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HOUSE PRICES AND HOUSING WEALTH IN ITALY

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HOUSE PRICES AND HOUSING WEALTH IN ITALY

by Luigi Cannari, Ivan Faiella*

Abstract

In Italy there is no official source of information on house prices. Data on this phenomenon are collected by means of a semi-annual survey of real estate agents (“Il Consulente immobiliare” - CI survey) from a large but non-representative sample of Italian municipalities. Information on the same issue is available from the Bank of Italy’s Survey of Household Income and Wealth (SHIW), that gathers housing data from a small, representative, sample of Italian households. In this paper we present a method for estimating the price per squared meter of the average Italian house - resorting to the CI survey of real estate agents - and compare the results to SHIW estimates. According to our results, SHIW estimates for 2002 turn out to be very close to market values, after adjusting the survey of real estate agents for its under-representation of small and non-tourism municipalities. We then compare SHIW estimates to Census data, showing that the survey overestimates the average surface of houses while it strongly underestimates the number of secondary dwellings. Overall, in 2002 SHIW housing wealth is about 20 per cent lower than macroeconomic estimates. The adjustment for underreporting and non reporting of dwellings brings about changes in the share of home-owners and the ratio of housing wealth to total net worth; from a qualitative point of view the profiles of these shares by income deciles show minor changes after the adjustment. The Gini index of housing wealth remains almost unchanged.

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1. Introduction¹

Housing wealth constitutes a significant share of household wealth and housing-related expenses are an important part of household expenditure. House-price dynamics are a key factor in the process of reallocation of household wealth (Davies and Shorrocks, 1999), in interacting with financial asset prices (Sutton, 2002) and conditioning labour mobility (Cannari et al., 1997).² This central role notwithstanding, in most industrialised countries statistics on house prices and housing wealth are not readily available (Kennedy and Andersen, 1994; Kneeshaw, 1995; Muzzicato et al., 2002).³ This informative gap is especially annoying for countries, such as Italy, where households' preference for housing wealth is high (Brandolini et al., 2002; Faiella and Neri, 2004), due also to the marked orientation of Italian households for owner-occupation (Paiella, 2001; Di Addario, 2002).

In Italy, official estimates are not available at macroeconomic level; the micro-level data on family holdings of tangible assets have been gathered since the 1960s in the Bank of Italy's Survey of Household Income and Wealth (SHIW) and constitute a substantial source of information on housing, although survey data are affected by under-reporting of dwellings (Cannari and D'Alessio, 1990). Some recent studies present estimates of Italian housing assets, mixing this source of information with estimates from the National Accounts and other data (Brandolini et al., 2002; Cannari et al. 2004).

The present paper aims to estimate the value of dwellings at both micro and macro level in Italy in 2002, by geographical area. Estimates of the market value of house prices obtained from a private source, "Il Consulente Immobiliare", are presented and compared with the implicit prices obtained from the SHIW. Subsequently, an appraisal of the total

¹ We wish to thank Claudia Biancotti, Andrea Neri, Giovanni D'Alessio and Massimo Omiccioli for their valuable suggestions; we are also grateful to Salvatore Muzzicato for providing us with the MSZ series. The views expressed are those of the authors and do not necessarily reflect those of the Bank of Italy. E-mail: luigi.cannari@bancaditalia.it, ivan.faiella@bancaditalia.it.

² The different dimensions and roles of housing wealth (as an "Equalizer", an "Accumulator", a "Cultivator" and a "Protector" of Household Wealth) are analyzed in Xiao Di (2001).

³ Nonetheless the importance of this information is widely recognized. In a recent speech delivered at the Second ECB Conference on Statistics, the President of the ECB remarked that "[...] the ECB attaches great importance to improving further the availability, timeliness and other qualities of the Principal European

surface derived from estimates based on the preliminary figures of the 2001 Italian census are used to evaluate housing assets by geographical area, and these amounts are compared to SHIW figures. Finally the main conclusions are drawn.

2. House prices

Estimates based on market transactions

In Italy, as in many other industrialised countries, there is no official source of information on house prices. Data on house prices are collected regularly by two private sources: *Nomisma*, an economic think-tank, publishes a semi-annual national index of house-prices (“Osservatorio sul mercato immobiliare”); “Il Consulente Immobiliare”, an industry-related review published by *Il Sole 24 Ore* media group, gathers information on actual sales of new and recently built (not older than 35 years) houses from real estate agents in more than 1,000 Italian municipalities.

As underlined by Muzzicato et al. (2002), while the former source may be preferable for aggregate analysis, due its more homogeneous methodology over time, the latter has the advantage of a deeper geographical coverage. Giving that the determinants of house prices mainly operate at local level (ECB, 2003), we chose to use “Il Consulente Immobiliare” (CI).

In the second half of 2002, CI collected data on house prices in 1,234 - out of 8,101 - Italian municipalities⁴; 56 per cent of Italian dwellings are located in the surveyed municipalities (table 1). The CI survey is not based on a random sample. It collects data in the most important municipalities, while small ones are likely to be selected according to the thickness of the market of secondary dwellings (i.e., vacation homes).

For each municipality CI gathers information on the prices of dwellings sited in three locations: town center, outskirts, between outskirts and town center. For the towns that are

Economic Indicators and to receiving more elaborate and consistent euro area statistics for assessing and analyzing productivity changes, for service activities and for housing, including house prices.”, Trichet (2004).

⁴The 103 towns head of province are always included in the CI sample.

head of province CI collects data on prices of new houses and recently built houses; for the other municipalities house prices are collected for new (or completely renewed) houses only.

Table 1

**COVERAGE OF THE CI SAMPLE: MUNICIPALITY AND TOTAL DWELLINGS
(2002)**

Municipality Size	Covered by the CI Sample		Not covered		Total	
	Dwellings (per cent)	Municipalities	Dwellings (per cent)	Municipalities	Dwellings (per cent)	Municipalities
Under 20,000 inhabitants	13	878	39	6,757	52	7,635
From 20,000 to 40,000 inhabitants.....	10	198	4	91	13	289
From 40,000 to 500,000 inhabitants....	22	152	2	19	23	171
More than 500,000 inhabitants.....	11	6	-	-	11	6
Total.....	56	1,234	44	6,867	100	8,101

Source: CI data. Data on dwellings are based on preliminary estimates of the 2001 Census.

Our macroeconomic estimates rely on these data and are computed according to the following method: first we estimate an average house price for each municipality, averaging the three prices by location based on the share of households living in each location; the shares of households are estimated resorting to the SHIW, classifying municipalities in 4 classes according to their size in terms of resident population.

Using the coefficients provided by CI, we then compute the ratio of the average price of recently built houses to the average price of new and completely renewed houses, and use this ratio (equal to 0.87) in order to downscale house prices in towns that are not head of province.⁵

Thus, all our estimates are based on the prices of recently built houses (i.e., not older than 35 years). We believe that these prices are good proxies for the average value of the whole stock of houses, because new houses represent a minor share of the whole stock, while houses older than 35 years are likely to have been renewed in the subsequent years (and their prices will not differ very much from those of recently built houses)⁶.

⁵ In detail, we computed the ratio of the average value per squared meter of recently built houses to that of new houses - equal to 0.77 -and inflated it by the 13 per cent (a CI coefficient) to account for the fact that in the towns not head of province CI prices are collected for new or completely renewed abodes.

