



Estimate of Real Estate in Italian Balance Sheets

Paola Santoro

(Italian National Institute of Statistics)

Francesca Tartamella

(Italian National Institute of Statistics)

Paper prepared for the 36th IARIW Virtual General Conference

August 23-27, 2021

Theme 12: Measurement in the Housing Market

IARIW, 36th Annual Virtual General Conference, Statistics Norway,
August 23-27th 2021

Estimate of Real Estate in Italian Balance Sheets

Paola Santoro, Francesca Tartamella

Italian National Institute of Statistics, National Accounts Department

pasantor@istat.it

tartamel@istat.it

Keywords: Real estate, net capital stock, dwellings, non-residential buildings, land, revaluations, capital gains-losses

Abstract

Real estate (residential and non-residential) accounts for about 75% of total non-financial wealth in Italy. The estimates of real estate for Italian balance sheets was a challenge and a chance to exploit the now available administrative (cadastral) data and to deepen the analysis of wealth by institutional sector.

In this paper we describe the methodological and practical approach applied in Italy to estimate the real estate value, the subsequent results in terms of value of constructions and the incidence of the value of the land underneath. We also underline the importance of administrative data but as well the need of their treatment in order to be coherent with National Accounts classification. For example how to take into account the different classification of destination of use of some units (residential versus non-residential) in the administrative archive with respect to National Accounts definitions: this can impact on their evaluation.

When real estate is estimated coherently over a sufficient time span, it is possible not only to analyse the process of accumulation of wealth over time for different institutional sectors, but also to evaluate the impact of price variation separating the effect due to changes in quality from the one due to bubbles that can have a relevant impact on prices. To do so, we present the analysis of holding gain and losses on residential units generated by price changes in the last decades. Moreover, we break down nominal holding gains into neutral holding gains and real holding gains, separating the effect due to changes in price of real estate (dwellings) and the underlying land.

Introduction¹

Since 2015, Istat disseminates estimates of the value of the main non-financial assets by institutional sector, namely dwellings, other buildings, other structures, land improvements, machinery and equipment (transport equipment, ICT, other machinery and equipment including weapons systems), cultivated biological resources, intellectual property products (research and development, software, other intellectual property products), inventories, land under cultivations. The value of the stock of consumer durables is provided too, as a memorandum item.

If we consider the value of real estate as the combined value of the building and the underlying land, it accounts for about 75% of total non-financial wealth, and in particular 95% for households.

The estimate of real estate is a challenging issue for national accountants and the results supply important input insights for the analysis of accumulation and distribution of wealth.

This paper is organized as follows. Paragraph 1 describes the methodology of estimation of real estate in Italy, which tries to exploit at its best the available information set. The choice was to estimate the combined values of dwellings and buildings other than dwellings and subsequently decompose these values by sector and into land value and net capital stock. Paragraph 2 deals instead with the issue of estimating holding gain and losses, a crucial step in the view of completing the full sequence of accounts with the accumulation accounts and opening and closing balance sheets.

¹ The views expressed in this paper are those of the authors and do not necessarily reflect the views of the Italian National Institute of Statistics. The paragraphs were authored as follows: §1.1 and 1.2 and 2 were written by P. Santoro and § Introduction, §1.3 and § Conclusions by F. Tartamella.

1 - Estimation methodology and main results

1.1 Estimation of the real estate value (residential and non-residential) for Total Economy

The choice of the methodological approaches to estimate the value of non-financial assets is strongly influenced by the organisation of the administrative system and by the availability and reliability of statistical information. In principle, SNA requires the estimate of two separate items for real estate, namely the building and the land underneath it. Therefore the choice is between a direct estimate of the combined asset and a separation ex post (with land computed as residual asset) or a separated estimate of the two assets. Istat chose to estimate the combined value, disposing of administrative and statistical data on the quantity and the market prices of real estate (and in particular of dwellings), while information on land prices (especially in densely populated area) does not always exist.

The combined value of **dwellings** is calculated by means of a ‘quantity x price approach’.

In notation:

$$CV_t = N_t \times S_t \times P_t \quad (1.1)$$

CV_t = combined value at time t

N_t = number of dwellings at time t

S_t = average surface (square metre m²) of dwellings at time t

P_t = average price per m² of dwellings at time t

The methodology is applied on an annual basis, at the regional level (NUTS-2²).

The *number* of dwellings for the years 2001 and 2011 stems from the 14th Population and Dwellings Census (2001) and the 15th Population and Dwellings Census (2011). For the extra-census years, the number of dwellings at time t is calculated by updating census data with the number of new constructions (both registered and unauthorized) estimated by using the outcomes of the ISTAT survey on building permits together with information provided by CRESME (Centre for Social and Economic Research on Construction and Territory).

The number of units is adjusted to take into account the unification of several units into one and the partition of one unit into several ones (based on cadastral data) and the number of dwellings demolished at time t.

The average surface and the average market price are both provided by the Observatory of the Real Estate Market (OMI), a Directorate of the Revenue Agency.

Average *surfaces* in square meters are derived from cadastral registers and they are intended to be gross, as they also include accessory and external areas and perimeter walls.

The average *price* per gross m² is an average market price at time t. It is computed mainly on the basis of actual purchaser’s prices of all units traded during the relevant year, included in the deeds of sale. In order to be representative of all the existing dwellings (traded and not traded in the year), these market prices are weighted by different types of residential buildings located on the territory,

²The NUTS classification (Nomenclature of territorial units for statistics) is a geocode standard for dividing up the economic territory of the EU for statistical purposes. For each EU member country, a hierarchy of three NUTS levels is established by Eurostat.

as recorded on cadastral registers, in particular taking into account their distribution (at micro-level) and their features³.

To complete the estimate, the value of units that are accessory areas of dwellings but are recorded with separate code (mainly garages and deposits) in cadastral registers is added. Their value is obtained by applying equation (1.1) to information (number, average surface and average market price) provided by OMI also for these accessory areas. The results are shown in table 1.1. Values do not include ownership transfer costs.

Table 1.1: Number (N, millions of units), average surface (S, m2) and average price per m2 (P, EUR), value of accessory area (Va, billion EUR), value of residential real estate (CV, billion EUR). Italy. Year 2001-2019.

	N	S	P	Va*	CV**
2001	27.3	109.1	996	180	3,145
2002	27.7	109.6	1,071	199	3,447
2003	28.0	110.2	1,151	220	3,776
2004	28.5	110.7	1,237	242	4,139
2005	28.9	111.1	1,326	265	4,528
2006	29.4	111.7	1,449	296	5,056
2007	29.9	112.2	1,532	320	5,452
2008	30.3	112.3	1,595	340	5,762
2009	30.6	112.6	1,588	349	5,831
2010	30.9	113.0	1,594	360	5,938
2011	31.2	113.8	1,596	371	6,041
2012	31.4	114.3	1,557	372	5,964
2013	31.6	114.6	1,509	369	5,828
2014	31.7	114.8	1,473	364	5,721
2015	31.8	114.9	1,435	359	5,605
2016	31.9	115.1	1,407	356	5,525
2017	32.0	115.3	1,388	355	5,483
2018	32.1	115.6	1,374	355	5,457
2019	32.3	115.8	1,363	355	5,446

* Va = Value of accessory areas

**CV = (N x S x P)+Va

The estimates of the stock of dwellings obtained through the direct approach include by construction the value of underlying land: as a matter of fact, land and any structure connected to it are typically sold together in a single transaction and therefore market prices refer to this combined asset.

