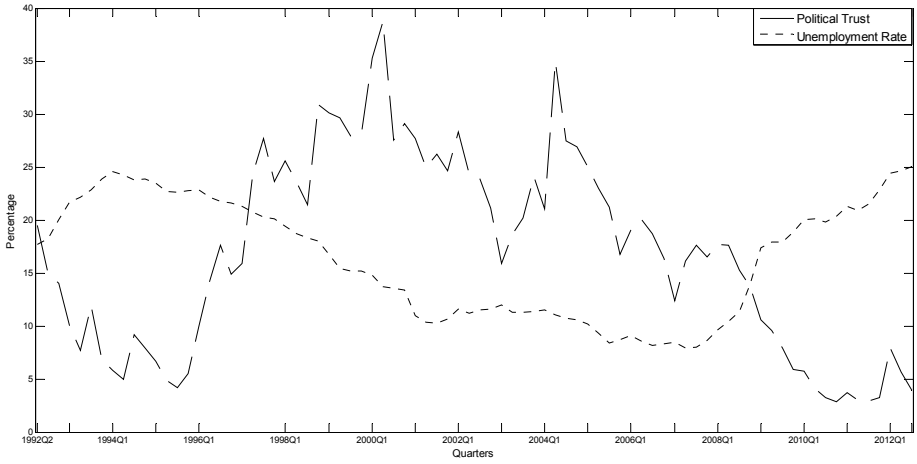


Table 1: Main Descriptive Statistics

	Original Data		**Filtered Data**	
	Tr	***U***	$\hat{e}$	$\hat{w}$
Mean	16.93	16.31	0.21	0.00
Median	17.18	17.53	-0.69	-0.04
Maximum	38.73	25.02	14.43	1.71
Minimum	2.83	7.95	-10.26	-2.14
Std. Dev.	9.27	5.56	3.62	0.59
Jarque-Bera (p-value)	3.47 (0.17)	7.78 (0.02)	38.17 (0.00)	22.73 (0.00)

Before proceeding with our empirical analysis, it is of paramount importance to check the stationarity of our variables. In the case of non-stationary variables, the standard statistical methods would fail to find and model a true relationship between the variables. That is, a high value of an estimated cross-correlation coefficient would not necessarily imply a true relationship between the variables (Haugh, 1976); or a regression equation with a high degree of fit and statistically significant parameters could only result from a spurious regression (Granger and Newbold, 1974).

Table 2 shows the results of the ADF (Dickey and Fuller, 1981), the P-P (Phillips and Perron, 1988) and the HEGY (Hylleberg *et al.*, 1990) unit root tests. All these tests do not reject the null hypothesis of non-stationary variables at frequency zero (therefore, they have a unit root in levels). Moreover, since our study uses quarterly data, we also examine the presence of unit roots at seasonal frequencies using the HEGY test. This test evidences that there is no seasonal unit root either at frequency biannual (t_2) or annual (F_{23}). Therefore, our variables are non-stationary variables only at frequency zero. According to this, we must transform our original variables to obtain stationary variables.

Table 2: Results of the ADF and P-P Unit Root Tests, and of the HEGY Seasonal Unit Root Test.

UNIT ROOT TESTS					
				HEGY TEST	
	ADF TEST *H_0: Unit Root*	**P-P TEST** *H_0: Unit Root*	*H_0: Unit Root* (t_1)	*H_0: Seasonal Unit Root*	
				Biannual (t_2)	Annual (F_{23})
Tr	-1.51 (0)	-1.51 (0)	-1.08 (2)	-4.01*** (2)	16.93*** (2)
U	-1.95 (4)	-0.69 (5)	-1.58 (2)	-3.40*** (2)	5.77*** (2)
$\hat{e}$	-10.43*** (1)	-10.56*** (3)	-3.68*** (1)	-4.07*** (1)	15.41*** (1)
$\hat{w}$	-8.93*** (0)	-8.93*** (1)	-3.65*** (1)	-4.00*** (1)	23.06*** (1)

Note: The symbols *, ** and *** mean rejection of the null hypothesis at the 10, 5 and 1 percent, respectively. For the P-P tests, the number of bandwidth is shown in brackets according to the Newey-West Criterion using Bartlett Kernel. For the ADF test, the number of lags is shown in brackets according to the Schwarz information Criterion. For the HEGY test, the number of lags for the augmented component is shown in brackets.