⁶ Pooling several waves of the SHIW, we verify that the average price of recently built houses is the 99 per cent of the average price of the whole stock of houses.

Finally, we impute the house prices for the 6,867 municipalities not covered by the CI survey, using the following regression model, estimated on the 1,234 CI survey units:

$$(1) \quad P_i = \alpha_p + \beta_1 DIM_i + \beta_2 TOU_i + \varepsilon_i,$$

where P_i is the average house price for the i -th municipality, α_p is a fixed effect at the provincial level⁷ and DIM_i and TOU_i are categorical variables at the municipality level, respectively containing information on the population size of the municipality and on the share of firms operating in the tourism industry; ε_i is an error term. Estimates are weighted by the number of dwellings per municipality according to the 2001 census (table 2).⁸

Table 2

**ESTIMATES OF THE HOUSE PRICES
(PER SQUARED METER) ON THE CI DATABASE
(2002)**

	Parameter Estimates ⁽¹⁾	Standard Errors ⁽²⁾	t Value	Pr > t
Intercept.....	2,738	321.81	8.51	<.0001
Share of units operating in the tourism industry				
Less than 5 percent.....	-959	113.54	-8.45	<.0001
From 5 to 10 percent	-838	112.55	-7.45	<.0001
From 10 to 20 percent	-391	138.69	-2.82	0.006
<i>More than 20 percent</i>		<i>Base case</i>		
Size of the municipality				
Less than 20,000 inhabitants	-1,093	298.14	-3.67	0.001
From 20,000 to 40,000 inhabitants	-913	297.08	-3.07	0.003
From 40,000 to 500,000 inhabitants	-681	283.10	-2.41	0.019
<i>More than 500,000 inhabitants</i>		<i>Base case</i>		
Number of Observations	1,233 ⁽³⁾	Sum of Weights	14,838,209	
Adj. R-square	0.7202	Root MSE	367	(Denominator DF 76)

Source: our calculations on the CI database.

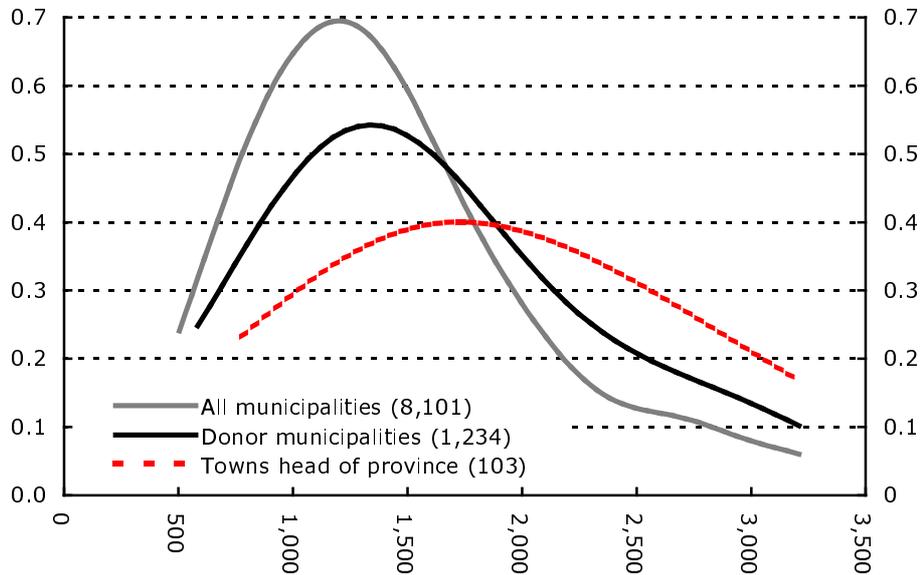
- (1) Fixed effects at the province level not shown in the table. - (2) Robust standard errors clustered at the province level. - (3) One extreme observation was zero-weighted.

⁷ We used a regional fixed effect when the cell of donors contained less than 10 observations.

⁸ To test the out-of-sample predictive power of equation (1), a similar regression was estimated on SHIW data at municipality level. The SHIW regression presented the same covariates of equation (1) plus a dummy indicating if the SHIW municipality was not covered by CI (of the 344 SHIW municipalities surveyed in 2002, 112 were not covered by CI). The coefficient of the dummy was not statistically different from zero (p-value=0.5128).

Figure 1

**DISTRIBUTION OF HOUSE PRICES:
ORIGINAL AND RECONSTRUCTED VALUES**
(euros per square meter, 2002)^(*)



Source: our calculations on the CI database.

(*) Non parametric estimation techniques. A normal function is used as kernel and the bandwidth is selected following a criterion that approximately minimises the asymptotic mean integrated square error (AMISE). See Pagan and Ullah (1999), pp. 49-54.

The distribution of house prices estimated through this equation exhibits a right skewness, with a modal value of around 1,200 euros per squared meter. As shown in figure 1, prices tend to be higher in towns that are head of province than in other surveyed municipalities. In addition, house prices tend to be lower in non-surveyed municipalities; this result is due to the bias in the CI sample, that under-represent small and non tourist towns, where prices are lower.

Having reconstructed the data on house prices for the whole set of 8,101 municipalities, we are able to analyse the level of house prices at the regional level (table 3). The territorial distribution of house prices confirms the Italian dualism: in 7 out of 8 southern Regions (Abruzzo, Molise, Campania, Puglia, Basilicata, Sicily, Sardinia), house prices are lower than 80 per cent of the national average. Higher prices turn out to be

correlated with the tourism vocation of regions and the presence of the largest Italian towns (Rome and Milan above all).

Table 3

HOUSE PRICES AT REGIONAL LEVEL
(Average price per squared meter, recently built houses, 2002)

	Regions	Towns head of province	Towns not head of province	Towns head of region	
Piedmont	1,289	1,569	1,178	Turin	1,667
Valle D'Aosta	2,066	1,748	2,124	Aosta	1,748
Lombardy	1,755	2,651	1,484	Milan	3,210
Trentino A.A.	1,838	2,108	1,777	Trento	1,741
Veneto	1,583	1,893	1,494	Venice	2,455
Friuli	1,271	1,367	1,224	Trieste	1,515
Liguria	2,254	1,974	2,443	Genoa	2,043
Emilia Romagna...	1,628	1,863	1,494	Bologna	2,319
Tuscany	1,593	1,799	1,493	Florence	2,409
Umbria	1,214	1,272	1,188	Perugia	1,376
Marche	1,365	1,667	1,299	Ancona	1,627
Lazio	1,971	2,577	1,315	Rome	2,712
Abruzzo	1,136	1,234	1,115	L'Aquila	1,184
Molise	891	1,105	851	Campobasso	1,212
Campania	1,275	1,911	1,095	Naples	2,058
Puglia	962	1,261	891	Bari	1,522
Basilicata	981	1,292	919	Potenza	1,211
Calabria	823	1,022	784	Reggio Calabria	1,073
Sicily	894	1,194	776	Palermo	1,438
Sardinia	994	1,136	962	Cagliari	1,276
Geographical area					
North west	1,687	2,168	1,509		
North east	1,588	1,820	1,495		
Center	1,712	2,238	1,366		
South and Islands ..	1,014	1,358	919		
ITALY	1,436	1,898	1,259	Total	2,259

Source: our calculations on the CI database.

