The influence of the confidence of household economies on the recovery of the property market in Spain

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Abstract

Consumer confidence as a leading indicator for the economy provides some very interesting information for research. The importance of the property market in the economy justifies the need for the construction of a prediction model that is as accurate as possible. This study aims to analyse the contribution of consumer confidence as an indicator in the housing price prediction model, together with other key variables. An in-depth analysis of each of the issues forming this sentiment indicator was carried out to select the one that has the greatest influence in this market. Cointegration analysis has shown a long-term equilibrium relationship through the Johansen test. Subsequently, it was possible to verify the contribution of information from the variable and the high predictive quality of the model in the short term with the application of the ECM. The significance of the variables confirms their validity in the case of Spain.

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Introduction

The property market in Spain has a great impact on the country's economy. The contribution of residential investment to GDP and total employment reached 13.6% and 9.2%, respectively in 2007, the year before the economic crisis. Therefore, the subsequent fall in the construction sector had a great impact on the contraction of the economy, reducing its contribution to both GDP and employment. Consequently, it is important to have greater knowledge of the behaviour of this market. The main objective of this research is to analyse the influence of consumer confidence in a model of predicting the price of housing with economic interpretation. Therefore, after the drastic fall in price in this market, this study aims to find out if confidence in the economy will really help your recovery.

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The consumer confidence indicator is formed from a series of questions that are asked to a representative sample of families. The value of the indicator is calculated from the arithmetic average of the balances (in percentage points) of the answers. Balances are adjusted seasonally.

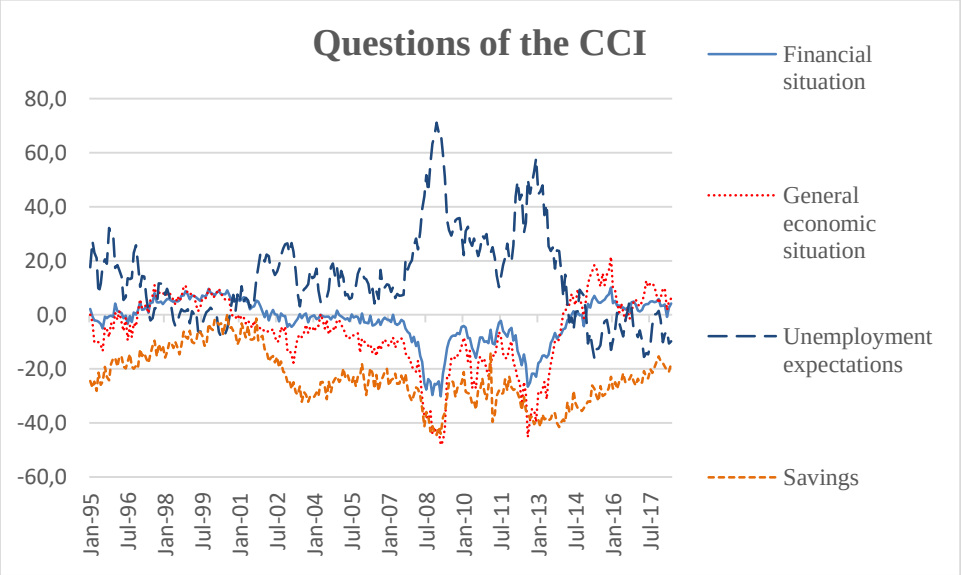
Through each of the questions, information is obtained on the expectations of the families in the next twelve months on their financial situation, the economic situation of the country in general and employment in particular and the savings forecasts.

In the search for variables to provide further information on the model, we have found other key variables that influence housing prices. The granting of mortgages, the construction sector, wages or interest rates are undoubtedly factors that affect the demand for housing.

Figure 1 and 2 show the changes in the perception of the economy by families in Spain. In an initial descriptive analysis, it can be seen how certain economic, political and social events can affect consumer confidence.