Following Katz (1988), we transform our original data by assuming that the dynamics of the variables *Tr* and *U* can be adequately represented by an autoregressive process with additive Gaussian noise. The procedure implies estimating a general autoregressive model:

$$Tr_t = \alpha_0 + \alpha_1 \cdot Tr_{t-1} + ... + \alpha_p \cdot Tr_{t-p} + e_t \quad (1)$$

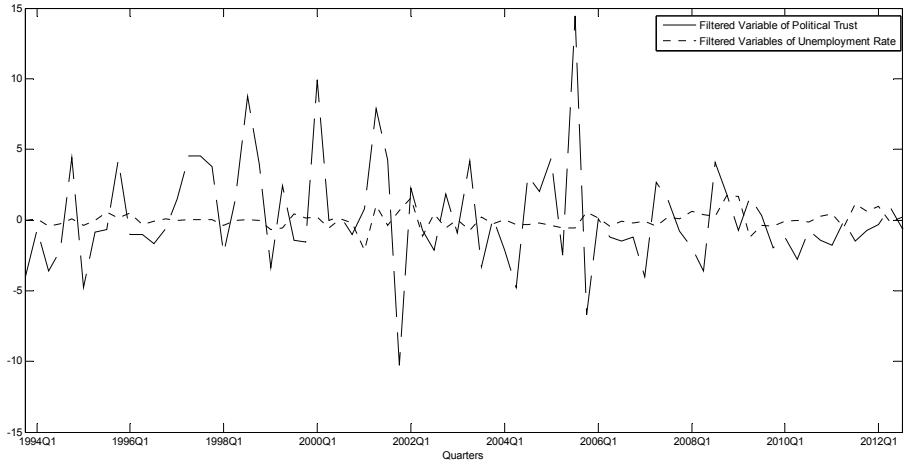
$$U_t = \mu_0 + \mu_1 \cdot U_{t-1} + ... + \mu_p \cdot U_{t-q} + w_t \quad (2)$$

where we select the order *p* and *q* that minimize the Akaike Information Criterion (AIC) (Akaike, 1973). In our case, we obtain *p=1* for *political trust*, and *q=6* for the *unemployment rate*. The two residual series thereby obtained are $\hat{e}_t$ and $\hat{w}_t$. Table 1 also displays the most important statistic descriptive for these variables, and Figure 2.b depicts their evolution over the sample period. Moreover, as we can see in Table 2, these residuals pass all the stationarity tests, and do not exhibit significant autocorrelations[1]. Consequently and as indicated by Katz (1988), we can use these variables to investigate the statistical relationship between the original variables: unemployment rate and political trust[2].

[1] The autocorrelation analysis was done using the correlogram of the residuals, and the null hypothesis for independently distributed data was not rejected using the Ljung-Box test (Ljung and Box, 1978). The results are omitted here due to space constraints, but are available from the authors on request.

[2] It is also very common to use first differences of the original series (ΔTr_t and ΔU_t) to make the data stationary instead of filtering the original data. In our specific empirical study, there were no divergences in our results, and the conclusions were exactly the same.

Figure 2.b: Time evolution of the filtered variables of Political Trust and Unemployment Rate.



3 Empirical results

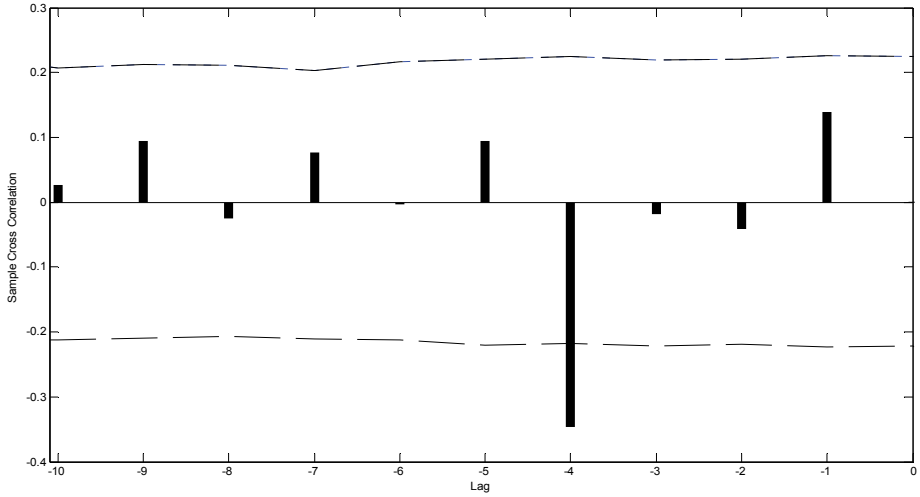
3.1 Looking for a statistical and causal relationship