Estimates based on survey data

In Italy the main source of information on household housing wealth at the micro level is the Survey of Household Income and Wealth (SHIW) conducted by the Bank of Italy since 1965⁹. The sample size is of about 8,000 units per year. The basic survey unit is the *household*, defined as a group of individuals linked by ties of blood, marriage or affection, sharing the same dwelling and pooling all or part of their incomes. Institutional population is

⁹ Information is publicly available starting from 1977. The reference is to the year for which, not in which, the survey is conducted.

not included. Data are collected by means of personal interviews conducted by professionally-trained interviewers¹⁰.

The SHIW data have the merit of being representative of the whole universe of Italian dwellings owned by households or rented to households (owing to the sampling nature of this survey); they provide us with qualitative characteristics of dwellings (for instance, dwellings rated as luxury, upscale and so on, dwellings having two or more bathrooms, having independent or centralized heating system)¹¹ and make it possible to link information on dwellings to social and economic characteristics of households. On the other hand, the SHIW is affected by non-response and under-reporting; as in many other surveys wealth is underestimated, due to the high concentration of wealth and the low propensity of the wealthy to participate in the survey (Davies and Shorrocks, 1999; D'Alessio and Faiella, 2002). Therefore, the comparison between survey results and macroeconomic estimates can be useful to shed light on the quality of SHIW data.

We focused on the sub-sample of 5,679 households that own at least a dwelling (primary residence or not). Data about the value of rented houses are provided by the owners. Sampling weights were post-stratified according to the distribution of population by region, municipality size, sex and age of household head (the main income earner within the family).

In figure 2 house prices per squared meter resulting from the SHIW (with the 95 per cent confidence interval¹² and the upper bound of the bias of the estimator, i.e., the coefficient of variation of the surface estimates¹³) are compared with CI estimates.

¹⁰ Further methodological details on the SHIW are given in Banca d'Italia (2004), Brandolini (1999) and Brandolini and Cannari (1994).

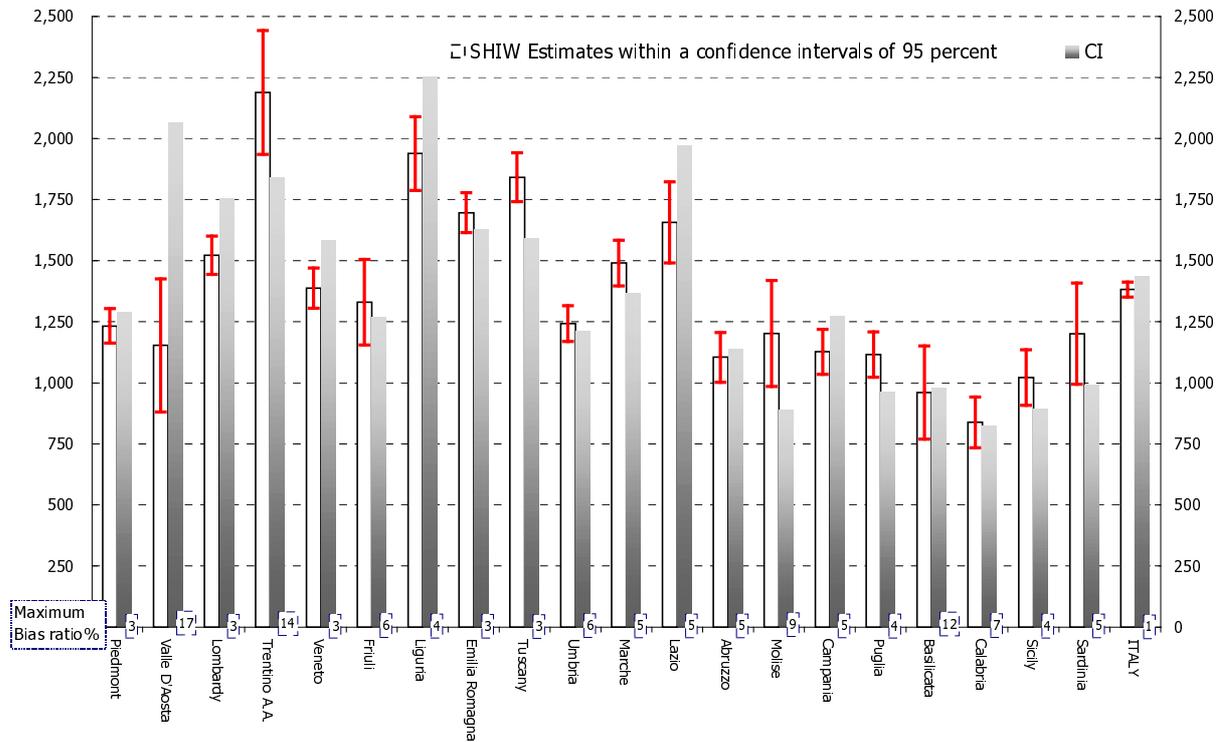
¹¹ In the SHIW, dwellings are subjectively evaluated by respondents. All interviewees are asked the following question: "In your opinion, what price could you ask for the dwelling in which you live (if sold unoccupied)? In other words, how much is it worth (including any cellar, garage or attic)? Please give your best estimate". For home-owners and tenants, the answer provides the value of their principal residence.

¹² In computing those intervals, the standard error of the ratio estimator was calculated according to SHIW sampling design.

¹³ When a ratio p of two unknown population totals is estimated by the corresponding sample totals ($p = \sum w_i v_i / \sum w_i s_i$), the resulting estimator is biased, but with an upper bound proportional to the relative variance of the estimator of the auxiliary variable (see section 5.6 of Särndal et al., 1992), i.e.

Figure 2

HOUSE PRICES: SURVEY ESTIMATES AND THEIR SAMPLING VARIABILITY
(euros per square meter, 2002)



Source: Our calculations on SHIW.

Overall, survey-based estimates seems to conform very well to CI prices. The price per squared meter of the average Italian house in 2002 is 1,382 euros according to the SHIW and 1,436 euros according to CI-based estimates (+4 per cent). The coefficient of correlation between regional series is 0.75 and the root mean square error is 271 euros per square meter. Excluding four regions that present a limited sample size in the SHIW (for Valle d'Aosta, Basilicata, Molise and Trentino there are less than 90 household surveyed in each domain)

$B(\hat{p})^2 V(\hat{p})^{-1} \leq V\left(\sum_{i=1}^n w_i s_i\right) \left(\sum_{i=1}^n w_i s_i\right)^{-2}$ the right-hand term tend to zero as sample size increases and so will do the the left-hand term (the square of the bias ratio).

the correlation coefficient rises to 0.91 and the root mean square error plunges to 174 euros per square meter¹⁴.

SHIW estimates appear to approximate CI prices well when the breakdown by location of the dwelling within the municipality is taken into consideration (table 4).¹⁵ The relative difference between SHIW point estimates and CI house prices is, on average, about +/- 5 per cent, except for houses located in the town center. In this case the average divergence is -19 per cent. This result seems to indicate that SHIW data under-represent the right tail of the distribution of house prices, probably because very rich people living in high priced houses have a lower propensity to participate in the survey

Table 4

HOUSE PRICES BY LOCATION OF THE RECENTLY BUILT DWELLINGS (euros, 2002)^(*)

	Outskirts	Between outskirts and center	Center	Total
North				
CI.....	1,337	1,616	2,075	1,645
SHIW.....	1,454	1,522	1,623	1,518
-/+ 1.96 standard errors....	1,374 - 1,533	1,461 - 1,584	1,536 - 1,710	1,474 - 1,561
Center				
CI.....	1,314	1,760	2,269	1,712
SHIW.....	1,476	1,704	1,853	1,646
-/+ 1.96 standard errors....	1,383 - 1,569	1,593 - 1,815	1,648 - 2,058	1,564 - 1,727
South				
CI.....	826	990	1,258	1,013
SHIW.....	957	1,073	1,158	1,059
-/+ 1.96 standard errors....	873 - 1,040	1,002 - 1,143	1,084 - 1,232	1,015 - 1,104
Italy				
CI.....	1,150	1,420	1,820	1,436
SHIW.....	1,305	1,396	1,474	1,382
-/+ 1.96 standard errors....	1,253 - 1,357	1,352 - 1,441	1,411 - 1,537	1,351 - 1,412

Source: our calculations on SHIW and CI database.

