House prices in Spain: is the evidence of overvaluation robust?

The authors of this article are Juan Ayuso and Fernando Restoy of the Directorate General Economics, Statistics and Research[1].

Introduction

Since late 1997 house prices in Spain have grown by around 150% in nominal terms. In real terms, the increase has exceeded 100%. Changes on such a scale in a variable that is important for analysing the situation and outlook for any developed economy warrant per se investigating which factors explain these movements.

As a starting point, it should be pointed out that the rises observed in property values in the recent past are not, despite their intensity, a one-off episode in the historical trajectory of our economy. And nor is this the case when they are compared with recent developments in other countries such as the United States, the United Kingdom or Ireland, among others. The rise in house prices in Spain has run in parallel with a series of substantial changes in variables such as interest rates, household income, employment and demographics, to cite a few, whose behaviour influences property values.

Under these conditions it is worthwhile disentangling the causes behind the marked property market boom and, in particular, the extent to which this may be explained by changes in the fundamentals of residential asset prices. Only thus may the future outlook for the market be evaluated in greater depth. Specifically, a distinction should be drawn between three possible alternative hypotheses, with widely different consequences in terms of the most likely future course of property prices and, therefore, of the foreseeable behaviour of the main macroeconomic and financial magnitudes that depend on them.

According to one hypothesis, the growth of house prices would be fully determined by the trend of its long-run fundamentals, such as income, interest rates and demographic variables. Under these conditions, property prices would be in equilibrium and additional changes therein would not be expected unless there were fresh changes in their fundamentals.

Assuming likewise that the changes in house prices have responded to changes in their fundamentals, one possible alternative is that the level reached stands temporarily above its long-run value as a consequence of the existence in this market of specific rigidities that prevent supply from reacting immediately to an expansion in demand. In this case, there would be an excessive response in the short run by prices which, subsequently, would autonomously move onto a trajectory returning them gradually to equilibrium. It is in these circumstances that there may be said to be *overvaluation* in the market and, consequently, a gradual adjustment of prices may be expected even if the fundamentals were to hold stable.

Finally, there is also a theoretical possibility that, irrespective of the changes caused by alterations to their fundamentals, house prices may increase as a result of the firming of expectations about future property price rises. By fuelling speculative demand, such expectations would ultimately be self-fulfilling. In this case, property prices would not only stand above their equilibrium level but would likewise outpace the adjustment path level proper to an overvaluation episode. It is at that point that mention of a *bubble* is warranted and, therefore, when a

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1. The article is a summary of Documento de Trabajo no. 0609, *House prices and rents in Spain: does the discount factor matter?* by the same authors.

TABLE 1

Paper	Approach	Differrence between observed price and	
		long-run equilibrium price (%)	short-term adjustment price (%)
Balmaseda et al. (2002)	Macro	28	...
Ayuso and Restoy (2003)	Financial	20	2
Martínez-Pagés and Maza (2003)	Macro	8 - 17	0 - 2
IMF (2004)	Macro	20	...
IMF (2005)	Financial	20 - 30	...
OECD (2005)	Financial	13	...
The Economist (2005)	Financial	> 50	...
ECB (2006)	Financial	30	...

SOURCE: Banco de España.

sudden change of expectations prompting an abrupt adjustment may be considered significantly likely.

To compare the likelihood of these three alternative hypotheses requires the use of formal statistical methods[2]. Indeed, papers in the past few years have analysed the recent behaviour of house prices in Spain from different analytical approaches which, essentially, may be grouped into two major blocks. On one hand are the macroeconomic-type models in which, along the lines laid down in Poterba (1984), house prices are approximated as a function of the variables which determine the supply of and demand for housing in a similar fashion to any durable good. On the other are financial-type models in which, as in Case and Schiller (1989), property is modelled as an asset that generates future income flows - in the form of rents or accommodation services - and whose equilibrium price may be derived through conventional valuation techniques under non-arbitrage conditions[3].

In both cases, however, the emphasis has traditionally been placed (as Table 1 shows) on evaluating the discrepancy between observed house prices and their theoretical long-run equilibrium prices. Indeed, the studies cited coincide in identifying a positive difference between both variables at the end of the sample used. However, only in certain cases has an attempt been made to compare real data with a level that would be consistent with a gradual adjustment path towards equilibrium. As seen, this latter comparison is crucial for being able to distinguish between overvaluation and bubble situations. In this latter group is the paper by Ayuso and Restoy (2003) which, using a very specific and stylised valuation model, offered evidence in favour of the overvaluation hypothesis.