As to **buildings other than dwellings**, the methodology hinges upon on the availability of suitable information, which, in turn, is strictly connected to the type of non-residential units.

It is possible to identify two groups (in notation, NRB1, NRB2):

³ Since 2010 Istat publishes regularly a RPPIs index (IPAB), referred to dwellings acquired by households. As long as the distribution of transactions by stratum is not representative for the stock distribution, the use of the index IPAB for stocks evaluation would give a bias due to a compositional effect and therefore it is not used.

NBR1= offices, shops, arts and crafts workshops, garages and deposits,

NBR2= factories, hotels, banks, shopping centres, hospitals, barracks, public offices, schools, museums.

For Non-residential buildings included in NRB1, the value is estimated through a “direct procedure”, as for dwellings (equation 1.1), on the basis of information (number, surface, price) provided by OMI.

Administrative and statistical classification do not always overlap: to use administrative data for statistical purposes it is important to study the legislative-fiscal requirements and classifications that originate data included in administrative archives and to operate the necessary re-classification to adapt to the necessary statistical codification. An example in this domain attain the number of dwellings vs the number of offices.

The number of units labelled as “Dwellings” in Cadastral registers in 2001 and in 2011 was around 5% (2001) and 9% (2011) higher than the one resulting from the 14th and 15th Population and Dwellings Census, despite the coherence in definitions and even if cadastral data do not include unauthorised buildings. An in depth analysis of this discrepancy showed that cadastral stock also includes many residential units that actually are exclusively used for production purposes (such as private offices and studies situated in residential buildings) . As a consequence, the number of offices in cadastral registers results to be underestimated and it has to be increased by the number of units that are incorrectly registered as Dwellings. This amount has been estimated for the years 2001 and 2011 on the basis of Census data (CP). The difference between the number of all types of units included in residential buildings and the number of dwellings included in these buildings has been calculated. The number of units registered as Dwellings but actually used for productive purposes is estimated by subtracting the number of units registered in cadastral registers as Offices, and therefore modelled for estimate extra-census years (see table 1.2).

These units - assumed to be mainly offices - are valued by applying superficies and prices available for this kind of non-residential units.

Table 1.2 Number of units and dwellings in residential buildings; number of offices. Italy, Year 2001 and 2011.

		2001	2011
Number of units included in residential buildings (CP)	A	29,468,876	33,635,232
Number of dwellings included in residential buildings (CP)	B	27,268,880	31,138,278
Units other than residential units included in residential buildings (CP)	C=A-B	2,199,996	2,496,954
. of which, offices recorded in cadastral registers as "Offices" (OMI)	D	455,482	652,132
. of which, offices recorded in cadastral registers as "Dwellings" (residual)	E=C-D	1,744,514	1,844,822
Revision of the number of offices	F=(C-D)/D	3.83	2.83

For Non-residential buildings included in NRB2 (factories, hotels, banks, shopping centres...), an alternative approach has been studied as, for some of these buildings, no information exists on their surfaces in cadastral registers. Moreover, no representative prices are available for all of them, as these typologies are traded on thin markets, characterized by a low number of transactions, and because of the high variety of buildings to evaluate.

The only information available is a tax value, called “cadastral rent” (“*rendita catastale*”), that is a value used for fiscal purposes, fixed by the Revenue Agency on the basis of some parameters (mainly surface, location, type of building). As these values are not market prices, an adjustment is needed

to be coherent with SNA definitions, using information available for others units: the ratio between the value at the market prices and the tax value is calculated for buildings for which both values are available (units included in NRB1 group); this ratio is then applied as an “adjustment coefficient” in order to estimate the market value of NRB2 buildings.

The procedure consists of two steps. In notation:

Step 1:

$$AC_t = \sum_{i=1}^n V_{it} / R_{it} \quad (1.2)$$

AC_t = adjustment coefficient

V_{it} = market value of building i at time t

R_{it} = cadastral rent of building i at time t

i = types of non-residential units for which the two values are both available (units included in NRB1 group).

Step 2:

$$V_{bt} = \sum_{b=1}^n R_{bt} * AC_t \quad (1.3)$$

V_{bt} = market value of building b at time t

R_{bt} = cadastral rent of building b at time t

b = types of non-residential units for which only the cadastral value is available (units included in NRB2 group).

The estimates obtained through the described two approaches, for NRB1 and NRB2, include the value of underlying land: market prices or adjusted market prices are used, so they refer to the combined asset (non-residential buildings and underlying land).

The value of non-residential real estate is estimated from 2005 onward, given the available data sources⁴. Table 1.3 displays the results, in terms of the two components of NRB and the resulting combined value for non-residential units for the whole period. Values do not include ownership transfer costs.

⁴ Cadastral data on non-residential units have been supplied from 2005 onwards.

Table 1.3: Value of non-residential real estate (billion EUR). Italy. Year 2005-2019.

	NRB1*	NRB2**	TOTAL ***
2005	1,062	776	1,838
2006	1,150	872	2,023
2007	1,234	947	2,181
2008	1,279	994	2,273
2009	1,287	1,014	2,301
2010	1,296	1,030	2,326
2011	1,321	1,080	2,400
2012	1,315	1,104	2,419
2013	1,283	1,083	2,366
2014	1,253	1,082	2,335
2015	1,219	1,048	2,266
2016	1,185	1,031	2,216
2017	1,159	1,015	2,173
2018	1,140	1,006	2,146
2019	1,125	1,007	2,133

* NBR1= offices, shops, arts and crafts workshops, garages and deposits

**NBR2= factories, hotels, banks, shopping centres, hospitals, barracks, public offices, schools, museums

***TOTAL = NRB1+NRB2

1.2 Allocation of real estate among sectors

Data on non-financial assets are produced for each institutional sector. Given the available data it was preferred to perform the estimate for the total economy and to decompose top-down by sector, rather than performing the estimate for each sector and sum up to obtain the total economy, since some information preserves the better quality only regardless to the owner. To split the value of dwellings and non-residential buildings among institutional sectors, cadastral data on the market value of buildings owned by “Private persons” (the so called “*persona fisica*”, mainly individuals or very small sized enterprises) and “Others” (“*altro*”) are used as an indicator.

Buildings of Private persons are assigned to *Households*.

Buildings whose owner is classified as “Others” have to be assigned to Non-Financial Corporations, Financial Corporations, General Government and NPISHs.

The real estate value of *Financial Corporations* (both residential and non-residential) is mainly estimated from their financial statements (in particular for banks and for insurance corporations), from supervisory reports collected by the Bank of Italy for banks, financial intermediaries and collective investment undertakings, in particular real estate investment funds, whose weight in terms of total buildings owned by the sector is very significant.