(*) Standard errors of ratios computed according to the sampling plan. The location of the dwelling in the SHIW is referred to the principal residence.

To better understand the factors influencing house prices we estimated a regression of the (log) price per squared meter derived from the SHIW on a set of characteristics related to the areas where households live and the quality of dwellings.

¹⁴ In those domains, the narrow size of the sample results in large confidence intervals; furthermore a high bias ratio indicates that those intervals are not fully reliable.

¹⁵ Due to the small number of observations resulting from the combination of dwelling location and region, the level of the analysis is limited at three macro-region.

Table 5

HOUSE PRICES PER SQUARE METER (HOUSEHOLD'S ESTIMATES)
(2002)^(*)

	Parameter Estimates	Pr > t	Parameter Estimates	Pr > t	Parameter Estimates	Pr > t
Intercept.....	5.969	<.0001	6.679	<.0001	6.752	<.0001
Area						
North-east.....	0.426	<.0001	0.355	<.0001	0.323	<.0001
North-west.....	0.441	<.0001	0.392	<.0001	0.366	<.0001
Centre.....	0.397	<.0001	0.358	<.0001	0.342	<.0001
South.....	0.129	0.0007	0.142	0.000	0.105	0.004
Islands.....	<i>Base case</i>		<i>Base case</i>		<i>Base case</i>	
Log of population.....	0.100	<.0001	0.089	<.0001	0.084	<.0001
Tourism prone ⁽¹⁾	0.286	0.0001	0.264	0.000	0.245	0.000
Dwelling						
Centre.....	0.089	<.0001	0.070	0.000	0.068	0.000
Outskirts.....	-0.048	0.0112	-0.042	0.021	-0.038	0.033
New house ⁽²⁾	0.216	<.0001	0.204	<.0001	0.210	<.0001
Age of the dwelling.....	0.000	0.5906	0.000	0.518	0.000	0.481
Run-down location.....	-0.253	<.0001	-0.226	<.0001	-0.228	<.0001
Low income dwelling.....	-0.364	<.0001	-0.284	<.0001	-0.274	<.0001
Log of dwelling surface.....	-0.026	0.2572	-0.173	<.0001	-0.173	<.0001
Years of residence.....	-0.002	<.0001	-0.002	0.002	-0.002	0.002
No bathrooms.....	-0.061	0.6591	-0.024	0.867	-0.029	0.831
No heating.....	-0.206	<.0001	-0.162	<.0001	-0.145	<.0001
Renewed.....	0.071	0.0090	0.023	0.372	0.025	0.321
Household - head of household						
Tenant.....			-0.073	0.001	-0.077	0.001
1 st Income class.....			-0.430	<.0001	-0.431	<.0001
2 nd Income class.....			-0.280	<.0001	-0.277	<.0001
3 rd Income class.....			-0.198	<.0001	-0.194	<.0001
4 th Income class.....			-0.116	<.0001	-0.120	<.0001
5 th Income class.....			<i>Base case</i>		<i>Base case</i>	
Male.....			0.040	0.046	0.038	0.048
Self-employed.....			0.038	0.085	0.034	0.109
Age.....			0.006	0.049	0.005	0.256
Age squared.....			0.000	0.089	0.000	0.140
Higher education.....			0.120	<.0001	0.045	0.175
HH members 1.....			0.086	0.002	0.079	0.004
HH members 2.....			0.058	0.017	0.051	0.030
HH members 3.....			0.008	0.679	0.005	0.792
HH members 4+.....			<i>Base case</i>		<i>Base case</i>	
Interview						
Duration.....					0.081	0.087
Difficulty.....					-0.049	0.235
Duration.....					-0.047	0.074
Age of the interviewer.....					0.000	0.931
Interviewer self-employed.....					0.106	<.0001
Interviewer with higher education.....					0.088	0.007
Years of general experience of the int.....					0.002	0.104
Years of SHIW experience of the int.....					-0.028	<.0001
Interviewing is the main source of income ...					-0.046	0.006
Number of Observations	8,011		8,011		8,011	
Adjusted R-square	0.3665		0.4127		0.4226	
Root MSE	0.4950		0.4766		0.4726	

Source: our calculations on SHIW.

(*) Standard errors computed according to the sampling plan - (1) More than 20 percent of local units working in tourism industry - (2) Less than 6 years-old.

As displayed in table 5, house prices tends to be higher in the North and Center than in Southern regions. They increase with municipality size and are higher in tourism-prone locations. Prices are lower when the dwelling is located in abodes with poor characteristics

or at the outskirts of the municipality. Finally, house prices per squared meter are negatively correlated with the house surface.

Including household characteristics in the set of explanatory variables, we observe that prices tend to be higher for more affluent households (probably because these households live in upscale areas and luxury dwellings) and lower for the elderly (probably because their houses are less likely to be recently renewed). Household characteristics, however, account for a small part of the total variance of house prices, at least when compared to the features of the dwelling and the area where it is located; including household characteristics, the adjusted R-squared increases from 0.37 to 0.41.

After including other controls (proxies of the quality of data), i.e., the reliability, the difficulty and the duration of the interview, the characteristics of the interviewer, the R-squared shows a minor increase (1 percentage point), while the coefficients remain unchanged. Systematic measurement error correlated with the covariates included in the regression equation (and due to interviewers' and respondents' effects) doesn't appear to be noticeable.¹⁶

House-price dynamic

In the last decade a sharp increase in house prices characterised the most developed economies. In the period 1995-2002, *The Economist* house-price index increased by 51 per cent in the US, and by 35 per cent in the Euro area (real terms changes were correspondingly 27 and 19 per cent) (The Economist, 2003). What were the house-price dynamics in Italy? To answer this question we again look at CI and SHIW data.

