Market Prices and Institutional Values

Comparison for Tax Purposes Through GIS Instrument

Gianluigi De Mare(✉), Antonio Nesticò, Maria Macchiaroli, and Luigi Dolores

University of Salerno, Via Giovanni Paolo II, 132, Fisciano, SA, Italy
{gdemare, anestico, mmacchiaroli, ldolores}@unisa.it

Abstract. In Italy, the institutional analysis of the real estate market values is carried out by the Inland Revenue (government agency), through the Observatory of the Real Estate Market (OMI). In the last ten years, the average values (for types of real estates: houses, warehouses, garages, etc.) reported by the OMI are much closer to the market prices really recorded through the housing market sale contracts. Therefore, the reform of taxes on the real estate, recently strongly required by the European Commission, intends to take as reference the OMI values to increase the level of equalization in the taxation. This measure wants to correlate taxes to the real market value of the property and not to the land register value, which is completely distant from the real prices: this is true both for historical reasons (the latest update of land register values dates to several years ago) and for the evolution that the market has suffered especially in the big cities because of metropolitan and transport infrastructure development.

This paper intends to verify the reliability of the OMI values compared to actual market prices and, at the same time, intends to control the possibility to equalize the fiscal mechanism considering the same tax revenue, as the Government claims to be able to do.

The intent is to avoid the sacrifice of the less affluent segments of the population benefiting the lobbies of high-quality property owners using these modern mechanisms of the tax system.

In this model, has been implemented an informative dataset in GIS mode. The use of GIS instrument makes it easier to verify the differential between government data and market prices.

Keywords: Estimation of the real estate · Real estate taxation · Dataset of values · GIS for the housing market

1 Introduction and Objectives

The proposed study is divided into three parts.

The first part concerns the classification of more than 500 deeds of sale, collected from 2008 to date in the Campania Region (Italy), in a computerized database divided

The work was developed equally among the authors.

O. Gervasi et al. (Eds.): ICCSA 2017, Part VI, LNCS 10409, pp. 430–440, 2017.
DOI: 10.1007/978-3-319-62407-5_30

into the following sections: features of the deeds of sale, features of the properties and features of the contractors.

The features of the deeds of sale are used to identify it: this includes information about the notary who has notarized the deed; the archive number; the number of collection; the registration date and the purchase price. There is also a hyperlink to the PDF version of each deed, to let read the whole sales document. This section is important to univocally identify the transaction and to recorder the real price paid for the property and the date of the sale (think to the importance of the temporal horizon in the Appraisal applications).

The characteristics of the properties are related to the type of sold property, the address, the land registry data as well as a short typological description. These are only partially contained in the sale contract (for example the commercial area is calculated through the measure of the plan of property according to DPR 138/1998) and they supply some information about the property to create an appraisal profile of the good.

The features of the contractors concern the entity (legal or natural) of seller and buyer (in Italy sale contracts between legal contractors are more reliable for fiscal reasons, so it becomes important to collect this kind of information).

The second part of the work concerns the implementation in the GIS instrument of data contained in the computerized database. In fact, all the information collected were geo-referenced. Subsequently, the part of database related to the town of Salerno has been illustrated. In this municipality, they were collected 66 purchase agreements.

Finally, the third part of the research concerns the comparison between the prices implemented within GIS interface and the values of Observatory of the Real Estate Market, thus giving rise to a reliability test model of the OMI's values based on prices directly recorded through the sale contracts[1].

2 The Computerized Database

The deed of sale is a contract in writing, with which the contractors (seller and buyer) transfer the ownership of the good and undertake to pay the price, to deliver the good and to give the guarantees provided by the law. The sales contract is governed by the articles of the Civil Code, from 1470 to 1509. Article 1470 states that "the sale is the contract concerning the transfer of ownership of a thing or the transfer of another right in exchange for the payment of a price".

In Appraisal, the deed of sale has an important role; in fact, two Appraisal's postulates state that: "the estimate method is unique and comparative" and that "the price is the foundation of every estimate" [1]; this means that there cannot exist estimates if these are not based on a comparison with other goods that have already been subject of a sale in the real market; in this case, in the deed of sale is reported the merchant information useful to proceed with the comparison.