We start our analysis by estimating the sample cross-correlation coefficients between the residual series of unemployment and political trust. The estimation of these coefficients is a simple and common method used in science research to describe the existing interrelationships between two time series. Figure 3 shows the sample cross-correlation estimates and the intervals of confidence empirically constructed by means of a Montecarlo simulation[3]. These intervals are used to determine the statistical significance of the cross-correlation coefficients. As we can observe, the residual series of the *unemployment rate* shows a statistically significant co-movement with the residual series of the *political trust* at lag *l=4*, and no significant cross-correlations are detected to other lags. Therefore, the hypothesis of independence of the variables

[3] Specifically, the Montecarlo experiment was carried out as follows: we generate randomly 5,000 time series with the same characteristics as a random white variable and with the same standard deviation as the variable e_t. Then, each one of these artificial variables was cross-correlated with the residual series of the variable w_t. An empirical distribution of each cross-correlation coefficient for each lag was computed. Using this empirical distribution, a confidence interval with a specific significant level is built and, in this case, the significance was determined to be 95%.

unemployment rate and *political trust* is rejected since there is evidence of a negative and statistical significant relationship between them.

Figure 3: Sample cross-correlation between residuals of the *unemployment rate* and the residuals of the *political trust*.



Nevertheless, the cross-correlation analysis is an adequate approach to relate two time series only in terms of co-movements. Therefore, the existence of a significant cross-correlation coefficient does not necessarily imply causation. It is for this reason that we also perform a regression analysis where the dependent variable is the residual series of the political trust (e_t), and the explanatory variables are *p* delays of the residual series of the unemployment rate (w_t)

$$e_t = \lambda_0 + \sum_{j=0}^{p} \delta_j \cdot w_{t-j} + \varepsilon_t \quad (3)$$

The modeling procedure is based on the general-to-specific approach (Hendry, 1995). That is, we start with the general specification represented in equation (3), and we incorporate as explanatory variables the contemporary value of the time series w_t, as well as *p* lags. The next step is to estimate the general equation, and the least significant variable is removed. This process of

estimation and elimination is repeated continuously until all the variables left in the equation are statistically significant. According to this, the final estimated regression equation was

$$e_t = \underset{(0.00)}{-2.23} \cdot w_{t-4} + \hat{\varepsilon}_t \quad (4)$$

where the p-value is in parenthesis below the estimated value. The residuals of the regression ($\hat{\varepsilon}_t$) do not show any problem of heteroskedasticity or autocorrelation. The latter facts guarantee the econometric robustness and efficiency of our estimation process. The most remarkable results of this simple regression are that (i) the only surviving significant variable is at lag 4, and (ii) that the estimated coefficient $\hat{\delta}_4 = -2.23$ reflects the negative relationship between the variables. Therefore, the regression analysis seems to confirm those results obtained using the cross-correlation analysis. It is also worth noting at this point that the regression analysis only helps us to corroborate the existence of a negative statistical relationship between *political trus*t and *unemployment rates* at lag 4, but we cannot interpret the coefficient $\hat{\delta}_4$ as an estimate of the direct impact of the latter variable on the former. The reason for this is that the variables that we have regressed are the residual series, and not the original ones.

In order to corroborate the finding obtained by the regression analysis, we also use the test proposed by Granger (1969). This test allows us to check if the variable unemployment has a causal effect on political trust. Table 3 presents the null hypothesis to be contrasted and the results of the statistical hypothesis testing. Specifically, the statistic has a value of 3.10, and its associated p-value is 0.02. As a result of this, the null hypothesis for *unemployment rate* not having a causal effect on *political trust* can be rejected at 5% level of statistical significance.

Table 3: Results of the Granger Causality Test.