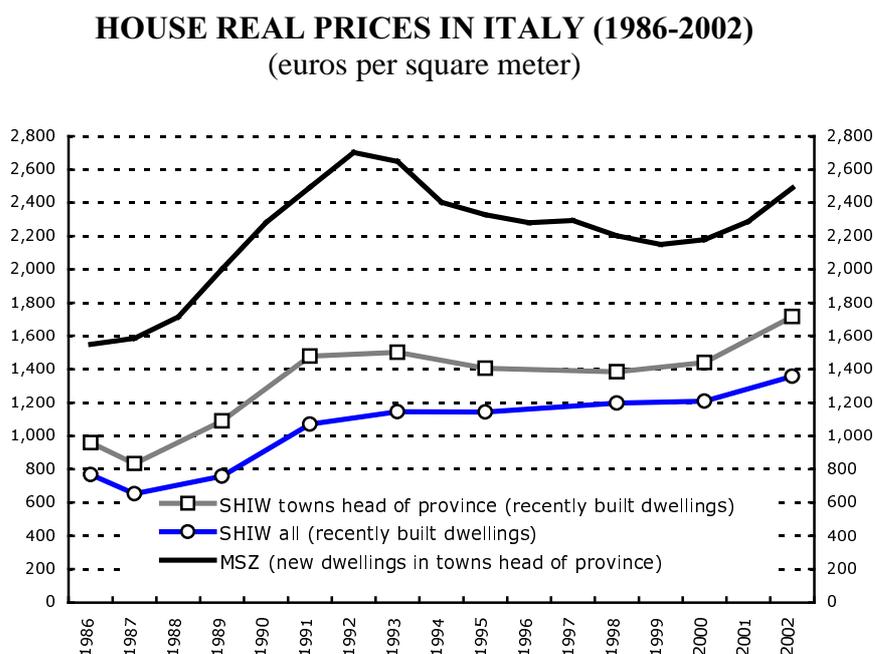
CI collects data on house prices in municipalities that are not head of province since 2000. For the preceding years, data on house prices are available only for towns that are head of province. The index estimated by Muzzicato, Sabbatini e Zollino (MSZ) and published by the Bank of Italy (2004, p. 115) relies on these data; in particular, the MSZ index is based on

¹⁶ Evaluating the extent of measurement errors in SHIW, Biancotti et al. (2004) point out that data on real estate wealth appear of good quality.

prices of new houses located in the towns that are head of province (for further details see Muzzicato et al., 2002).

As shown in figure 3, according to the MSZ index, in the towns head of province house prices (deflated by the consumer price index) increased by more than 60 per cent between 1987 and 1992; after a reduction, they exhibited little variation until mid-2000, when they reverted to a new phase of steep progression. The buoyant rise in house prices in the first years of the current decade has been favoured by several factors: the poor performance of share prices, fallen abruptly from 2000 to 2002, the low level of long-term interest rates, the tax credits for house renovation, the lengthening of the average duration of loan contracts and the increase in financing as a proportion of the value of the property.¹⁷

Figure 3



Source: Muzzicato et al. (2002) and our calculations on SHIW. Data are deflated using the CPI.

Where regional differences are concerned, house prices exhibited stronger dynamics in the North and in the Centre than in the South and Islands. Although the pattern of house prices level is geographically differentiated, intra-regional differences tend to weaken. In

¹⁷ For a general discussion on the main determinants of house prices see Fleming and Nellis (1990), Kennedy and Andersen (1994) and Tsatsaronis and Zhu (2004).

1992, when the real-estate market peaked, the variance of the average house prices among regions reached a maximum. In comparison with 1987, when house prices gained momentum, the coefficient of variation of prices had increased more than a half. The dispersion among regional house prices tended to shrink thereafter; in 1996 the coefficient of variation returned to the 1987-88 values, showing moderate changes in the following years.¹⁸

For the towns head of province, SHIW data (figure 3) draw a picture that is close to that of the MSZ index. The level of house prices is lower - because SHIW is representative of the whole stock of houses while the MSZ index is based on new houses only – but the patterns of the two series are very similar.

For the whole set of municipalities, instead, the SHIW time series is smoother and there is no reduction after 1992. These results suggest that the time variability of house prices may be higher in the towns head of province than in small municipalities. The house-price dynamic shown by the MSZ index, hence, might not be fully representative of the changes in the average house price.

Therefore, we propose a new index, based on our elaboration on 2002 CI survey, MSZ index and SHIW data. In particular we resort to the 2002 benchmark estimated on CI data: the level of house prices per squared meter in 2002 for towns head of province is set equal to 1,898 euros; that of towns that are not head of province is set equal to 1,259 euros (table 3). The time series for towns head of province is estimated backward multiplying the level of house prices in 2002 by the MSZ index; the time series for towns that are not head of province is estimated backward multiplying the level of house prices in 2002 by the respective SHIW index¹⁹. The resulting series is a weighted average of these two series, with the relative number of dwellings - according to 2001 Census preliminary estimates - as weights. Results are shown in table 6. As far as the time profile is concerned, house prices in real terms increased by almost 60 per cent between 1986 and 1992, when they reached their

¹⁸ Muzzicato et al. (2002) point out that house prices dispersion in the main towns tends to increase during market recessions; the phenomenon is evident particularly in towns head of province of the North-Center Italy. The authors focused on the variation among house price rates of change. Considering instead the variation among house price levels, the dispersion tended to reduce in the years following the 1992 peak.

¹⁹ For intra-survey years an interpolation combining SHIW and MSZ dynamics was used.

peak. Afterwards prices remained substantially stable, until 2000 when they started recovering strength.

Table 6

HOUSE PRICES: RECONSTRUCTED SERIES
(Average price per squared meter, recently built houses, 1986-2002)

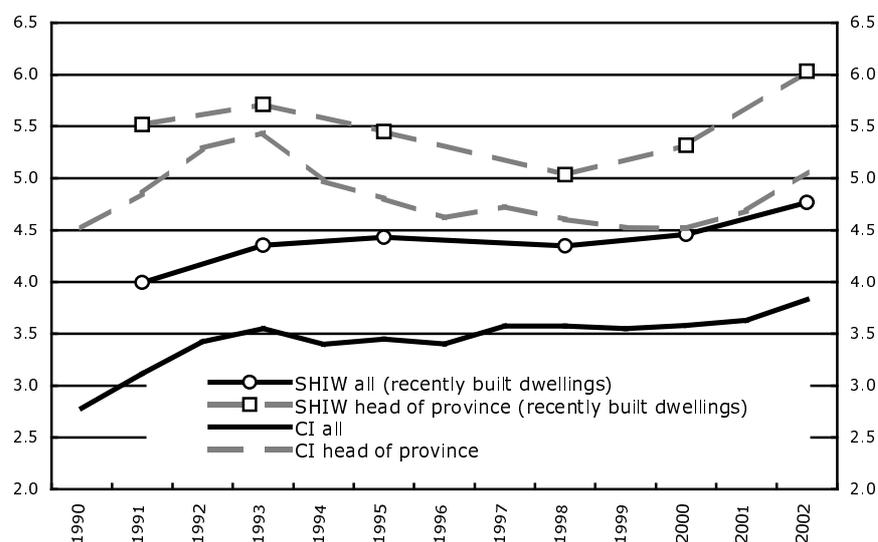
	Towns head of province	Towns not head of province	Total			
	<i>Weights according to Census 2001 (27.8 per cent of dwellings)</i>	<i>(72.2 per cent of dwellings)</i>	Nominal	Real	Nominal	Real
	<i>euros per squared meter</i>				<i>percentage changes</i>	
1986	623	382	449	841	-	-
1987	668	336	428	765	-4.6	-9.0
1988	759	356	468	794	9.2	3.8
1989	942	411	559	892	19.4	12.3
1990	1,143	536	704	1,056	26.1	18.5
1991	1,327	668	851	1,202	20.8	13.8
1992	1,515	774	980	1,318	15.1	9.7
1993	1,552	805	1,012	1,306	3.3	-0.9
1994	1,465	824	1,002	1,242	-1.0	-4.9
1995	1,494	911	1,073	1,259	7.1	1.4
1996	1,522	967	1,121	1,276	4.5	1.3
1997	1,563	1,036	1,182	1,322	5.4	3.6
1998	1,529	1,056	1,187	1,307	0.5	-1.2
1999	1,518	1,065	1,191	1,285	0.3	-1.6
2000	1,577	1,124	1,250	1,314	5.0	2.2
2001	1,702	1,170	1,318	1,352	5.5	2.9
2002	1,898	1,259	1,436	1,436	9.0	6.2

Source: our calculations on SHIW and CI.