The main source of information used to measure the value of buildings owned by *General government* is the “General government buildings census” carried out by the Treasury Department of the Ministry of Economy and Finance (law 191/2009), integrated with estimates of the value for

the surveyed buildings, according to the methodology⁵ developed by the Department of the Treasury (DT) in collaboration with Sogei⁶.

DT does not impute values for non-respondents and exclude some types of buildings whose value is difficult to measure. Moreover, the domain of this census does not perfectly overlap with the set of units classified in the General Government sector according to national accounts. The completeness of the estimate is obtained by integrating the DT estimates through an imputation procedure carried out with the price-by-quantity method, using median surfaces and prices calculated in reference strata on data provided by respondents. For some missing units the value of buildings was taken from their financial statements.

Because of a lack of information (no data exist from statistical surveys nor from administrative sources), the value of real estate owned by *NPISHs* is calculated applying its share of Gross Fixed Capital Formation (GFCF) in this asset to the stock of total economy (implying an average incidence of the value of underlying land).

When the value is obtained for Financial Corporations, General Government, and NPISHs, real estate of *Non-Financial Corporations* is obtained as a residual from the total value attributed to "Others".

Tables 1.4 and 1.5 show the resulting values of residential and non-residential buildings by institutional sector.

Table 1.4: Value of residential real estate (billion EUR) by Institutional sector. Italy. Year 2001-2019.

	Non-financial corporations	Financial corporations	General government	Households and NPISHs	Owner occupied dwellings	Total Economy
2001	240	4	70	2,831	2,469	3,145
2002	277	10	56	3,104	2,714	3,447
2003	311	9	54	3,402	2,978	3,776
2004	349	8	54	3,728	3,264	4,139
2005	386	8	53	4,081	3,574	4,528
2006	434	8	53	4,561	4,000	5,056
2007	471	7	54	4,919	4,314	5,452
2008	496	7	54	5,205	4,564	5,762
2009	488	7	55	5,281	4,625	5,831
2010	483	7	54	5,394	4,723	5,938
2011	470	9	54	5,508	4,813	6,041
2012	458	9	53	5,444	4,759	5,964
2013	436	9	51	5,332	4,668	5,828
2014	419	9	50	5,243	4,595	5,721
2015	399	10	48	5,149	4,508	5,605
2016	376	10	47	5,091	4,461	5,525
2017	360	10	47	5,066	4,436	5,483
2018	352	9	47	5,049	4,415	5,457
2019	344	9	47	5,047	4,411	5,446

⁵Methodological details are available on the following website:

http://www.dt.mef.gov.it/it/attivita_istituzionali/patrimonio_pubblico/censimento_immobili_pubblici/modello_di_stima_del_valore_del_patrimonio_immobiliare_pubblico

⁶Sogei (Società Generale d'Informatica) is the 100% Information Technology company of the Ministry of Economy and Finance.

Table 1.5: Value of non-residential real estate (billion EUR) by Institutional sector. Italy. Year 2005-2019.

	Non-financial corporations	Financial corporations	General government	Households and NPISHs	Total Economy
2005	944	49	248	597	1,838
2006	1,061	53	259	650	2,023
2007	1,151	60	273	697	2,181
2008	1,194	65	287	728	2,273
2009	1,200	70	297	734	2,301
2010	1,198	76	308	744	2,326
2011	1,237	80	323	760	2,400
2012	1,255	83	323	758	2,419
2013	1,220	86	321	739	2,366
2014	1,217	83	317	718	2,335
2015	1,171	86	313	697	2,266
2016	1,138	88	308	683	2,216
2017	1,099	97	306	672	2,173
2018	1,083	99	305	660	2,146
2019	1,071	106	306	650	2,133

1.3 Net stock of buildings and land underlying buildings

It is possible to split the combined value of dwellings and non-residential buildings (CV_t) into the two components, the net capital stock (C_t) and land (L_t), given the following equation:

$$CV_{jt} = C_{jt} + L_{jt} \quad (1.4)$$

j = dwellings or non-residential buildings.

Net stock In Italy C is calculated by applying the PIM under the hypothesis of:

- constant average service life (79 years for dwellings and from 35 to 51 years for buildings other than dwellings, depending on the activity in which the construction is used)
- truncated normal distribution of retirements
- linear depreciation function.

This value excludes the value of underlying land because land is a tangible non-produced asset and, as a consequence, its acquisition is not included in gross fixed capital formation (SNA 2008 13.44).

For Total Economy, the value of underlying land is assumed to equal the difference between the estimate of the combined values and the estimate of buildings provided by PIM: the former includes the value of underlying land, since market prices are used, while the latter is by construction net of the value of underlying land. Both, CV and C, have to include or exclude costs of ownership transfer, to measure the value of land accurately.

This estimation method is generally referred as “residual approach”⁷: it is one of the procedures most frequently applied by countries, where it is not possible to use a direct approach because no separate information exists on quantities and prices for land beneath buildings. It implies that all revaluations and other changes in value not included in the PIM estimate are implicitly attributed to land.

The weight of land underlying buildings for a country strongly depends from factors such as the geographic distribution of constructions, geographical features of land (mountainous vs. level country), population density, land consumption, dearth of land, building permits.

Table 1.6 shows the resulting weights of land for total (residential and non-residential) buildings. It is possible to see that the weight of land is strongly related with the variation of the combined value and the evolution of prices of real estate (see price of dwellings in table 1.1).

Table 1.6 Weight of land on the combined value for real estate (residential and non-residential). Italy. Year 2005-2019.

	Weight of land, %
2005	56.7
2006	58.9
2007	59.5
2008	59.5
2009	58.7
2010	57.8
2011	56.8
2012	55.8
2013	54.6
2014	53.7
2015	52.4
2016	51.3
2017	50.2
2018	48.9
2019	48.4

2 - Conceptual analyses and first estimates of holding gains/losses components for residential buildings

When the real estate is estimated over a sufficient time span, it is possible not only to analyse the process of accumulation of the net worth over time for different institutional sectors, but also to evaluate the impact of price bubble on wealth. To do so, this section presents the analysis of holding gain and losses generated by price changes in the last decades in Italy, breaking down nominal holding gains into neutral holding gains and real holding gains. The analysis is applied to residential units for which we dispose of a longer time series, moreover, it is not possible to apply the same

⁷ Compilation guide on land estimation, 2015 edition, Eurostat/OECD.

procedure to non-residential buildings, since there are not estimates of relevant prices for all types of non-residential buildings.

In what follows the analysis of holding gain and losses on dwellings is not confined to the combined value, but it is carried out also for the two separated components capital stock and land, therefore we first show in table 2.1 the decomposition of the combined value of dwelling into the capital stock and the land value. For this exercise we also exclude the value of accessory area, since presently we do not dispose of detailed data on number and prices for the all the time span considered. For these reason the value of combined value of dwellings of table 2.1 differs from the one of the tables presented in paragraph 1⁸.

Table 2.1 Combined value (CV), the net capital stock by the PIM (C), value of land underlying dwellings (L) (billion EUR). Italy. Year 2001-2019.