This article extends the Ayuso and Restoy (2003) paper in two directions. First, it considers a reasonably broad set of asset valuation models, allowing the robustness of the results to be tested against more flexible approaches to the problem. Further, it studies the stability of the conclusions obtained when tax considerations, which were absent from the original paper, are brought into the analysis.

The following section briefly summarises the main characteristics of the financial approach and the results in Ayuso and Restoy (2003). The third section then tests the robustness of these results when alternative asset valuation models are estimated. The fourth section stud-

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2. See Restoy (2006) for an explanation of the limitations of descriptive as opposed to quantitative approaches.   **3.** See Ayuso, Martínez Pagés, Maza and Restoy (2004) for a more detailed explanation of both types of approach to the empirical analysis of house price behaviour.

ies the sensitivity of the models to tax considerations. Finally, the main conclusions are drawn.

The approach and the results in Ayuso and Restoy (2003)

Ayuso and Restoy (2003) use as a starting point an (intertemporal and stochastic) financial asset pricing model formulated on the behaviour of households that decide on their consumption of goods and their demand for accommodation services on the basis of the prices of such goods and services and of their income. Housing is one component among others in households' asset portfolio and, as such, provides returns in the form of rents received or accommodation services enjoyed. Insofar as individuals may obtain accommodation services through renting a house, the rental price should be equal, in equilibrium, to that of the services.

The financial asset pricing model formulated enables an equilibrium equation to be obtained for the ratio of the house price to the rental price (a ratio which plays, in this case, the same role as the PER for shares), which depends positively on expected rents and negatively on a temporary discount factor, which varies in terms of the envisaged behaviour of a consumption basket (featuring both consumer goods and accommodation services) and of a series of parameters[4]. The estimation of this equilibrium equation takes into account, moreover, the possibility that the observed and equilibrium prices may differ temporarily as a result of the existence of specific rigidities that prevent adjustments in this market from taking place immediately.

Chart 1 summarises the main findings of the paper. More specifically, it shows three series relating to the house prices/rents ratio: the observed ratio, the (estimated) long-run equilibrium ratio and the (estimated) ratio consistent with a dynamic but not immediate market adjustment towards a situation of equilibrium. Comparison of the first two ratios reveals that, at end-2004, the observed ratio stood around 30% above its reference value[5] (see left-hand panel of the chart). However, the distance between that ratio and the ratio relating to the adjustment path was at that same date scarcely 2% (see right-hand panel of the chart). It may be concluded from the joint consideration of these two results that, of the three possible situations discussed in the introduction, the model identifies the overvaluation hypothesis as that which best fits the data available.

How the results change when alternative discount factors are considered

The valuation model used in Ayuso and Restoy (2003) resides on a series of assumptions which, at least potentially, may prove restrictive in certain contexts. Under these conditions it is worthwhile asking whether the relaxing of some of these assumptions substantially affects the conclusions obtained. This section therefore considers alternative asset pricing models based on less demanding assumptions, it estimates the related long-run equilibrium and adjustment equations, and it compares the results obtained with one another and with those of the original paper.

Specifically, the intertemporal equilibrium conditions of the model in Ayuso and Restoy (2003) are replaced by the (weaker) condition of absence of arbitrage opportunities. This allows various discount factors to be specified for future rents in terms of the return on alternative financial assets. In particular, three possible reference portfolios are considered: the IBEX 35 index,

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4. Those interested can find details of the model in the original paper summarised in this section.   **5.** Note that this approach does not allow it to be ascertained whether the overvaluation of the ratio is mainly from an overvaluation of housing or from an undervaluation of rents, whereby it is reasonable to assume that it provides a higher level for the former. Moreover, it should be pointed out that in the original paper the sample ended in 2003 Q2 and provided an overvaluation level of around 20%.