In the towns head of province the ratio of house prices to household disposable income, after declining from almost 6 in 1992-93 to 4.5 in 2000, has shown a new phase of progression; in 2002 it is close (according to CI data) or above (according to the SHIW) to the level of the previous peak. For the whole set of municipalities the profile is smoother; even in this case, the house-price-to-income ratio in 2002 is higher than in the previous decade.

Figure 4

House prices to household disposable income ratio: 1990-2002
(percentages)



Source: Our calculations on SHIW and the CI database. Disposable income per household at the macro level is estimated using National Accounts data, at micro level is estimated using SHIW data.

3. Housing wealth in Italy

We consider the price index presented in the previous section to be the better benchmark available in order to track house prices in Italy. Therefore in this section we use this series to obtain macro estimates of housing wealth, evaluating the total dwelling surfaces owned by Italian households in 2002 and extending the results to the 1991-2002 period.

The macro estimates of the main components of housing wealth (prices, number of dwellings and average surface) are compared with those derived from the SHIW, and subsequently the time pattern of housing wealth according to the two sources is presented.

At the end of this section the distribution of housing wealth is evaluated after adjusting for the under-reporting of secondary dwelling in the SHIW.

Estimates of dwelling surface

In the previous sections we reached the conclusion that SHIW estimates of house prices compare very closely to those obtained from the CI database, when its information is correctly extended to all Italian municipalities. In this section we look at the other two components of housing wealth: the average surface of dwellings and the number of dwellings owned by households.

Information on the average surface of occupied dwellings is provided by the 1991 Population Census (2001 data on house surface are not available yet). According to the Census, the average surface in squared meters of occupied dwellings ranges from 81.6 in Val d'Aosta to 108.7 in Veneto, with a limited regional variance (the coefficient of variation is around 7 per cent). In comparison with Census data, SHIW estimates tends to slightly overestimate the size of the occupied dwellings. While the Census presents an average surface of 94.3 square meters, the same measure according to the SHIW is about 10 per cent higher.

Table 7

AVERAGE DWELLING SURFACE ESTIMATE
(squared meters, percentages)

Geographical areas	SHIW 1991			SHIW 2002			Occupied		
	Occupied	Not occupied	Total	Occupied	Not occupied	Total	Census 1991	SHIW coverage 1991	SHIW coverage 2002
	<i>square meters</i>						<i>percentages</i>		
North west	99.8	80.9	95.9	102.0	78.0	99.8	90.1	110.8	113.2
North east	113.6	90.3	111.0	117.1	79.7	113.0	102.4	110.9	114.4
Center	99.4	75.7	96.0	100.9	78.9	98.2	94.2	105.5	107.1
South	109.3	87.9	107.6	107.8	87.7	105.4	93.0	117.5	115.9
ITALY	105.6	82.6	102.4	106.8	82.1	104.0	94.3	112.0	113.3

Source: Estimates based on SHIW 1991, 2002 and Census 1991

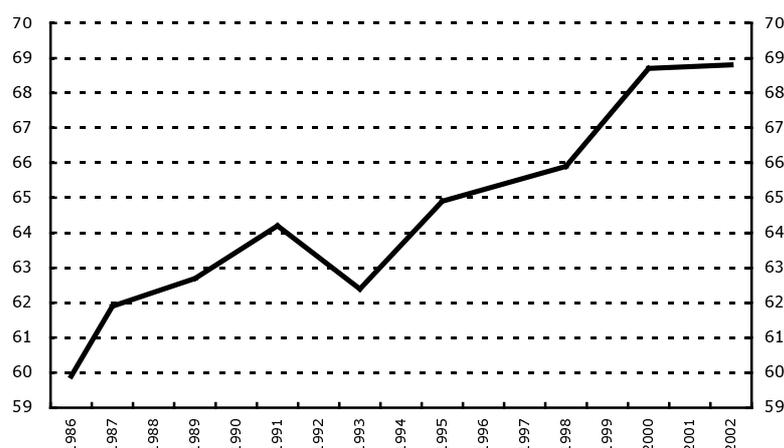
In order to assess how SHIW data estimate the number of dwellings owned by households, we have projected the 1991 Census data to 2001; the number of dwellings owned by households in 2001 is obtained multiplying the 1991 value by the rate of increase of total dwellings (whoever is the owner) estimated on 2001 Census preliminary data. The number of owner-occupied houses is estimated by multiplying the share of owner-occupied dwellings in 1991- augmented for the change in the share of households homeowners (figure

5) in the 1991-2002 period - by the number of (estimated) occupied dwellings in 2001. The number of not occupied houses is computed subtracting the number of occupied houses from the total.

As shown in table 8, SHIW estimates are affected by a severe underestimation of secondary dwellings, as pointed out by Cannari and D'Alessio (1990) and Brandolini et al. (2002), who indicate that the total number of dwellings reported in the SHIW were about 75 per cent of census estimates (both referred to 1991). For 2002 this ratio is substantially unchanged. This figure is an average of the slight under-reporting (about 16 per cent) of occupied and the severe under-reporting (about 63 per cent) of the dwellings which are not occupied.

Figure 5

HOMEOWNERSHIP IN ITALY, 1977-2002
(percentages of household)



Source: Estimates based on SHIW Historical Database version 3.1.

Table 8

SHIW COVERAGE OF DWELLINGS UNIT
(thousands of units and percentages)

Condition of dwellings	Census 1991	Census 2001	SHIW 1991		SHIW 2002	
	Dwelling units	Dwelling units	Dwelling units	Reporting rate	Dwelling units	Reporting rate
Occupied.....	17,757	19,191	14,960	84.2	16,001	83.4
<i>of which:</i> by the owner.....	13,419	15,550	13,745	102.4	14,636	94.1
Not occupied	8,909	4,510	3,409	38.3	2,080	46.1
Total	22,328	23,701	16,802	75.3	18,081	76.3

Source: Estimates based on SHIW 2002 and 1991 and 2001 Census data.

Housing wealth decomposition: macro versus survey data

An estimate of gross housing wealth (HW) can be obtained by multiplying the average house price (P) by the average surface (S) and the number of dwellings (N). This calculation has been carried out for 2002 on CI-Census data (macroeconomic estimates) and SHIW data (microeconomic estimates). As the Census does not provide us with information on the average surface of unoccupied dwellings, we imputed it by scaling down the average surface of occupied houses by 96 per cent. This ratio has been estimated on SHIW data, over the period 1989-2000.

The discrepancy between the two sources can be decomposed in its components, considering that the log of the ratio of SHIW to macroeconomic estimates can be expressed as:

$$(2) \quad (hw)^{micro} - (hw)^{macro} = (p^{micro} - p^{macro}) + (s^{micro} - s^{macro}) + (n^{micro} - n^{macro})$$

where $hw = \log(HW)$, $p = \log(P)$, $s = \log(S)$ and $n = \log(N)$.