	CV	C	L
2001	2,966	1,484	1,482
2002	3,247	1,567	1,680
2003	3,556	1,628	1,928
2004	3,897	1,714	2,183
2005	4,263	1,822	2,441
2006	4,760	1,919	2,841
2007	5,132	2,035	3,097
2008	5,422	2,138	3,284
2009	5,481	2,207	3,274
2010	5,578	2,282	3,296
2011	5,669	2,378	3,291
2012	5,592	2,427	3,165
2013	5,459	2,445	3,014
2014	5,357	2,454	2,902
2015	5,246	2,473	2,773
2016	5,169	2,496	2,673
2017	5,127	2,526	2,602
2018	5,102	2,580	2,523
2019	5,091	2,598	2,493

According to SNA 2008 (2.115) nominal holding gain “records the full change in value of the various assets or liabilities due to the change in the prices of those assets and liabilities since the beginning of the accounting period or the time of entry into stock and the time of exit from stock or the end of the accounting period.” ESA 2010 (6.32) expresses nominal holding gains as:

$$G_t = (P_t - P_{t-1}) \times Q_{t-1} \quad (2.1)$$

where G_t is the nominal holding gain, $P_t - P_{t-1}$ is the change of the asset price in the period $t- t-1$ and Q_{t-1} is the quantity of the asset.

⁸ Coherently, in this exercise the net stock of dwellings by the PIM (C) and the value of land underlying dwellings (L) also are adjusted in order to eliminate accessory area from their values.

P is an average value. It is obtained from market prices of traded dwellings weighted on the stock of dwellings, under a stratification by zone and category in order to represent all residential units included in the Italian stock (see section 1.1.).

Besides capital gains or losses, prices may change because the introduction of new residential buildings changes the composition of the stock or because the quality of the existing stock changes. If we consider that the weight of new dwellings is negligible (1% in terms of number and no more than 2% in terms of total surface, for years 2001-2019) we can assume that their impact on the average price is close to zero. It is also plausible that the quality of the existing stock does not change so much to impact on the average price of the stock as a whole, in a year (as a consequence, also other changes in volume are assumed to be negligible or zero, that is almost realistic in a short time analysis). Therefore we assume that all price changes are due to capital gain and losses.

On the basis of these assumptions, it is possible to calculate nominal capital gains/losses (ESA2010 6.31), applying the equation 2.1 to the quantity of dwellings at time t-1, multiplying P at time t calculated on Q at time t by the stock Q_{t-1} : $G_t = (P_t - P_{t-1}) \times Q_{t-1}$.

Table 2.2 displays the results for dwellings as combined value (capital stock+land). It shows capital gain (G^{CV}) from 2001 to 2011 (with the exception of 2009) and capital losses from 2012 to 2019. The highest value refers to 2006 (8.3% of the combined value), when market prices increased by around 9.3%. Such outcomes seem coherent with the performance of the estate market. The evolution in prices drives the development in the total value of dwellings (see table 2.2) and the changes in the total value of dwellings are close to the evolution of nominal capital gains/losses. G^{CV} (chart 2.1).

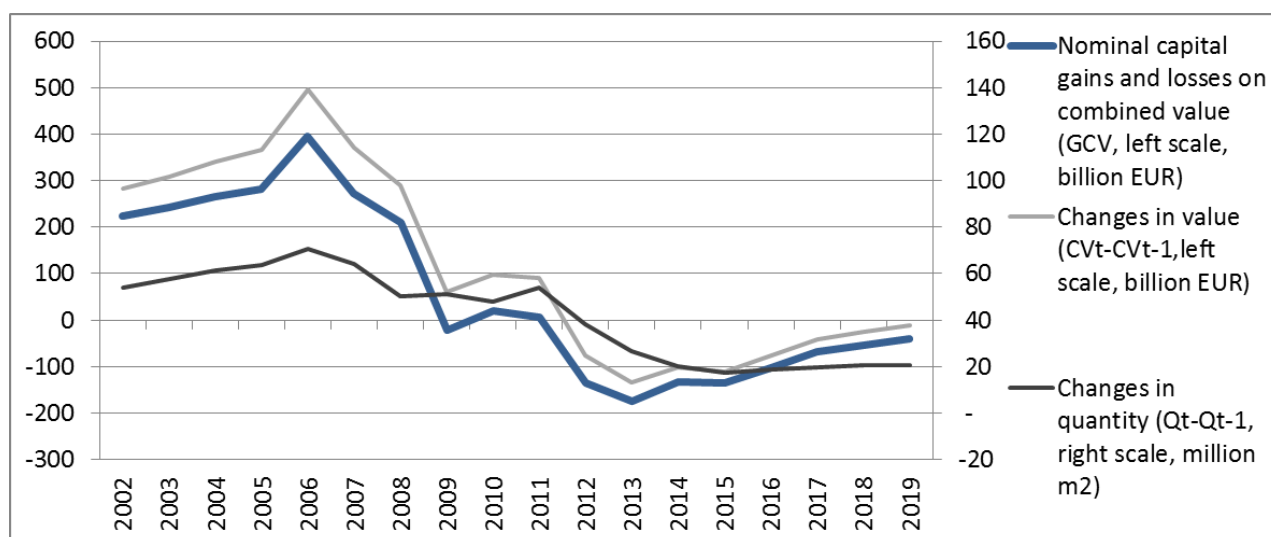
Table 2.2 Quantity (million m2, Q), average price per m2 (EUR, P), total value (billion EUR, CV) and nominal capital gains and losses (billion EUR, G^{CV}) for the combined value. Absolute values and percentage changes. Year 2001-2019. Italy.

	Quantity, millions of m2 (Q)*	% change	Average price per m2 (euro) (P)	% change	Total value (CV)**	% change	Nominal capital gains and losses (G^{CV})	G^{CV}/CV %
2001	2,978		996		2,966			
2002	3,032	1.8	1,071	7.6	3,247	9.5	224	6.9
2003	3,090	1.9	1,151	7.5	3,556	9.5	242	6.8
2004	3,151	2.0	1,237	7.4	3,897	9.6	265	6.8
2005	3,214	2.0	1,326	7.2	4,263	9.4	282	6.6
2006	3,285	2.2	1,449	9.3	4,760	11.7	395	8.3
2007	3,349	2.0	1,532	5.7	5,132	7.8	273	5.3
2008	3,400	1.5	1,595	4.1	5,422	5.6	209	3.9
2009	3,451	1.5	1,588	-0.4	5,481	1.1	22	-0.4
2010	3,499	1.4	1,594	0.4	5,578	1.8	21	0.4
2011	3,553	1.5	1,596	0.1	5,669	1.6	5	0.1
2012	3,591	1.1	1,557	-2.4	5,592	-1.4	136	-2.4
2013	3,617	0.7	1,509	-3.1	5,459	-2.4	174	-3.2
2014	3,638	0.6	1,473	-2.4	5,357	-1.9	132	-2.5
2015	3,655	0.5	1,435	-2.5	5,246	-2.1	135	-2.6
2016	3,674	0.5	1,407	-2.0	5,169	-1.5	104	-2.0
2017	3,694	0.5	1,388	-1.3	5,127	-0.8	69	-1.3
2018	3,714	0.6	1,374	-1.0	5,102	-0.5	53	-1.0
2019	3,735	0.6	1,363	-0.8	5,091	-0.2	40	-0.8

*Q = number x average surface (million m2)

**CV= QxP

Chart 2.1 Change in quantity ($Q_t - Q_{t-1}$), changes in value ($CV_t - CV_{t-1}$) and nominal capital gains/losses (G^C) for the combined value. Year 2002-2019. Italy.



