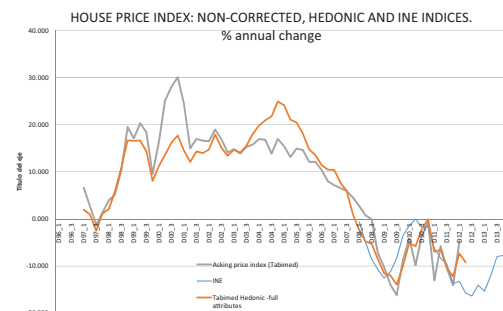
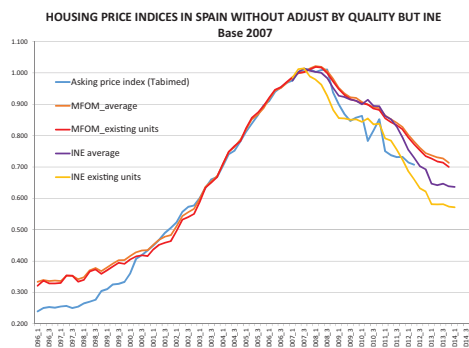


Supplementary material

A RE-ASSESSMENT OF HOUSE PRICE INDICES:
EVIDENCE FROM THE SPANISH MARKET

Paloma TALTAVULL DE LA PAZ, Stanley McGREAL



Note: The figure represents the official house price indices in Spain: the one built from the Spanish Statistical Institute (INE) and the one built from the Ministry of Fomento (MFOM). INE index is hedonic based using size, number of rooms, location and whether or not the house is new or used as attributes. Location is the main variable determining the index value. MFOM index is weighted index estimated from the lower area level, that is, cities and provinces, and including also the main attributes to segment prices.

Figure S1. House Price index non quality adjusted (but INE)

Table S1. Basic statistics

	Variable	Mean	Median	St. deviation	Description
	Year/quarter	2003.7	2004	3.58	
	UD	2.46	2.000	0.93	Urban dependence. 4 categories (D = dependent, i = independent, CC = county capital, CP = province capital)
	prov2	20.76	19	16.87	Province where the house is located
	Phask	148480.7	134000	98561.3	Asking prices
City (7)	PD	2.53	3.00	0.54	Density of population in the city (L = low, M = medium, H = High)
	Pdev	3.56	3.00	1.07	Population development (s = stopped, + slow, m = mean, f = fast, renovation, f = full)
	PGR	1.75	2.00	0.48	population growth in the city (n = negative, s = stable, p = positive)
	P	233906.8	40575.0	815015.70	Total population in the city
	Eco	4.11	5.00	1.33	Economic activity in the city/neighbourhood (a = agric, i = industry, s = tourism + services, m = multiple)
	UENV	2.98	3.00	0.16	Urban environment: urban area in rural, medium or urban (1 = rural, 2 = suburb, 3 = urbano)

	Variable	Mean	Median	St. deviation	Description
Neighborhood (12)	Inc	4.25	4.00	0.67	Income level in the neighbourhood where the house is located (l = very low + low, m = medium.low + mean + mean-high, h = high + very high)
	Resarea	1.30	1.00	0.69	Use of houses in the area: 1 = 1st residen, mix = mix, 2 = 2nd residence
	Con	85.80	90.00	15.22	Urban consolidation measuring the lack of some infrastructures or urbanization in the neighbourhood
	URR	13.28	10.00	17.00	Urban renewal in infrastructure, building and equipment
	Qroad	2.96	3.00	0.27	Quality of road network in the neighbourhood (b = bad, G = good, vg = very good)
	Qw	2.44	2.00	0.50	Quality of water system (b = bad, G = good, vg = very good)
	Qlig	5.44	5.00	0.51	Quality of urban lights (b = bad, G = good, vg = very good)
	Qsh	4.17	4.00	0.98	Quality of shopping area (b = bad, p = poor, G = good, vg = very good)
	Qschool	3.95	4.00	0.79	Quality of school in the area (b = bad, p = poor, G = good, vg = very good)
	Qchurch	3.95	4.00	0.77	Quality of religion infrastructure (b = bad, p = poor, G = good, vg = very good)
	Qleis	3.92	4.00	0.77	Quality of leisure facilities (b = bad, p = poor, G = good, vg = very good)
Qhealth	3.93	4.00	0.79	Quality of health facilities (b = bad, p = poor, G = good, vg = very good)	
Accessibility (3)	Bus	4.16	4.00	0.81	Bus stop nearby (N = there isn0t, Y = yes, there is nearby)
	Train	1.23	2.00	0.95	Train stop/station nearby (N = there isn0t, Y = yes, there is nearby)
	Und	0.29	0.00	0.92	Underground station nearby (N = there isn0t, Y = yes, there is nearby)
House (12)	TB	1.49	1.00	0.81	Type of building (apart = apartment, Detach = detach house, DHGAR = single family house)
	Dwel	17.96	12.00	25.56	Total dwellings in the building where the house is located
	Lift	0.84	1.00	0.92	Number of lift in the building where the house is located
	Age	8.03	4.00	10.36	Age of the house, number of years since it was built
	Qshop_n	4.15	5.00	1.14	Quality of shop facilities in the neighborhood close property (b = bad, p = poor, G = good, vg = very good)
	Inc_t	4.24	4.00	0.63	Income in the building where the property is located (l = very low + low, m = medium.low + mean + mean-high, h = high + very high)
	PD_t	2.54	3.00	0.53	Population_density in the neighbourhood (L = low, M = medium, H = High)
	Ori	4.96	6.00	2.30	Orientation in main front of the house (b = bad, g = good, vg = very good)
	Vi	2.41	2.00	0.79	View quality from main front of the house (b = bad, p = poor, G = good, vg = very good)
	ConQ	3.93	4.00	0.79	Construction quality of the house (p = poor, n = normal, G = good, vg = very good)
	m ²	102.51	100.00	36.46	m ² number of square metres of the house
m ² _O	8.64	0.00	952.58	m ² other areas like garden, patio, balcony	
Variables	38				
N	3,363,562				