The results of this decomposition show that SHIW data are inadequate in estimating the number of dwelling units, while average surface is overestimated and prices are close to market values (table 9). As the coverage for occupied dwelling is satisfactory, the weakness of the SHIW is concentrated in the underreporting and non-reporting of secondary dwellings.

Table 9

**DECOMPOSITION OF THE DISCREPANCIES BETWEEN
MICRO AND MACRO ESTIMATES OF HOUSING WEALTH, 2002**
(percentages)

Geographical area	Average surface	Number of dwellings	House prices	Total difference
North west.....	9.4	-26.7	-11.5	-28.7
North east.....	10.0	-21.5	-1.7	-13.1
Center.....	4.6	-19.0	-2.8	-17.2
South.....	13.1	-25.8	5.3	-7.5
ITALY.....	9.8	-23.7	-3.5	-17.4

Source: Estimates based on SHIW 2002 and 1991 and 2001 Census data.

Housing wealth in 1991-2002

We used our house price index to evaluate the time pattern of housing wealth. The stock of dwellings at constant prices for the years 1991-2002 is estimated by interpolating the Census 1991 and 2001 (preliminary) estimates with a series provided by the Italian statistical office (Istat) calculated as the variations in the stock of dwellings at constant prices. The estimates at constant prices are then multiplied by our house-price index.

According to macro estimates, in 2002 housing wealth amounted to about 3,200 billion of euros (an average value of around 150,000 euros per household). This value, based on a better price estimate, is 18 per cent lower than the one estimated by Brandolini et al. (2002). According to SHIW, housing wealth is equal to 2,700 billion of euros, 17 per cent lower than the corresponding macro estimate (table 10). Over the years the ratio of SHIW estimates to macroeconomic figures has increased from 70 per cent (in 1991) to almost 85 per cent (in 2002). This result is might be ascribed to the decrease in the number of secondary dwellings, severely under-reported in the SHIW.

Only definitive figures coming from the 2001 Census will tell us if the decrease in the number of secondary dwellings - apparent in the estimates reported in table 8 - might possibly account for this trend .

Table 10

HOUSING WEALTH IN ITALY, 1991-2002
(billions of euros, percentages)

	Housing Wealth (macro estimates) (a)	Housing Wealth (micro estimates) (b)	Ratio (b)/(a) * 100
1991	1,776	1,251	70.5
1992	2,060		
1993	2,143	1,515	70.7
1994	2,135		
1995	2,300	1,819	79.1
1996	2,417		
1997	2,562		
1998	2,587	2,023	78.2
1999	2,609		
2000	2,754	2,395	87.0
2001	2,921		
2002	3,233	2,712	83.9

Source: Estimates based on SHIW, CI and Census 1991, 2001.

Housing wealth distribution

In the previous section we have shown that the main shortcoming of the SHIW is the underestimation of secondary dwellings. In this section we evaluate how this under-representation can influence the distribution of housing wealth. To shed light on this issue we compare survey estimate to adjusted estimates.

Following the adjustment method discussed by Cannari and D'Alessio (1990) and recently applied by Brandolini et al. (2002), we correct for the under-reporting of dwellings caused by non-sampling errors. The empirical distribution of the number of houses recorded in the SHIW, excluding those where the household lives, is well approximated by a discrete Poisson distribution, identified by the parameter $\lambda_d(x)$, where x is a vector of household characteristics (including sex, age and squared age of the household head, income, squared income, place of residence, municipality size, household size, homeownership, annual dummy). Lacking more precise information, we assume that all dwellings not used as principal residence are equally likely to be declared by the owners. The probability that one of these dwellings is declared in the SHIW can then be described by the binomial distribution:

$$(3) \quad \Pr(D = d | S = s) = \binom{s}{d} p^d (1-p)^{(s-d)},$$

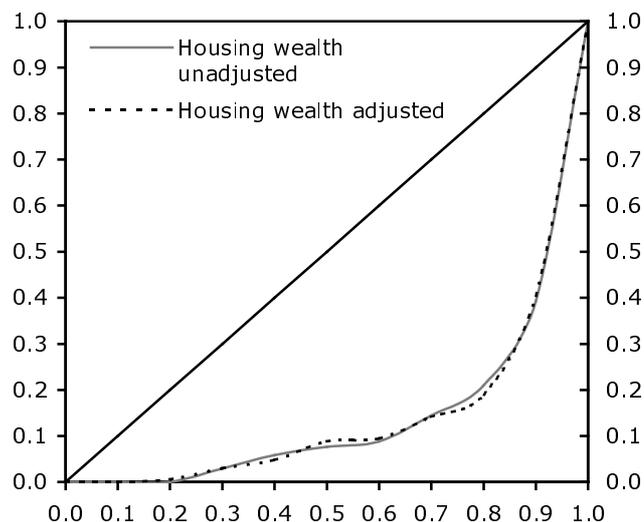
where s is the number of dwellings owned (excluding the household residence), $d \leq s$ is the number of those declared and p is the proportion of these dwellings recorded in the SHIW. Equation (3) implies that the probability distribution of houses actually owned (excluding the household residence) is the same as that of declared houses or, more precisely, it is a Poisson distribution with parameter $\lambda_s(x) = \lambda_d(x)/p$. By computing $\Pr(S = s | D = d)$, it is then possible to impute the ownership of non-reported dwellings. Characteristics and value are assigned by a hot deck method controlling for geographical area and income brackets. For each year, the proportion p is computed as the ratio of the number of dwellings owned by the households (excluding the household residence) recorded in the SHIW, after the adjustment for non-response, to the corresponding “true” figure, derived from the Census for 1991, on the basis of the average rate of growth of the number of dwellings.

Since in the SHIW respondents are requested to complete a separate sheet for each dwelling they own, failing to report certain assets is a way of reducing the questionnaire burden. The method described above – which can be seen as the equivalent of a proportional adjustment rule for a discrete variable – can account for such non-reporting behaviour, but relies on the crucial assumption that the degree of reticence of respondents is constant across socio-economic characteristics and, in particular, wealth classes. Some indirect evidence that the adjustment works satisfactorily is provided by the similarity of the distributions of rental incomes in the adjusted SHIW data and in tax returns, although it may still slightly underestimate the under-reporting of the richest households.

According to unadjusted data, the Gini index for housing wealth is equal to 0.594. The share of housing wealth held by the top ten per cent of households is 39.3 per cent. After adjusting data, the Gini index increases to 0.596 (statistically not different from 0.594) and the share of housing wealth held by the top ten per cent is 40.4: thus the adjustment process leaves the housing wealth distribution substantially unchanged (figure 6).