We now apply the same methodology to compute capital gain and losses of capital stock and land.

When the net capital stock is obtained by applying the PIM, the only change in prices included in this estimate is the one connected to fluctuations in the construction prices: the most common method of calculating price indices in the PIM is through a cost approach (the change in price of the finished asset is calculated from price changes of labour and material inputs).

On the contrary, if the value of land is calculated as the difference between the combined value and the PIM value, its value at time t includes all the nominal holding gains/losses for the real property (the combined value), that are not incorporated by construction in the PIM estimate. Therefore, the value of underlying land, calculated as a residual, will include all the other changes in market prices that differ from the changes in the costs of construction.

Even if most holding gains/losses for the capital stock of buildings mainly originate from fluctuations in the construction costs, other types of revaluations involving the building itself may exist, but it can be supposed that their impact is limited. For example, in a given period of time, buildings characterized by a specific quality feature (historical buildings versus new buildings, apartment at the top/first floor) could be most appreciated and demanded, so that their prices increase. If it is not feasible to calculate and to isolate these revaluation factors, the value of land obtained by applying the residual approach could be overestimated. The revaluations registered for that asset will be more accentuate and volatile. However, it is plausible and generally accepted that *“every change in price due to demand fluctuations on the real estate market accrues more to land than to structures upon it, as land is a non-reproducible, limited and in short supply asset”*⁹.

Concerning capital stock (C), obtained by applying PIM, the value of nominal capital gains and losses (G^C) is calculated on the bases of the following equations and identities:

The deflator is defined as $F_t = (Q_t \times P_t) / (Q_t \times P_{t-1})$ and $P_t = F_t \times P_{t-1}$,

Nominal capital gains and losses, defined in the equation (2.1), can be also obtained as

⁹ Compilation guide on land estimation, 2015 edition, Eurostat/OECD, pg.82 (6.116)

$$G_t^C = (Q_{t-1} \times P_t) - (Q_{t-1} \times P_{t-1})$$

Therefore, $G_t^C = (Q_{t-1} \times F_t \times P_{t-1}) - (Q_{t-1} \times P_{t-1})$. Since $C_{t-1} = Q_{t-1} \times P_{t-1}$:

$$G_t^C = (C_{t-1} \times F_t) - (C_{t-1}) \quad (2.2)$$

where C is the PIM estimate (net capital stock) at time t.

The equation (2.2) can be applied to estimate nominal revaluations for capital stock. Chart 2.2 shows that the trend of nominal gains and losses on capital stock is driven by the implicit deflator of capital stock.

Chart 2.2 Deflator (F) and nominal capital gains/losses (G^C) for the net capital stock. Year 2002-2019. Italy.



The value of capital gains and losses for land (G^L) is then obtained as a residual: the difference between capital gains and losses on the combined value (G^{CV} , equation 2.1) and the ones on capital stock (G^C , equation 2.2).

$$G_t^L = G_t^{CV} - G_t^C \quad (2.3)$$

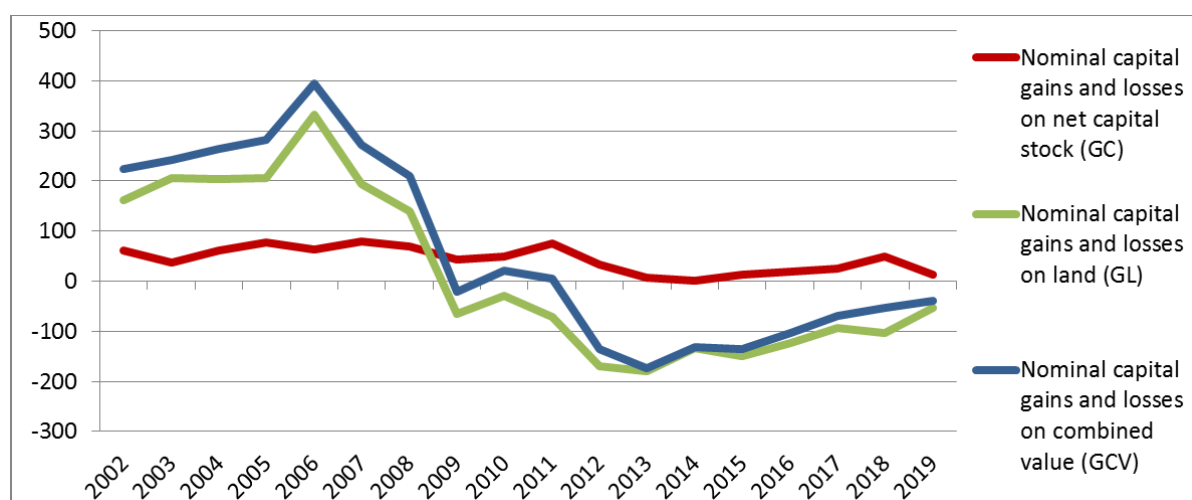
The results of the exercise are presented in table and chart 2.3. Revaluation on land is the most volatile component of the G_t^{CV} capital gains. It is also the main component registered in the 2002-2008 period, with the highest weight on the combined value in 2006 (7,3%), when its market prices increase considerably. From 2009, the decreasing or stable prices on the residential real estate market generate a nominal capital loss for land, while for the net capital stock a gain is still measured, even if with a decreasing level.

These two opposite revaluations (losses for land and gains for capital stock) recombine the nominal capital gains/losses accrued to the combined value. It is also possible to compute the incidence of nominal gains and losses on the two separate items, net capital stock and land value. Table 2.3 shows that nominal gains and losses have a more relevant impact on land rather than on capital stock value.

Table 2.3 Nominal capital gains and losses on the combined value (G^{CV}), on net capital stock (G^C) and on land (G^L). Absolute values (billion EUR) and incidence on the combined value and its components. Year 2002-2019. Italy.

	Nominal capital gains and losses on combined value (G^{CV})	G^{CV}/CV %	Nominal capital gains and losses on net capital stock (G^C)	G^C/CV %	G^C/C %	Nominal capital gains and losses on land (G^L)	G^L/CV %	G^L/L %
2002	224	6.9	61.5	1.9	3.9	163	5.0	9.7
2003	242	6.8	36.4	1.0	2.2	206	5.8	10.7
2004	265	6.8	60.6	1.6	3.5	204	5.2	9.4
2005	282	6.6	76.8	1.8	4.2	205	4.8	8.4
2006	395	8.3	62.4	1.3	3.3	333	7.0	11.7
2007	273	5.3	79.7	1.6	3.9	193	3.8	6.2
2008	209	3.9	68.8	1.3	3.2	141	2.6	4.3
2009	22	-0.4	44.0	0.8	2.0	66	-1.2	-2.0
2010	21	0.4	48.8	0.9	2.1	28	-0.5	-0.8
2011	5	0.1	76.1	1.3	3.2	71	-1.3	-2.2
2012	136	-2.4	33.4	0.6	1.4	170	-3.0	-5.4
2013	174	-3.2	6.2	0.1	0.3	180	-3.3	-6.0
2014	132	-2.5	1.6	0.0	0.1	134	-2.5	-4.6
2015	135	-2.6	13.8	0.3	0.6	149	-2.8	-5.2
2016	104	-2.0	19.1	0.4	0.8	123	-2.4	-4.5
2017	69	-1.3	25.4	0.5	1.0	94	-1.8	-3.5
2018	53	-1.0	49.4	1.0	2.0	103	-2.0	-3.9
2019	40	-0.8	13.9	0.3	0.6	53	-1.0	-2.0

Chart 2.3 Nominal capital gains and losses on the combined value (G^{CV}), on net capital stock (G^C) and on land (G^L). Year 2002-2019. Italy.