NULL HYPOTHESIS	Lags	F-Statistic	p-value
Unemployment rate does not Granger Cause Political Trust	4	3.10	0.02

Note: The lag length is based on the Akaike Information criterion. The residuals show no serial autocorrelation.

All the proposed methods indicate the existence of a significant and negative relationship between the lag four of the Spanish unemployment rate and the contemporaneous value of political trust. A very interesting topic would be to find out if there is a long-run equilibrium between these two variables and to measure the quantitative response of political trust to a change in unemployment rate. We address these important questions in the next section.

3.2 Looking for a long-run equilibrium

In this subsection we go a step further by analyzing the existence of a long-run equilibrium between political trust and unemployment rate. This can be done by using different traditional cointegration methods such as the two-step residual-based procedure of Engle and Granger (1987), or the Johansen's rank regression technique (Johansen and Juselius, 1990). However, they have shown important technical limitations (Pesaran and Shin, 1999). In our study we use the autoregressive distributed lag (ARDL) bounds testing approach (Pesaran *et al.*, 2001). This approach exhibits several advantages that justify its use in detriment of the other cointegration methods[4].

[4] Among these advantages we can list the following. First, the ARDL approach is consistent and relatively more efficient in small or finite sample data sizes than the traditional cointegration techniques (Pesaran and Shin, 1999). Second, it takes a sufficient number of lags to represent appropriately the data-generating process in a general-to-specific framework (Laurenceson and Chai, 2003). Another reason is that we can include dummy variables in the cointegration test process (Habibi and Rahim, 2009). Moreover, unlike the other cointegration procedures, this approach does not have need of pre-testing the variables included in the model for unit roots (Pesaran *et al.*, 2001).

Following the model defined in Stevenson and Wolfers (2001), we start our procedure by proposing that political trust in Spain can be correctly explained by unemployment rate according to the general expression

$$Tr_t = \beta_0 + \beta_1 \cdot U_t + \beta_2 \cdot E_t + \varepsilon_t \ \forall t = 1,....T \qquad (5)$$

where ε_t is the disturbance term. Additionally, in order to enhance the explanatory ability of our model, we have also included the dummy variable *E* as potential influencing factor of the political trust. This variable takes value one in the quarter where general elections are celebrated in Spain.

From the model represented in equation (5), it is possible to derive the following conditional Error Correction Model (ECM) using a simple reparameterization (Banerjee *et al.*, 1993)

$$\Delta Tr_t = \alpha_0 + \sum_{j=1}^{p} \alpha_j \cdot \Delta Tr_{t-j} + \sum_{j=1}^{p} \psi_j \cdot \Delta U_{t-j} + \vartheta \cdot Tr_{t-1} + \theta \cdot U_{t-1} + \delta \cdot E_t + \varepsilon_t \qquad (6)$$

where Δ is the first-difference operator, and ε_t is assumed to be a white noise error term. ϕ and ϑ_i are the parameters that represent the long-run relationship, and α_j and δ_{ij} reflect the short-run dynamics of the model. Finally, the number of lags (*p*) is chosen using the minimum value of the AIC.

The bounds testing approach to cointegration is a method that allows us to study whether there is a significant stable relationship between the variable Tr and *U*. According to the specification of the model represented in equation (6), the testing procedure is based on two F-statistics to check the null hypothesis that the variables are not cointegrated (Pesaran *et al.*, 2001)[5]. The first one (F_{II})

[5] We have estimated the ECM represented in equation (6) by ordinary least squares adding a deterministic linear trend ($\delta \cdot T$). This model with intercept and linear trend is associated to the scenarios *IV* and *V* described in Pesaran *et al.* (2001). However,

is associated to the hypothesis testing $H_0 : \alpha_0 = \vartheta = \theta = 0$. The second test ($F_{III}$) checks the hypothesis $H_0 : \vartheta = \theta = 0$. Both F-statistics have a non-standard distribution under the null-hypothesis of no relationship of cointegration. However, Pesaran *et al.* (2001) derived their asymptotic distributions and proposed critical value bounds for different scenarios. These critical values allow us to statistically decide whether to accept or reject 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 it follows that we have evidence of a long-run relationship. On the other hand, if the value is below the respective critical 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.