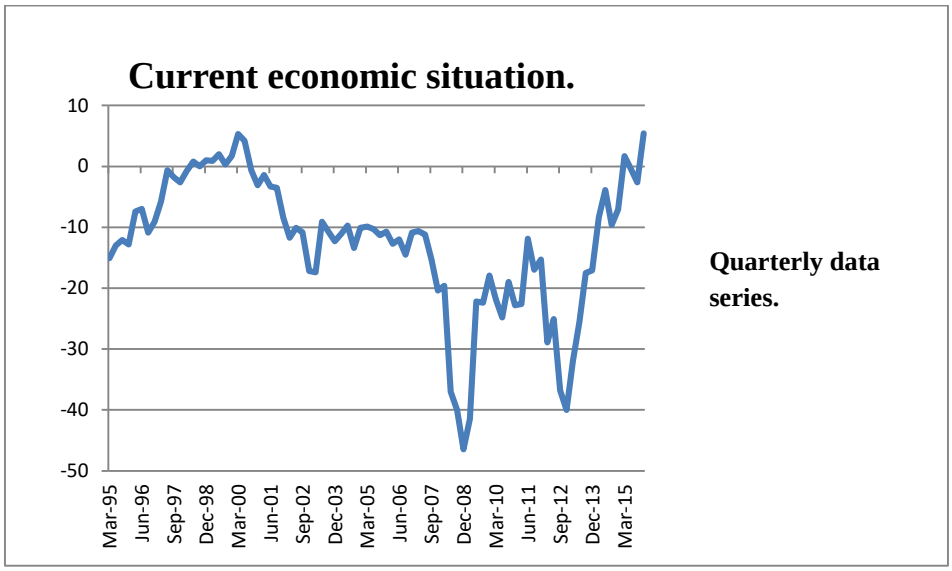
The data series runs from the first quarter of 1995 to the last of 2015. Initially, the graph shows a stage of economic recovery from the financial crisis that began in 1992 and caused high inflation. Progressive growth in confidence can be seen during this period, accompanied by meeting the requirements to enter the European Union in 1998. This is followed by a minor slowdown with an increase in inflation from 1998 to 2000. From then on, there was a sudden change in trend following the dotcom crash in 2000. Different events, such as the terrorist attacks of 11th September 2001, the Iraq war in 2003 and the terrorist attacks in Madrid on 11th March 2004, did nothing to help recover confidence. Only the monetary policies on minimal interest rates seemed able to cushion its fall. However, it could not maintain these levels and experienced its greatest drop following the start of the subprime mortgage crisis of 2007 and the subsequent international impact on the real economy. In Spain, the financial and property crisis had a notable effect on the economy, especially unemployment. The latest drop in confidence seems to have been due to the lack of market confidence reflected by the increase in the risk premium on public debt. As of late 2012, optimism has improved to reach positive levels not seen since the end of 1999.

Figure 1: Consumer Confidence Index in Spain



Source: The authors, from data published by Eurostat.

Figure 2: Changes in the current economic situation



Source: The authors, from data published by Eurostat.

In reviewing the literature, Tsuchiya (2014) shows consumer confidence to be a useful predictor of durable goods' consumption and price indices. The author uses directional analysis with the estimation of thresholds in extreme-value applications.

Along the same lines, Dees and Soares (2013) assess the link between consumer confidence and consumption expenditures for the United States and the Euro area. More specifically, they demonstrate increased predictive power with major changes in confidence indices. The results obtained are based on an out-of-sample analysis with non-linear models. Kilic and Cankaya (2016) use a factor-augmented vector autoregressive (FAVAR) approach to study the effects of consumer confidence on the US economy. The results show that consumption expenditure and housing market variables are strongly correlated with this index.

The methodology applied in the cointegration analysis of study variables has been used by other authors, such as Gimeno and Martínez- Carrascal (2010), who showed a link between mortgage debt and long-run house prices in Spain. Along these same lines, Çelik and Özerkek (2011) performed panel data analysis with the cointegration test to show the long-run equilibrium between consumer confidence and other economic and financial variables in different European Union countries.

Finally, the results confirm the existence of cointegration in the model that explains house prices in Spain for the period analysed. Subsequently, the quality of the short-term model and the levels of significance in the variables with up to four lags were shown via the ECM.

This paper is structured as follows: Section II provides the data series and methodology used; Section III explains the results obtained and, finally, the conclusions are presented in Section IV.

Data Series and Methodology

One of the variables selected for the model was excess mortgages, Ferruz and Lample (2016), defined as the difference between mortgages constituted and finished homes. The addition of this variable provides information that explains the difference between the rate of growth of mortgage

concession, which directly affects the demand for housing, and activity in the construction sector. Another variable included was the theoretical effort[1] to purchase a home without tax deductions, which also affects demand. The value of this indicator depends on the cost of acquiring a property in relation to household income and the ability to obtain the financing for the purchase. It was considered useful for a variable showing banking profitability with mortgages to be investigated. Thus, a variable representing the intermediation margin for this type of loan was constructed. It was calculated on the difference between the reference interest rate (MIBOR, EURIBOR) and the average mortgage interest rate. Finally, consumer confidence[2] was selected as an indicator to provide information on the opinion of household economies on the economic situation in the country over the previous twelve months, as this is the one that most affects housing prices.