Nominal holding gains can be broken down into neutral holding gains and real holding gains (ESA 2010 6.26, SNA 2.118). The neutral holding gain on an asset is defined as the value of the holding gain that would accrue if the price of the asset changed over time in the same proportion as the general price level (ESA 2010 6.38, SNA 2.118); the real holding gain on an asset is defined as the difference between the nominal and the neutral holding gain on that asset (ESA 2010 6.43, SNA 2.119).

Neutral capital gains and losses may be calculated on the basis of the equation defined by ESA 2010 (6.40):

$$NG_t = P_{t-1} \times Q_{t-1} (r_t/r_{t-1}-1) \quad (2.4)$$

where r is the consumption price index.

The real capital gains and losses is obtained as a residual, as the difference between nominal capital gains and losses and neutral capital gains and losses (ESA 2010, 6.44):

$$RG_t = G_t - NG_t \quad (2.5).$$

Its value depends on the movements of the price of the asset relative to movements of other prices, as measured by the general price index.

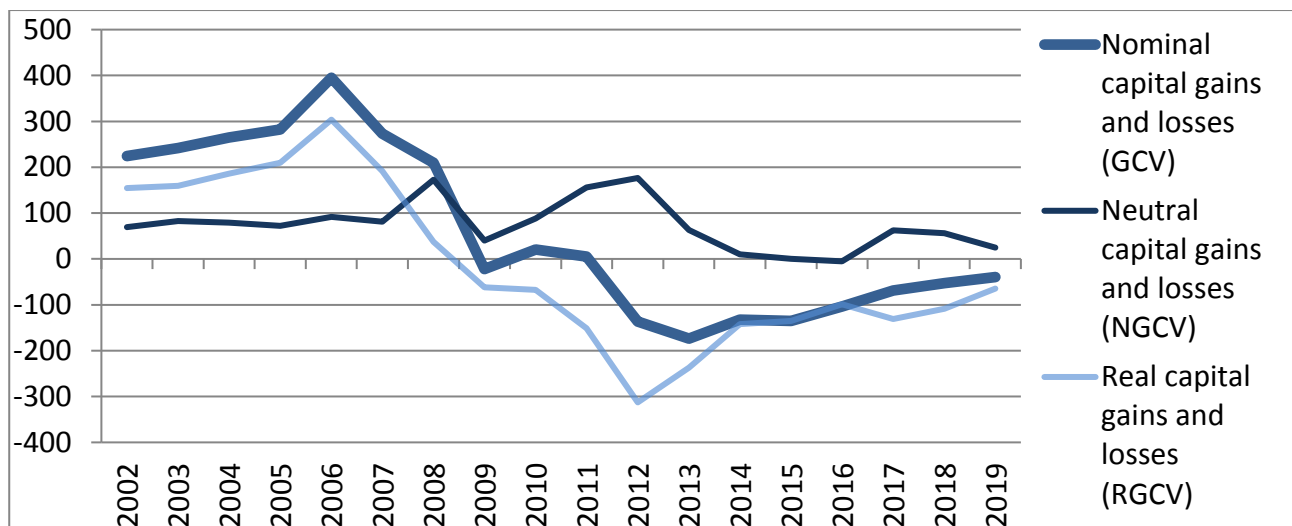
Table and chart 2.4 show the results obtained by applying equations (2.4) and (2.5) for the combined value (NG^{CV} and RG^{CV}).

In the years 2002 – 2007 the main component of the nominal capital gains is the real revaluation: prices on the dwellings market increased more than the general price index. In 2008, the difference between the change rate of the general price index and the one of the dwelling prices is reduced. From 2009 average prices of the combined value decrease (2009, 2012-2019) or they are almost stable (2010 and 2011), generating a real loss. The average increase of general prices balances the real capital loss, reducing the impact (2009, 2012-2019) or neutralizing (2010 and 2011) the nominal capital loss recorded for the market of residential buildings.

Table 2.4 Nominal capital gains and losses (G^{CV}), neutral capital gains and losses (NG^{CV}) and real capital gains and losses (RG^{CV}) on the combined value. Absolute values (billion EUR) and incidences on combined values and on capital stock values. Year 2002-2019. Italy

	Nominal capital gains and losses (G^{CV})	G^{CV}/CV %	Neutral capital gains and losses (NG^{CV})	NG^{CV}/CV %	Real capital gains and losses (RG^{CV})	RG^{CV}/CV %
2002	224	6.9	69.4	2.1	154.7	4.8
2003	242	6.8	82.6	2.3	159.5	4.5
2004	265	6.8	79.3	2.0	185.6	4.8
2005	282	6.6	72.4	1.7	209.8	4.9
2006	395	8.3	91.4	1.9	303.6	6.4
2007	273	5.3	81.4	1.6	191.7	3.7
2008	209	3.9	172.5	3.2	36.9	0.7
2009	-22	-0.4	40.1	0.7	-61.9	-1.1
2010	21	0.4	88.5	1.6	-67.6	-1.2
2011	5	0.1	156.2	2.8	-151.2	-2.7
2012	-136	-2.4	176.5	3.2	-312.7	-5.6
2013	-174	-3.2	63.3	1.2	-237.0	-4.3
2014	-132	-2.5	10.2	0.2	-142.3	-2.7
2015	-135	-2.6	0.0	0.0	-135.4	-2.6
2016	-104	-2.0	-5.2	-0.1	-98.7	-1.9
2017	-69	-1.3	62.1	1.2	-130.8	-2.6
2018	-53	-1.0	55.8	1.1	-108.9	-2.1
2019	-40	-0.8	25.0	0.5	-64.5	-1.3

Chart 2.4 Nominal capital gains and losses (G^{CV}), neutral capital gains and losses (NG^{CV}) and real capital gains and losses (RG^{CV}) on the combined value. Year 2002-2019. Italy.



The equations (2.4) and (2.5) have been also applied to estimate the value of neutral and real capital gains accruing to capital stock (NG^C and RG^C); then, the revaluations only accruing to land are estimated as a residual:

$$NG_t^L = NG_t^{CV} - NG_t^C \quad (2.6)$$

$$RG_t^L = RG_t^{CV} - RG_t^C \quad (2.7).$$

The tables and charts 2.5 e 2.6 show the main results of the exercise.

Even if the net capital stock does not experience a loss in the examined period, there is a loss on the real component in 2003, 2012 -2014 and 2017, counterbalanced by the positive neutral effect. It is neutral gains that, on average, have a higher weight on capital stock values.