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 restricted intercept and no trend ($H_0 : \alpha_0 = \vartheta = \theta = 0$)	F_{II}=3.96	3.02	3.51	YES
Model with unrestricted intercept and no trend ($H_0 : \vartheta = \theta = 0$)	F_{III}=5.11	4.04	4.78	YES

Table 4 contains the values of the F-statistics, the critical values at a level of significance of 10 percent, and the optimal number of lags. As we can see, the value of the statistics F_{II} (3.96) and F_{III} (5.11) are both above the critical upper bounds at a level of significance of 10 percent (3.51 and 4.78, respectively). The null hypothesis of no cointegration is therefore rejected on the basis that we have statistical arguments that allow us to reject the null hypotheses

in our specific case, we found that the parameter δ was not statistically significant in all regressions that we have run, and for this reason we decided not to include the trend term in our model.

$H_0 : \alpha_0 = \vartheta = \theta = 0$ and $H_0 : \vartheta = \theta = 0$. This result supports the presence of a long-run relationship between *political trust* and *unemployment rate*.

The next step is to construct a model that allows us to estimate the impact of unemployment rate on the political trust. We can estimate long-run equilibrium by estimating equation (5), and the short-run dynamic by using the following model with the variables in differences

$$\Delta Tr_t = \gamma_0 + \sum_{i=1}^{p-1} \gamma_i \cdot \Delta Tr_{t-i} + \sum_{j=0}^{p-1} \mu_j \cdot \Delta U_{t-j} + \phi \cdot ECT_{t-1} + \omega_t \quad (7)$$

where ω_t are the disturbance terms and the ECT_t is the error correction term, which is defined as

$$ECT_t = y_t - \hat{\beta}_0 - \hat{\beta}_1 \cdot U_t - \hat{\beta}_2 \cdot E_t + \varepsilon_t \quad (8)$$

The short-run model finally estimated must meet certain econometric requirements: (i) the estimated coefficient must be statistically significant and show a sign coherent with the economic theory; (ii) it must not exhibit any problems of autocorrelation, heteroskedasticity or misspecification; and (iii) the estimated coefficient of the lagged error correction term $\hat{\phi}$ must have a negative sign and be statistically significant to corroborate cointegration (Kremers *et al.*, 1992; Granger *et al.*, 2000). If the estimated model satisfies all these requirements, then the estimated coefficient of the parameters β_1 and β_2 are assumed to adequately assess the long-run effect of the variables *U* and *E* on *Tr*, respectively.

The estimated long-run coefficients are contained in Table 5. As we can see, all estimates have the expected signs, but the most remarkable finding is that these coefficients give us a quantification of the long-rung impact of the variables *U* and *E* on *Tr*. The estimated coefficient of *U* is -1.01. According to

this, we can affirm that if the unemployment rate increases one point, then political trust will worsen one point. On the contrary, the estimated coefficient of *E* was 5.52; therefore, if there is an election process in one quarter, then political trust will increase in 5.52 points in the following quarter. To make our analysis more complete, we use the accelerated bias-corrected bootstrap method to construct an efficient confidence interval for each long-run parameter β_i (Efron and Tibshirani, 1998). Bootstrapping allows us to verify the statistical significance of the long-run parameters without assuming the restrictive hypotheses of the classical inferential statistics. The decision rule is that if the zero value is contained in the bootstrap interval, then the null hypothesis $H_0 : \beta_i = 0$ would be accepted. Consequently, the impact of the associated variable would not be statistically significant. Table 5 shows the bootstrap intervals associated to each parameter of the model at a significance level of 90 percent. As we can see, the null hypotheses that the explanatory variables *U* and *E* have no statistically significant impact on *Tr* can be rejected.

Table 5. Point and Bootstrap Interval Estimation of the Long-run Parameters

Variable	Estimated Coefficients	p-value	Bootstrap Interval Estimation
Intercept	32.99	0.00	(28.94, 37.18)
U	-1.01	0.00	(-1.25, -0.77)
E	5.52	0.08	(0.62, 10.88)

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

Table 6 shows the results of estimating the short-run model represented in equation (7). The modeling procedure is based on a general-to-specific approach, starting with a number of lags equal to *p*=8. The estimated coefficients are statistically significant and have the expected sign. That is, the survival variable is ΔU_{t-4}, and has a negative impact on ΔTr_t. The estimated coefficient of the lagged error correction term $\hat{\phi}$ is equal to -0.10. Therefore, it has the required negative sign necessary to corroborate the earlier finding of a

long-run relationship using the bounds testing approach. Moreover, this estimated coefficient also gives us information on the speed of adjustment to the long-run equilibrium in face of a shock. Specifically, the deviation from the long-run equilibrium induced by a shock is corrected by nearly 10 percent over the following quarter.