Table S2. HD model for Alicante

	Urban level	1. Dependent urban area			2. Autonomous city			3. County capital			4. Province capital		
<i>var dep: Log of asking prices</i>		β	<i>t-est</i>	<i>p_value</i>	β	<i>t-est</i>	<i>p_value</i>	β	<i>t-est</i>	<i>p_value</i>	β	<i>t-est</i>	<i>p_value</i>
	constant	6.018	264.95	***	6.397	673.00	***	4.671	326.55	***	5.451	179.15	***
City (7)	PD	0.058	19.34	***	0.020	26.39	***	-0.050	-34.28	***	-0.036	-23.91	***
	Pdev	excl			excl			excl			excl		
	PGR	0.059	28.38	***	0.046	62.15	***	0.064	56.96	***	0.112	28.34	***
	P (logs)	0.000	-0.65		0.000	0.00		0.109	129.83	***	0.000	0.00	
	Eco	0.012	13.74	***	0.032	135.46	***	0.015	24.99	***	0.012	7.74	***
	UENV	0.146	99.87	***	0.043	85.49	***	0.064	37.62	***	0.153	86.90	***
Neighborhood (12)	Inc	0.021	13.75	***	0.047	77.50	***	0.052	65.58	***	0.086	104.77	***
	Resarea	-0.012	-16.89	***	-0.088	-323.04	***	-0.112	-157.60	***	-0.027	-17.17	***
	Con	0.001	22.77	***	0.001	49.92	***	0.000	9.52	***	0.001	10.25	***
	URR	0.001	6.24	***	-0.001	-31.95	***	-0.001	-18.99	***	0.000	-3.00	**
	Qroad	0.037	12.18	***	-0.017	-12.98	***	-0.068	-25.59	***	-0.049	-9.12	***
	Qw-pipe	-0.046	-10.05	***	-0.087	-41.68	***	0.026	10.42	***	-0.025	-5.66	***
	Qlig	0.025	11.71	***	0.016	17.87	***	-0.013	-7.72	***	0.004	1.59	
	Qsh	0.005	4.94	***	0.007	15.06	***	0.025	35.85	***	0.037	39.09	***
	Qschool	-0.005	-4.04	***	-0.021	-22.69	***	0.041	14.28	***	-0.008	-1.91	*
	Qchurch	-0.016	-15.51	***	0.003	3.20	***	-0.037	-15.89	***	0.036	7.67	***
	Qleis	0.026	20.95	***	0.012	10.76	***	0.016	4.34	***	-0.001	-0.41	
	Qhealth	0.012	10.26	***	-0.018	-19.33	***	0.007	2.64	**	-0.031	-7.54	***
Accessibility (3)	Bus	0.003	5.46	***	0.010	26.20	***	0.007	6.55	***	-0.011	-5.64	***
	Train	0.008	6.09	***	0.009	26.04	***	0.028	23.03	***	0.033	33.09	***
	Und-Tram	0.000	0.03		-0.001	-0.45		-0.005	-1.98	*	-0.008	-2.79	**
House (12)	TB	0.068	57.75	***	0.081	207.20	***	0.118	120.74	***	0.043	51.29	***
	dwel	-0.002	-32.64	***	-0.001	-48.37	***	0.000	0.26		-0.001	-36.95	***
	lift	0.019	12.58	***	0.016	38.26	***	0.062	86.72	***	0.052	88.75	***
	age	-0.010	-84.12	***	-0.010	-315.58	***	-0.011	-209.09	***	-0.006	-110.61	***
	Qshop_n	-0.005	-4.57	***	0.015	41.01	***	0.028	56.02	***	0.043	57.00	***
	Inc_t	0.054	32.71	***	0.072	112.82	***	0.099	116.90	***	0.091	105.31	***
	PD_t	0.058	19.34	***	0.020	26.39	***	-0.050	-34.28	***	-0.036	-23.91	***
	Ori	0.005	19.25	***	0.006	53.13	***	0.003	16.66	***	0.004	19.35	***
	Vi	0.041	36.14	***	0.037	86.65	***	0.031	41.12	***	0.019	25.55	***
	ConQ	0.047	33.97	***	0.037	82.67	***	0.040	57.97	***	0.046	67.50	***
	m2	0.757	338.54	***	0.767	769.53	***	0.878	464.85	***	0.831	456.58	***
	m2_O	excl			excl			excl			excl		
	Adj R2	0.87			0.88			0.87			0.890		
	Σe^2	0.22			0.19			0.21			0.207		
	F	74901	***		7064	***		41699	***		18508	***	
	N	94009			212097			84734			87578		