(Ln) HOUSE PRICES/RENTS   CHART 1
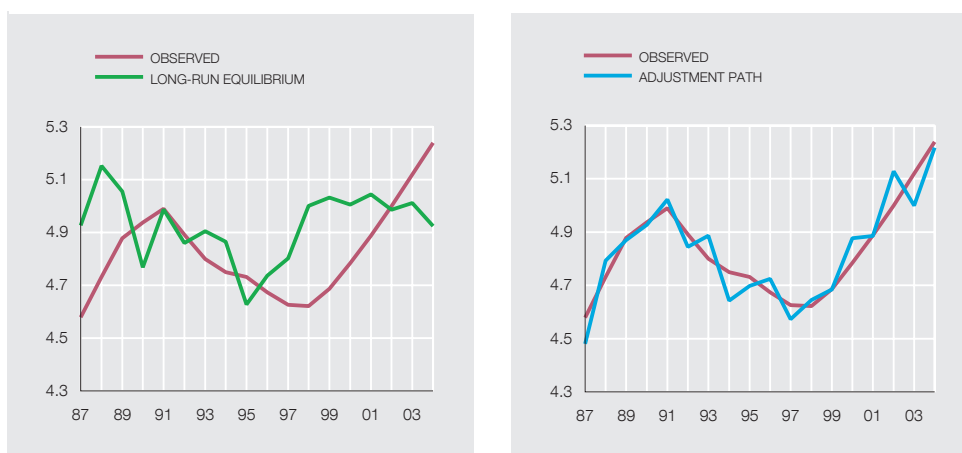
SOURCE: Ayuso and Restoy (2006)

a public debt index compiled by the Banco de España[6] and the aggregate financial portfolio of households. We thus cover a reasonable spectrum ranging from a pure equity portfolio to a fixed-income portfolio, with an (observed) combination of both between. In addition, we include a constant discount factor in the analysis.

The different estimates were made on the basis of a quarterly data sample covering the period 1987 Q1-2004 Q4, the lengthiest period for which it is possible to obtain a sufficiently homogenous house price series in Spain, bearing in mind the different methodological changes in recent years in the compilation of this statistic.

The first result worth mentioning is that, of the four new valuation models considered, the only one to be rejected by the data is that which imposes a constant discount factor. This implies that the historical mean of the price/rents ratio is a poor guide for assessing the current market situation and, therefore, it reinforces the need to estimate more complex models. The fact that there is more than one such model compatible with the data shows, moreover, the notable difficulties there are in accurately quantifying, using the techniques available, the equilibrium value of any financial or, as in this case, non-financial asset.

In order to assess to what extent the different models provide more or less homogenous results, the left-hand panel of Chart 2 shows the levels of the maximum, minimum and mean equilibrium price/rents ratios that are derived from the comparison of the results of the four alternative valuation models: those derived from the use of the three reference portfolios plus that used in Ayuso and Restoy (2003).

As can be seen, the mean equilibrium ratio shows a growing trend from the mid-90s, which was followed by a strong increase in the observed ratio. The latter tended, initially, to draw both ratios closer and, therefore, to restore a situation of equilibrium. However, its continuity ultimately placed the observed data approximately 29% above its estimated long-run equilibrium value. As might be expected, the minimum and maximum ratios determine a fairly wide "plausibility zone" which shows, as indicated, the difficulties inherent in any asset valuation exercise such as that tackled here. As a result, the difference between the observed value and the estimates available lies in a range from 24% to 32%.

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6. See Banco de España (1991).
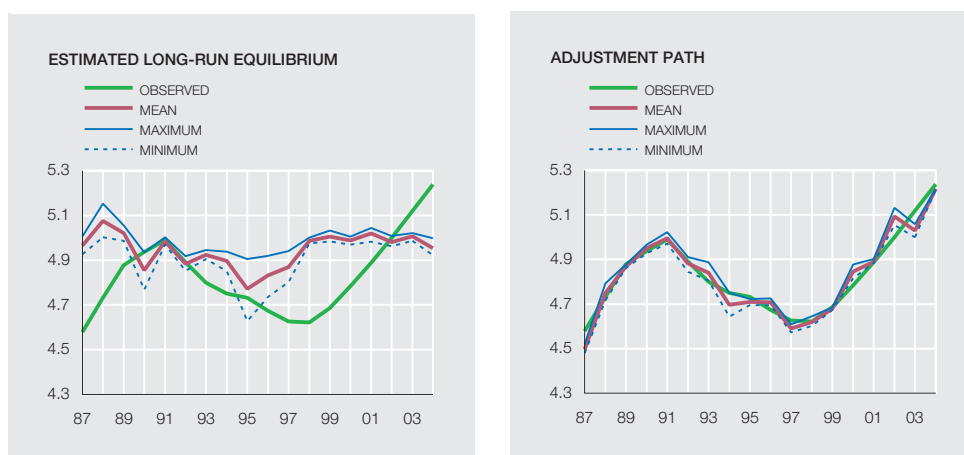
SOURCE: Ayuso and Restoy (2006).