Figure 6

**HOUSING WEALTH CONCENTRATION:
ORIGINAL AND ADJUSTED DATA, 2002**
(percentages)

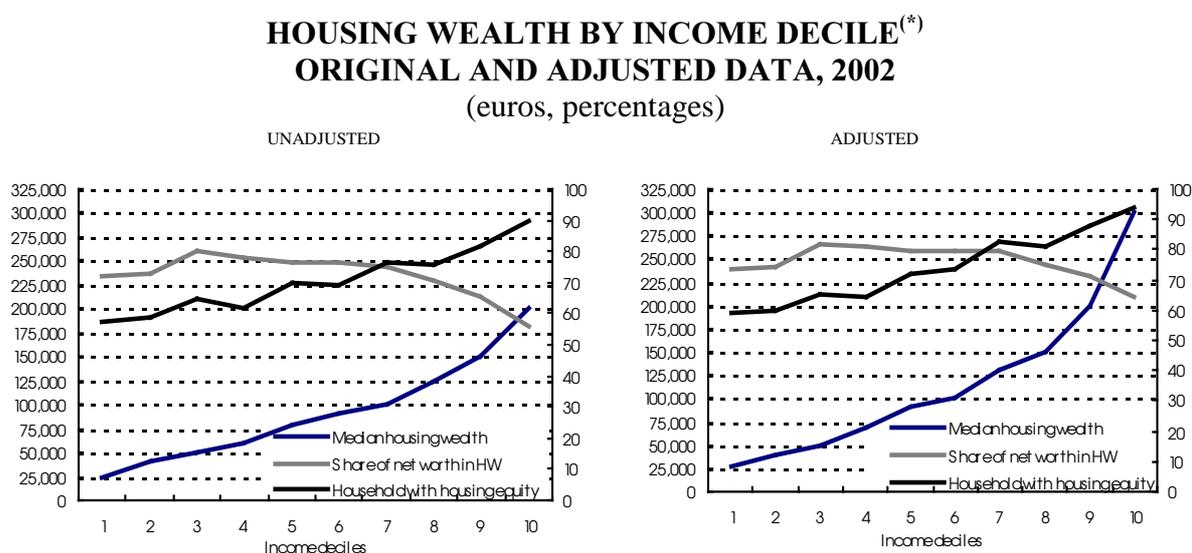


Source: Our calculations on SHIW.

Looking at the breakdown by income deciles, we see that the share of homeowners increases rapidly with income, while the ratio of housing wealth to total net worth gradually

declines after reaching a maximum in the 3rd ten per cent of households. After the adjustment, the share of housing wealth and that of homeowners increase, but the profile by income deciles shows minor changes (figure 7).

Figure 7



Source: Our calculations on SHIW.

(*) Income from dwellings is excluded.

4. Conclusions

In Italy there is no official source of information on house prices. Data on this issue for a large but non-representative sample of Italian municipalities are collected by a semi-annual survey of real estate agents. Data for a representative but small sample of households are collected by the Bank of Italy's Survey of Household Income and Wealth.

In this paper we present a method for estimating the price per squared meter of the average Italian house - resorting to the CI survey of real estate agents - and compare the results to SHIW estimates. According to our results, the SHIW estimates for 2002 turn out to be very close to market values, after adjusting the survey of real estate agents for under-representation of small and non-tourism prone municipalities.

For towns that are head of province, SHIW and CI time series on house prices show a similar pattern. For towns that are not head of province, CI data are not available; SHIW data

show a time dynamic that is smoother than the one for towns head of province, suggesting that house-price dynamics may differ across municipalities of different size. Using the 2002 CI estimates as a benchmark, the MSZ index for towns head of province and SHIW data for towns that are not head of province we compute a new house-price index, more relevant to the estimation of Italian households' housing wealth.

We then compare SHIW estimates to Census data, showing that the survey overestimates the average surface of houses while it strongly underestimates the number of secondary dwellings. Overall, in 2002 the SHIW-based housing wealth is about 20 per cent lower than macroeconomic estimates. The adjustment for under-reporting and non-reporting of dwellings brings about changes in the share of homeowners and the ratio of housing wealth to total net worth; from a qualitative point of view the profiles of these shares by income deciles show minor changes after the adjustment. The Gini index of housing wealth remains almost unchanged.

References

- Brandolini, A., L. Cannari, G. D'Alessio and I. Faiella (2002), "Household Wealth Distribution in Italy", paper presented at the 27th General Conference of the International Association for Research in Income and Wealth, 18-24 August, Djurhamn, Sweden.
- Banca d'Italia (2004), "I bilanci delle famiglie italiane nell'anno 2002", C. Biancotti, G. D'Alessio, I. Faiella e A. Neri (eds.), Supplementi al Bollettino Statistico (nuova serie), Banca d'Italia, n. 12, March.
- Biancotti, C, G. D'Alessio and A. Neri (2004), "Measurement error in the Bank of Italy's Survey of Household Income and Wealth", Banca d'Italia, mimeo.
- Cannari, L. and G. D'Alessio (1990), "Housing Assets in the Bank of Italy's Survey of Household Income and Wealth", in C. Dagum e M. Zenga (a cura di), *Income and Wealth Distribution, Inequality and Poverty*, Berlin, Springer-Verlag, pp. 326-334.
- Cannari, L., D'Alessio, G. and M. Paiella (2004), "La ricchezza delle famiglie italiane: un'analisi territoriale", Banca d'Italia, mimeo.
- Cannari, L., Sestito, P. and F. Nucci, (2000), "Geographic labour mobility and the cost of housing: evidence from Italy", *Applied Economics*, Vol.32 n.14, November, pp. 1899-1906.
- D'Alessio, G., and I. Faiella (2002), "Non-response behaviour in the Bank of Italy's Survey of Household Income and Wealth", Banca d'Italia, Temi di discussione, No. 462, December.
- Davies, J. B., and A. F. Shorrocks (2000), "The Distribution of Wealth", in A. B. Atkinson and F. Bourguignon (eds.), *Handbook of Income Distribution. Volume 1*, pp. 605-675. Amsterdam: North-Holland.
- Di Addario, S. (2002), "Italian Household Tenure Choices and Housing Demand", Banca d'Italia, Mimeo.
- Economist (The) (2003), "Survey: Property", May 29th.
- European Central Bank (2003), "Structural Factors in the EU Housing Markets", March.
- Faiella, I., and A. Neri (2004), "La ricchezza delle famiglie italiane e americane", Banca d'Italia, Temi di discussione, No. 501, June.
- Fleming, M.C., and J.G. Nellis (1990), "The Rise and Fall of House Prices: Causes Consequences and Prospects", National Westminster Bank Quarterly Review, November.
- Kennedy, N. and P. Andersen (1994), "Household Saving and Real House prices: an International Perspective", BIS, working paper n.20.
- Kneeshaw, J.T. (1995), "A survey of non-financial sector balance sheets in industrialised countries: implications for the monetary policy transmission mechanism", BIS, working paper n.25.

- Megbolugbe, I.F., Marks A.P. and M.B. Schwartz (1991), “ The Economic Theory of Housing Demand: A Critical Review”, *The Journal of Real Estate Research*, Vol. 6, No. 3, pp. 381-93.
- Muzzicato, S., R. Sabbatini and F. Zollino (2002), “I prezzi delle abitazioni in Italia: una rassegna di temi metodologici e la costruzione di un nuovo indice”, Banca d’Italia, Mimeo.
- Paiella, M. (2001), “Demand for Housing, Saving Behavior and Wealth Allocation”, Banca d’Italia, Mimeo.
- Särndal, C.E., B. Swensson and J. Wretman, (1992), “Model Assisted Survey Sampling”, Springer-Verlag, New York.
- Sutton, G. D. (2002), “Explaining changes in house prices”, *BIS Quarterly Review*, September, p.46-55.
- Trichet, J.C. (2004), “Euro area statistics and their use for ECB policy-making”, Speech by the President of the ECB delivered at the Second ECB Conference on Statistics, Frankfurt am Main, 22-23 April
- Tsatsaronis, K. and H. Zhu (2004), “What drives housing price dynamics: cross-country evidence”, *BIS Quarterly Review*, March, p.65-78.
- Zhu Xiao, D. (2001), “The Role of Housing as a Component of Household Wealth”, W01-6, July.