All the variables were expressed in quarterly terms, and the period studied ran from the first quarter of 1995 to the last quarter of 2015.

The general model[3] was expressed as follows:

$$\Delta X_t = \prod X_{t-1} + \sum_{j=1}^{q-1} \Gamma \Delta X_{t-j} + \varepsilon_t$$

Where X_t is a vector including House Price per m^2 (HP), Excess of Mortgages granted (EM), Theoretical Purchase Effort without deductions (TE), Mortgage Intermediation Margin (MIM) and Current Economic Situation (CES).

A Johansen contrast test was performed to verify the existence of cointegration vectors from the range of the corresponding matrix. This contrast considered the trace test and maximum eigenvalue to determine the number of cointegrating vectors. The null hypothesis was the lack of cointegration and the alternative hypothesis expressed the existence of at least one cointegration vector; consequently, the matrix range was one or more. If the null hypothesis was rejected in the first contrast, the search for cointegrating vectors increased sequentially, until the null hypothesis was accepted to give the matrix range. Following this reasoning, a maximum

number of possible vectors was reached, which was the same as the number of explanatory variables.

The contrast was performed with the unrestricted constant. The variables were introduced with up to four lags due to the quarterly periodicity of the series.

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[1] The Bank of Spain prepared this indicator as the ratio of the cost during the first year of a fixed interest rate mortgage - which, at current rates and for a term of 15 years, finances 80% of the price of an average home - and average annual salary. An average house was considered to be a residence of 93.75m^2 gross floor area (approximately 75m^2 usable floor area).

[2] The consumer confidence index was calculated from questions about the particular economic situation of households, the general situation in the country, expectations of unemployment and family savings. The method used for the valuation was a simple arithmetic mean of the positive or negative balances obtained from the scores of the answers. These balances were seasonally adjusted.

[3] Data published by Bank of Spain and Ministry of Development.
The variables were seasonally adjusted using Tramo/Seats methodology (TSW).
The house price variable was deflated using the CPI.
The rate of correlation between the variables, which might cause multicolinearity problems, was analysed.
The order of integration of each of the variables was analysed using the Augmented Dickey-Fuller Increased (ADF) and Phillips-Perron (PP) contrast, with (1) resulting for each.
A dummy variable called “Crisis” was included in the model from the second quarter of 2008 until the end of the series.

Cointegration was confirmed as the long run equilibrium relationship without being spurious. The short run equilibrium model was constructed using the error correction model (ECM) of Pesaran et al (2000). This contrast uses the maximum likelihood method for estimation. As the residuals correction coefficient (EC) was significant, it was possible to verify the term the model shows to return to the equilibrium situation. Specifically, the residual coefficient represents the correction that occurs each quarterly period. In addition, the adjusted R^2 result shows the quality of the prediction of the model.

Estimation results

Firstly, the Johansen test demonstrated the existence of a maximum of 3 cointegration vectors. Since the null hypothesis was rejected sequentially until the Trace value or Maximum Eigenvalue was less than the critical value selected, we accepted this null hypothesis. Therefore, the results showed that the matrix range at the corresponding significance levels was equal to 3 long-run equilibrium vectors.

Table 1 shows the results from Johansen's contrast in the period analysed:

Table 1. Cointegration test

Johansen test
Number of equations = 6
Lag order = 4
Estimation period: 1996:1 - 2015:4 (T = 80)
Unrestricted constant

Range	Eigenvalues	Trace Statistic	p- value	Max statistics, Log-likelihood	p- value
0	0.60027	160.11	[0.0000]	73.357	[0.0000]
1	0.36354	86.752	[0.0009]	36.147	[0.0224]
2	0.30325	50.604	[0.0253]	28.906	[0.0302]
3	0.15323	21.698	**[0.3255]**	13.306	**[0.4389]**
4	0.082295	8.3915	**[0.4318]**	6.8704	**[0.5129]**
5	0.018835	1.5211	**[0.2174]**	1.5211	**[0.2174]**

Note: p-values are given in brackets denote rejection of the hyphotesis at 10%, 5% and 1% levels.
Source: Own elaboration.

The cointegrating equation is represented in table 2, where the relationship between the normalized cointegrating coefficients of the variables is shown. There is a positive relationship between the house price and the excess of mortgages granted, the confidence index of the current economic situation and the theoretical effort that families must make to purchase a house. This explains how house prices evolve in the same direction as the mentioned variables that have an impact on the demand. On the contrary, the negative relationship with the mortgage intermediation margin explains how a decrease in the margin leads to higher demand, thus increasing house prices.