Also for land, it is the real component that leads to a capital loss starting from 2009, before the loss in net capital stock. For land, the real component is far more volatile.

Table 2.5 Nominal capital gains and losses (G^C), neutral capital gains and losses (NG^C) and real capital gains and losses (RG^C) on the net capital stock. Absolute values (billion EUR) and incidences on combined values and on capital stock values. Year 2002-2019. Italy.

	Nominal capital gains and losses on net capital stock (G^C)	G^C/CV %	G^C/C %	Neutral gains and losses on net capital stock (NG^C)	NG^C/CV %	NG^C/C %	Real gains and losses on net capital stock (RG^C)	RG^C/CV %	RG^C/C %
2002	61.5	1.9	3.9	34.8	1.1	2.2	26.7	0.8	1.7
2003	36.4	1.0	2.2	39.8	1.1	2.4	- 3.4	-0.1	-0.2
2004	60.6	1.6	3.5	36.3	0.9	2.1	24.3	0.6	1.4
2005	76.8	1.8	4.2	31.9	0.7	1.7	44.9	1.1	2.5
2006	62.4	1.3	3.3	39.0	0.8	2.0	23.4	0.5	1.2
2007	79.7	1.6	3.9	32.8	0.6	1.6	46.9	0.9	2.3
2008	68.8	1.3	3.2	68.4	1.3	3.2	0.4	0.0	0.0
2009	44.0	0.8	2.0	15.8	0.3	0.7	28.2	0.5	1.3
2010	48.8	0.9	2.1	35.6	0.6	1.6	13.2	0.2	0.6
2011	76.1	1.3	3.2	63.9	1.1	2.7	12.2	0.2	0.5
2012	33.4	0.6	1.4	74.0	1.3	3.1	- 40.6	-0.7	-1.7
2013	6.2	0.1	0.3	27.5	0.5	1.1	- 21.3	-0.4	-0.9
2014	1.6	0.0	0.1	4.6	0.1	0.2	-3.0	-0.1	-0.1
2015	13.8	0.3	0.6	0.0	0.0	0.0	13.8	0.3	0.6
2016	19.1	0.4	0.8	-2.4	0.0	-0.1	21.4	0.4	0.9
2017	25.4	0.5	1.0	29.2	0.6	1.2	-3.8	-0.1	-0.2
2018	49.4	1.0	2.0	26.6	0.5	1.1	22.8	0.4	0.9
2019	13.9	0.3	0.6	12.0	0.2	0.5	1.9	0.0	0.1

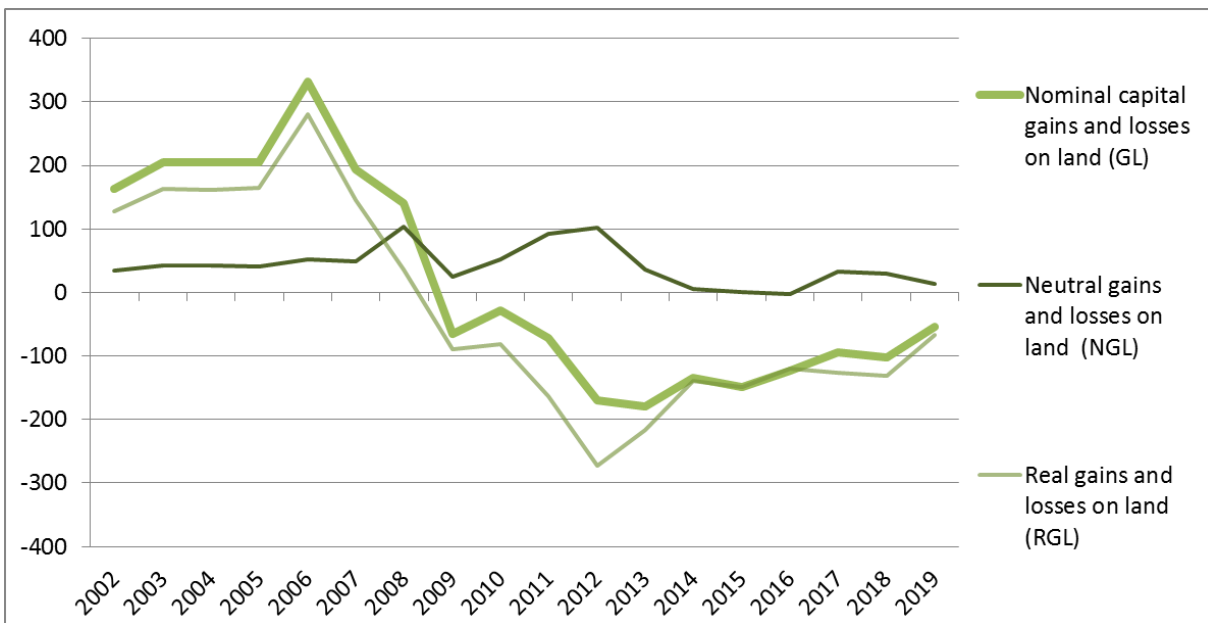
Chart 2.5 Nominal capital gains and losses (G^C), neutral capital gains and losses (NG^C) and real capital gains and losses (RG^C) on the net capital stock. Year 2002-2019. Italy.



Table 2.6 Nominal capital gains and losses (G^L), neutral capital gains and losses (NG^L) and real capital gains and losses (RG^L) on land. Absolute values (billion of euros) and incidences on combined values and on land values. Year 2002-2019. Italy.