Table 6. Results of the short-run model

Short-run Variable	Estimated Coefficients	p-value	Bootstrap Interval Estimation
ΔU_{t-4}	-1.50	0.00	(-2.34, -0.65)
ECT_{t-1}	-0.10	0.09	(-0.20, -0.004)

DIAGNOSTIC CHECKING				
			Value	**p-value**
Adjusted-R^2			0.09	-
Autocorrelation	Ljung-Box Q-Statistic	Q(1)	1.35	0.25
		Q(4)	1.82	0.77
	WhiteTest		0.89	0.47
Heteroskedasticity	ARCH Test	ARCH(1)	0.22	0.64
		ARCH(4)	1.24	0.87
Misspecification	Ramsey Test		0.47	0.49

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

In addition to the estimated coefficients, Table 6 also provides a battery of diagnostic tests on the estimated short-run model. These tests verify the econometric strength of our estimations, and the validity of the estimated long-run coefficients β_1 and β_2. Specifically, the estimated model passes all the diagnostic tests commonly used in the literature to detect problems of serial correlation and heteroskedasticity. Additionally, we use the Ramsey's RESET test to check the existence of misspecification problems. The results of this test allow us to assert that there is neither omission of relevant explanatory

variables nor incorrect choice of the functional form of the model. Finally, following Pesaran and Pesaran (1997), we examine the stability of the long-run coefficients using the cumulative sum of the recursive residuals (CUSUM) and the cumulative sum of squares (CUSUMQ) tests. The plots of the CUSUM and CUSUMSQ show the stability of the long-run coefficients. Stability is also corroborated by using the recursive least squares procedure.[6]

4. Conclusions

The Great Recession is deeply undermining the economic, institutional and social basis of many countries. This situation is especially tough in Spain. This country suffers the highest unemployment rate of all the developed economies. The dire economic situation has generated a deep institutional decline and an intense disaffection with political representatives. In spite of the seriousness of this situation, no empirical research has yet analyzed the impact of the economic crisis on the decline of trust in the Spanish political institutions. Our study tries to throw some light on this problem by using a complete and robust statistical and econometric analysis where the specific problem of working with non-stationary processes has been taken into account.

In general, the aim of our study is twofold. Our first aim was to study whether political trust and the unemployment rate have been statistically related in Spain. For this purpose, we applied a simple but very useful statistical tool: the sample cross-correlation function. The results revealed that the only statistical significant cross-correlation coefficient was at lag four. Therefore, there was a relationship between the contemporaneous value of political trust and the level of unemployment four quarters ago. However, a significant cross-correlation does not necessarily imply a causal relationship. This is why we have carried out a regression analysis and applied the Granger causality test. The results of

[6] For the sake of brevity, the plots of CUSUM, CUSUMSQ, and recursive least squares for each estimated parameter are not reported here, but they can be delivered upon request.

both methods indicate that unemployment rate causes a significant change in the political trust of the Spanish society.

Our second aim was to find out if there is a long-run equilibrium between political trust and unemployment. In particular, we studied whether both variables were cointegrated by using the ARDL bounds testing approach. The tests showed that effectively both variables are cointegrated. They validated the existence of a long-run equilibrium between these variables from a statistical point of view. This finding is extremely relevant since it guarantees the possibility of modeling the political trust in function of the unemployment rates. The next step was to construct and estimate an ARDL model. The estimated model generated some interesting results not only for academics, but also for political advisors and policy-makers. First, if the Spanish unemployment rate increases one point, then political trust will worsen one point four quarters later. On the contrary, if there was an election in one quarter, then political trust in the following quarter would increase by 5.52 points. The different checking diagnosis tests carried out in our study verify the consistency and the econometric strength of our results. Moreover, the absence of serial correlation of the residuals is 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. According to all this, our study provides statistical arguments that support the pro-cyclicality of trust in political institutions in Spain.

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