The right-hand panel of Chart 2 likewise shows the estimated mean, minimum and maximum ratios corresponding to the adjustment paths. In this case, the three series are much closer together and, therefore, the consideration of alternative models does not appear to question the conclusion that deviations from the equilibrium value are in step with those that would be expected in the light of the adjustment patterns exhibited by prices in this market in other episodes.

In sum, these results do not support the equilibrium or bubble hypothesis. On the contrary, they tend to reinforce the initial conclusion that the Spanish property market situation (at end-2004) was characterised by an overvaluation of housing compatible, therefore, with a gradual absorption of the discrepancy encountered between observed prices and those explained by their long-term fundamentals.

The influence of tax   In the formulation and subsequent estimation of the models discussed in the previous section, no explicit consideration has been given to the different taxes that have a bearing on the ratio of house prices to rents. The notable heterogeneity in the tax treatment of individual agents is a virtually insurmountable obstacle to an accurate analysis of the influence of taxation on equilibrium prices in this market.

However, a recent paper by García Vaquero and Martínez Pagés (2006) provided an estimate of what we might call the "net total tax" on housing that different standard Spanish households incur, defined on the basis of characteristics such as property ownership or rental status, among others. Drawing on this information, it is possible to redefine the equations derived from the different models considered so as to incorporate this total net tax and thus analyse its influence on the ratios estimated, under different assumptions. As explained in detail in the working paper summarised here, this process allows modified valuation rules to be obtained in which a new term emerges that depends directly on the tax wedge introduced by the taxation arrangements for house and rental prices.

This new term, however, is not statistically significant in any of the four models considered. Moreover, when the effects (while not being significant) of the total net tax on the calculation of the estimated equilibrium and adjustment ratios are included, the changes in the ratios are minimal: the observed prices ratio continues to hold (on average for the four models) at 28% above the first ratio, and it is 2% greater than the second.

Accordingly, the taxation of housing, even though it has probably affected the mean ratio of house prices to rents, does not appear to have exerted an appreciable influence on the latest expansionary behaviour of this ratio. Consequently, it does not seem likely either that the explicit non-consideration of taxes influences the conclusion whereby, of the three possible situations discussed in the introduction, the estimated models suggest that the most plausible is that of an overvaluation of housing.

Conclusions

Analysing the property market is a complex exercise that has to address the limitations of the quantitative techniques currently in use, against the background of the shortage of statistics on relevant variables and the scant length and uniformity of the price time series for these assets. Consequently, as seen in this and other related papers, we cannot reasonably aspire to evaluate accurately the extent to which the property inflation observed in recent years is due to the marked changes our economy has undergone. Accordingly, forecasts of the future course of house prices are inevitably prone to a high degree of uncertainty.

Nonetheless, it seems reasonable to attempt to set limits on this uncertainty through the adoption of a pragmatic methodological approach that consists of identifying common features in the results obtained from the application of alternative formal frameworks. The analyses available may, therefore, be a useful guide for evaluating the general market situation which, in turn, may enable future scenarios that prove more likely to be identified. In this respect, the article shows at least three conclusions that appear to offer an appreciable degree of robustness. First, the marked increase in house prices since the late 90s involves, in part, the correction of the prevailing undervaluation of this asset in the period immediately before. Second, econometric analyses support the hypothesis of an overvaluation of property in recent years that is compatible with the habitual adjustment path of a market subject to notable rigidities preventing the immediate response of supply to changes in demand. Third, the evidence available does not support the hypothesis that the recent market boom is due to widespread speculative behaviour or to the favourable tax treatment of owner-occupied housing.

On the basis of the foregoing, the most likely future scenario is one of a gradual absorption of the overvaluation existing in this market. The likelihood of this scenario, however, is not independent of the degree of persistence of unusually high house price growth rates, since these may ultimately take root in expectations and encourage speculative behaviour. Admittedly, the methodological change to the official statistics does not, so far, allow for a rigorous extension of the valuation exercises conducted beyond 2004 Q4. But the slowdown observed since then appears, in any event, to be consistent with a gradual move in property values towards levels more compatible with their long-run fundamentals.

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