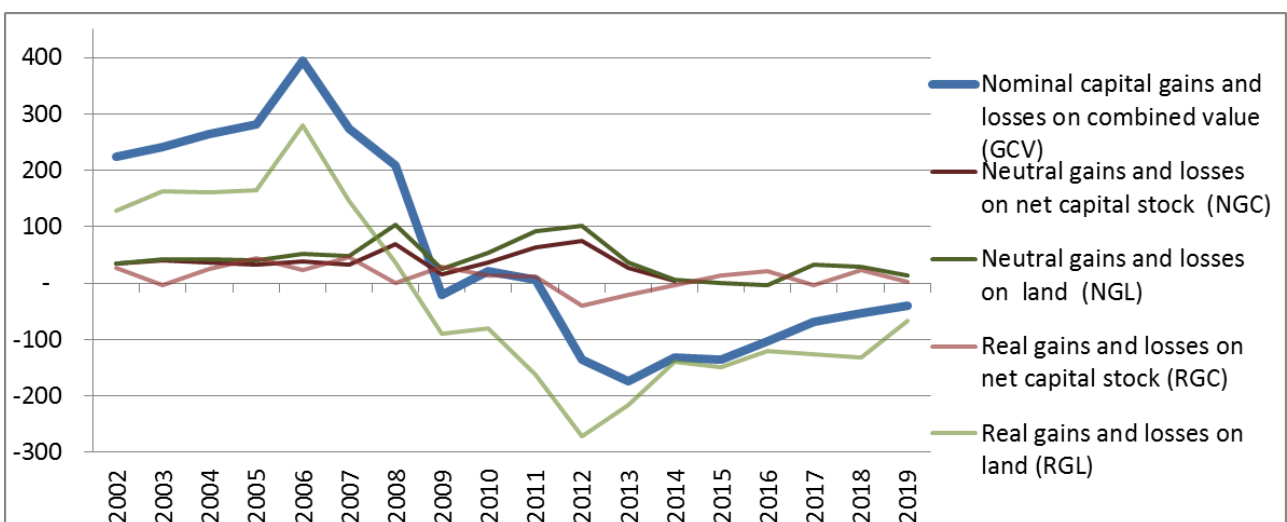
	Nominal capital gains and losses on land (G ^L)	G ^L /CV %	G ^L /L %	Neutral gains and losses on land (NG ^L)	NG ^L /CV %	NG ^L /L %	Real gains and losses on land (RG ^L)	RG ^L /CV %	RG ^L /L %
2002	163	5.0	9.7	35	1.1	2.1	128	3.9	7.6
2003	206	5.8	10.7	43	1.2	2.2	163	4.6	8.4
2004	204	5.2	9.4	43	1.1	2.0	161	4.1	7.4
2005	205	4.8	8.4	41	1.0	1.7	165	3.9	6.8
2006	333	7.0	11.7	52	1.1	1.8	280	5.9	9.9
2007	193	3.8	6.2	49	0.9	1.6	145	2.8	4.7
2008	141	2.6	4.3	104	1.9	3.2	37	0.7	1.1
2009	-66	-1.2	-2.0	24	0.4	0.7	90	-1.6	-2.8
2010	-28	-0.5	-0.8	53	0.9	1.6	81	-1.4	-2.5
2011	-71	-1.3	-2.2	92	1.6	2.8	163	-2.9	-5.0
2012	-170	-3.0	-5.4	102	1.8	3.2	272	-4.9	-8.6
2013	-180	-3.3	-6.0	36	0.7	1.2	216	-4.0	-7.2
2014	-134	-2.5	-4.6	6	0.1	0.2	139	-2.6	-4.8
2015	-149	-2.8	-5.2	-	0.0	0.0	149	-2.8	-5.2
2016	-123	-2.4	-4.5	3	-0.1	-0.1	120	-2.3	-4.4
2017	-94	-1.8	-3.5	33	0.6	1.2	127	-2.5	-4.7
2018	-103	-2.0	-3.9	29	0.6	1.1	132	-2.6	-5.0
2019	-53	-1.0	-2.0	13	0.3	0.5	66	-1.3	-2.5

Chart 2.6 Nominal capital gains and losses (G^L), neutral capital gains and losses (NG^L) and real capital gains and losses (RG^L) on land. Year 2002-2019. Italy.



To conclude the analysis of capital gain and losses, we display in chart 2.7 the four components that add up to nominal gains and losses of the combined value, i.e. neutral gains and losses on land and capital stocks and real gains and losses on land. It is clear that it is land value that incorporates most of the capital gains (and losses) on the combined value and that drives the neutral and especially the real capital gain and losses.

Chart 2.7 Neutral (NG) and real (RG) capital gains and losses on net capital stock (C) and on land (L) and nominal capital gains and losses on the combined value (GCV). Year 2002-2019. Italy.



Conclusions

The compilation of balance sheets for non-financial assets by institutional sector is a substantial improvement to the statistical framework of National Accounts data: combined with balance sheets for financial assets and liabilities, they complete the information on wealth, for the Total Economy and for institutional sectors. They supply relevant information for users and policy makers in the analysis of accumulation of wealth.

Real estate is the most significant asset among items composing the non-financial wealth, its composition and variation is a crucial determinant in the analysis of wealth of institutional sectors. The analysis of the real together with the financial assets provides a comprehensive description of net wealth and how its composition changes over time. Istat together with the Bank of Italy released a publication on the wealth of Italian households and non-financial corporations¹⁰, joining the value of real assets, estimated by Istat, together with the value of financial assets and liabilities published by the Bank of Italy. They are planning to complete the analysis for all institutional sectors.

Italy has carried out an important effort not just to be compliant with Eurostat transmission program but to develop at its best the analysis of real estate market, being this step crucial to be able to analyse the available information set and to choose the best estimation method. Nevertheless, we are aware that something can still be improved on the estimation of real estate, namely on the sub-item of non-residential buildings that we called NBR2 (factories, hotel, shopping centre, etc). This would not impact so much on the general amount of real estate value and its allocation among sectors, but would improve the overall quality and especially the detail of the estimates.

The estimates of the real estate value is particularly important for the household sector. Dwellings are the main component of real estate combined value (around 72%) and households detain most of the stock of dwellings in Italy (93%). Households detain therefore 75% of total real estate in Italy, when they produce about 26% of GDP and almost 32% of gross savings in 2019.

The analysis of gain and losses on real estate is again crucial in the analysis of wealth. The analysis showed that prices variation and price bubbles strongly impact on variation of the market value of real estate. This is important to correctly evaluate the actual wealth of a sector: all holding gains are effectively realized only when the asset is sold and they can be quite volatile and have a significant impact on the value of the asset. Moreover, it supplies useful information for the analysis of wealth and income flows, as the variation of prices of real estate have an impact on actual financial flows and stocks (in terms of debts and mortgages) and on some related income flows (i.e. actual and imputed rents). A comprehensive analysis of flows and stocks, therefore, has to consider and evaluate each component of variation of wealth.

A further effort is necessary. Firstly not all asset included in the SNA are estimated¹¹, therefore the evaluation for the other balance sheet items is an important goal to achieve. Secondly, to have a complete tool to measure the wellness and the sustainability of an economy, it would be an essential goal to complete the set of other accounts where flows impacting on the final value of assets are measured (Other changes in volume accounts and Revaluation accounts), in addition to the already available capital account.

¹⁰ https://www.istat.it/it/files//2019/05/Wealth_2005_2017_EN.pdf

¹¹ The assessment of the stock of non-financial assets carried out by Istat is not yet complete, as in other countries, due to the unavailability of data on certain assets that are more difficult to measure, such as valuables and some non-financial non-produced assets (e.g. natural resources other than land). Only a limited amount of data is unavailable which does not compromise the information content of the estimates.

Bibliography

Australian Bureau of Statistics, Recording land in the national balance sheet, 15th Meeting of the London Group on Environmental Accounting, Wiesbaden, 30 November – 4 December 2009

EUROSTAT, 2010, European System of Accounts, ESA2010, Luxemburg

EUROSTAT- OECD, 2015, Compilation guide on land estimation

ISTAT and Bank of Italy, The wealth of Italian households and non-financial corporations: 2005-2017, https://www.istat.it/it/files//2019/05/Wealth_2005_2017_EN.pdf, 2019

ISTAT, Compilation of annual balance sheets for non-financial assets: methodological approach, main outcomes and open issues in the Italian experience, Conference on Strengthening Sectoral Position and Flow Data in the Macroeconomic Accounts, IMF – OECD, February 28 – March 2, 2011

Statistics Netherlands, Compiling Complete Balance Sheets for The Netherlands, OECD Working Party on National Accounts, 1-3 December 2010

United Nations Statistical Commission (UNSC), 2008, System of National Accounts, New York