Table 2. Cointegrating equation

	HP	EM	Crisis	CES	MIM	TE
HP	1	-3895	-0.00096669	-0.039353	0.030756	-0.47843
EM	-0.0030763	1	-6.3525e-006	0.00094367	-0.00011810	0.00086669
Crisis	-407.94	8.1843e+005	1	41.708	-10.444	-375.71
CES	1.8963	3487.1	-0.0030062	1	-0.084306	-9.2708
MIM	-62.884	3.1235e+005	-2.1303	64.024	1	41.450
TE	-10.101	1.2480e+005	0.026981	2.9420	-0.064002	1

Source: Authors.

Finally, the short-run equilibrium model was calculated in Table 3 using the error correction mechanism (ECM). VECM[4] is estimated by using the method of maximum likelihood:

Table 3. Vector error correction model

VECM	**ΔHousing Price**	
Range	**05:01 - 15:04**	**Lags: 4**
	Coefficient	***p-value***
Cons	104.303	0.46307
Δ HP t-1	0.14526	0.12959
Δ HP t-2	-0.0439318	0.63951
Δ HP t-3	0.235209	0.01726**
Δ HP t-4	0.711651	0.00001***
Δ EM t-1	0.000242285	0.00076***
Δ EM t-2	0.000227356	0.00555***
Δ EM t-3	0.000131927	0.09079*
Δ EM t-4	0.000155954	0.01527**
Δ Crisis t-1	-9.52554	0.48468
Δ Crisis t-2	-24.0159	0.09827*
Δ Crisis t-3	-5.35647	0.73608
Δ Crisis t-4	-19.4421	0.31748
Δ CES t-1	-0.289938	0.28411
Δ CES t-2	-0.819585	0.00484***
Δ CES t-3	-0.624745	0.01967**
Δ CES t-4	-0.252427	0.35782
Δ MIM t-1	-25.3438	0.00096***
Δ MIM t-2	-1.16275	0.882
Δ MIM t-3	9.59637	0.16304
Δ MIM t-4	7.74242	0.18854
Δ TE t-1	2.53825	0.11904
Δ TE t-2	1.51696	0.31895
Δ TE t-3	0.968805	0.53547

[4] The Breusch-Godfrey test was used to analyse whether or not there were any problems with autocorrelation, the ARCH test was used to analyse heteroscedasticity and the Jarque-Bera test was used to analyse normality. Ramsey's reset test was used to verify that the functional form was adequate.

Δ TE t-4	-3.10561	0.01842**
EC	**-0.0253619**	0.00002***
	Adjusted R^2	**0.8737**

Notes: *, ** and *** denote significance at 10, 5 and 1% levels, respectively.
Source: Authors

The resulting model includes the explanatory and endogenous variables with up to four lags to avoid problems of autocorrelation and heteroscedasticity. Although some variables were not significant at levels of 1%, 5% and 10%, they were included in the model because of their relevant contribution to economic interpretation. The coefficient of determination adjusted R^2 showed a high predictability with a value of 87.38%. Following the results of the analysis, the variable EC represents the error correction term, and is significant at levels of 1%. The coefficient of this variable provides information about the speed of adjustment or amount of correction each period, with a value of 0.0254. Therefore, the resulting correction would be 2.54% quarterly to return to the equilibrium level.

Conclusions

Economic, political and social events affect consumer confidence and therefore their behaviour. Reactions to certain events can affect the economy in general or a specific market. In this case, the information provided by the consumer confidence index, and specifically the question of the country's economic situation in the last twelve months, was analysed together with other key variables for the property market in particular. The Johansen test results confirmed there were up to 3 cointegration vectors in the model built to explain house prices. Therefore, there is a long-run equilibrium relationship, without being spurious, between house prices and the variables that explain it, including consumer confidence about the economy. In addition, using the error correction model, the short-run prediction model was established with a high accuracy in the prediction, reaching a value of 87.38% for adjusted R^2 in the estimate.

The results obtained from the error correction coefficient reveal a return to the equilibrium situation in 9 years and 10 months approximately, accelerating the speed of adjustment due to information provided by confidence. It seems that consumer confidence helps reactivate the property market in particular, perhaps encouraged by improving economic data. However, we still consider the return to the maximum house prices of 2006 to be gradual, coinciding with Shiller (2006).

Finally, following this line of research, we consider the in-depth study of the speed of information transmission of explanatory variables of the property market to be interesting. The high levels of significance indicate that it could be slower than in other markets.

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