Tolerance and VIF test indicates the absence of colineality

Non-standardized betas, Time dummies parameters have been deleted to reduce the table size. They are represented in Figure 1

*** p-value < 0.001, ** p-value < 0.01, * p-value < 0.05

Table S3. Zivot-Andrews test for breaking points in attributes categories^N

Variable/ category	Zivot-Andrews test			Year of break	Variable/ category	Zivot-Andrews test			Year of break	Variable/ category	Zivot-Andrews test			Year of break
UD_D	-4.86	*	(1)	2002	URR_95	-6.04	***	(1)	2005	Qshop_n_go	-5.40	**	(1)	2005
UD_I	-6.82	***	(1)	2005	Qroad_g	-6.81	***	(1)	2005	Qshop_n_VG	-6.54	***	(1)	2002
UD_CP	-5.96	***	(1)	2004	Qroad_vg	-5.64	***	(1)	2006	Inc_t_L	-7.00	***	(1)	2004
PD_h	-7.96	***	(1)	2005	Qw_B	-12.19	***	(1)	2001	Inc_t_A	-6.25	***	(1)	2005
Pdev_m	-6.90	***	(1)	2005	Qw_G	-6.33	***	(1)	2005	Inc_t_H	-5.27	**	(1)	2005
PGR_s	-7.72	***	(1)	2005	Qlig_G	-6.88	***	(1)	2005	PD_t_H	-7.96	***	(1)	2005
PGR_p	-6.12	***	(2)	2005	Qlig_VG	-5.50	**	(1)	2006	Ori_W	-5.11	**	(1)	2005
P_5	-6.75	***	(2)	2002	QSH_B	-5.47	**	(1)	2007	Ori_VG	-6.63	***	(1)	2004
P_75	-7.74	***	(1)	2000	QSH_P	-7.88	***	(1)	2005	Vi_P	-6.14	***	(1)	2005
P_95	-6.68	***	(1)	2006	QSH_VG	-6.34	***	(1)	2005	Vi_G	-4.96	*	(1)	2002
P_99	-5.97	***	(1)	2006	QLeis_P	-5.63	**	(1)	2002	Vi_VG	-6.86	***	(1)	2004
Eco_S	-5.87	***	(1)	2005	QLeis_G	-6.14	***	(1)	2005	ConQ_N	-7.26	***	(1)	2005
Eco_M	-6.44	***	(1)	2005	QLeis_VG	-5.93	***	(1)	2005	m2_5	-16.81	***	(1)	2005
UENV_95	-6.04	***	(1)	2005	Train_N	-4.97	*	(1)	2005	m2_25	-10.64	***	(1)	2005
Inc_L	-7.00	***	(1)	2004	Train_Y	-6.76	***	(1)	2005	m2_75	-64.60	***	(1)	2004
Inc_a	-6.25	***	(1)	2005	Und_N	-6.40	***	(1)	2005	m2_95	-5.20	**	(2)	2010
Inc_H	-5.27	**	(1)	2005	Und_Y	-7.62	***	(2)	2005	m2_99	-10.41	***	(1)	2007
Resarea_1	-6.94	***	(1)	2005	TB_Apart	-7.67	***	(1)	2005					
Con_95	-5.68	***	(1)	2004	dwel_5	-8.90	***	(1)	2005					
Age_75	-4.73	*	(2)	2008	dwel_25	-7.67	***	(1)	2004					
Age_95	-5.15	**	(1)	2005	dwel_99	-5.00	*	(1)	2004					
Tests Critical values:		Critical at 1%	Critical at 5%		Critical at 10%									
	(1)	-5.57	-5.08		-4.82									
	(2)	-5.34	-4.93		-4.58									
^N Only attributes with statistically significant test are reported. The full results are available under request														
*** p < 0.01														
** p < 0.05														
* p < 0.1														

Note: The variables are tested in every one category. They are named with the variable nick-name as listed in Table 1 followed by the category (also provided in Table 1) if the variable is categorical, or the percentile if the variable is continuous. For instance, P_dev is break down in P_dev_s (slow population development), P_dev_m (mean), P_dev_f (fast development or renovation) and P_dev_f (full). Dwel (number of dweelings in the building) is break down in dwel_5 (5% of the distribution), dwel_25 (25% of distribution) and so on.