In Italy, the registration documents of the trades have never been reliable for issues related to the tax authorities. Because property taxes are paid in proportion to the

[1] It would like to thank Eng. Paolo Risi for his collaboration to the project.

amount of the transaction, historically it was not convenient to declare the real price; so, it was registering a price lower than the real in order to pay less tax; the only constraint was to declare a price higher than the land register value (automatically calculated by the government), because, if the amount was at or below the land register value, the Inland Revenue (like government agency) intervened imposing a penalty on the transaction. This was the habit: the deeds of sale always contained prices next to the land register values and distant from the real market value; thus, these contracts were useless for value estimates. This has resulted in limited development at national level of the studies and statistical applications [2, 3], unlike what happened in the Anglo-Saxon world [4, 5], that is characterized by greater transparency in this kind of transactions and by the possibility to implement a more representative database of the real market.

However, the Italian scenario is changed between 2006 and 2008 because some laws were introduced to increase the transparency of transactions [6]. For the purposes of this study they were selected only deeds of sale registered after January 1st, 2008.

As I said, the database is organized in three main sections, as shown in the diagram of Fig. 1.

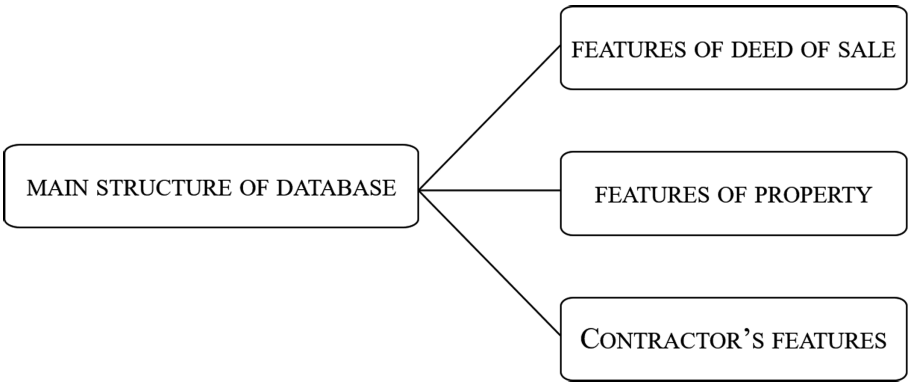

Fig. 1. Structure of the computerized database

The excel interface of the information system created is presented like in Tables 1, 2 and 3 shown below.

Table 1. Excel extract from the computerized system – Section 1

Features of deed of sale						
ID	Notary	Archive number	Number of collection	Registration date	Date of deed of sale	Price (€)
1	A	26118	7093		22/10/2008	184.000
2	B	50			14/10/2010	26.354
3	C	38384	17444	24/09/2009	22/09/2009	175.000
4	D	61965	12937	19/02/2010	17/02/2010	118.800
5	E	66152	17574	16/09/2008	09/09/2008	150.000
6	F	35800	6445	15/07/2010	15/07/2010	165.000
…	…	…	…	…	…	…

Table 2. Excel extract from the computerized system - Section 2

Features of property													
ID	Municipality	Prov	Sheet	Parcel	Sub.	Address	Street number	Description	Floor	Area		Plan	Commercial area (m^2)
										(vani)	(m^2)		
1	Baronissi	SA	14	422	14	Via Indipendenza	9	Flat	3	5		Hyperlink	
					25			Basement	S1		33		
2	Pellezzano	SA	7	1886	20	Via Gentile	9	Flat	4	3		Hyperlink	
3	Fisciano	SA	19	166	13	Via Roma	3	Flat	PT	6,5		Hyperlink	117,5
					25			Garage	S1		30		
4	Fisciano	SA	20	2200	9	Via Fratelli Napoli		Flat	2	3,5		Hyperlink	
5	Solofra	AV	5	929		Via San Gaetano		House	S1-PT-1-2			Hyperlink	
6	Salerno	SA	66	35	4	Via Calata San Vito	36	Flat	2	4,5		Hyperlink	110
…	…	…	…	…	…	…	…	…	…	…	…	…	…

Table 3. Excel extract from the computerized system - Section 3

Contractor's features						
ID	Seller	Legal entity	Natural person	Buyer	Legal entity	Natural person
1			1			1
2	G	1		B		1
3	G		1	B		1
4	G	1		B		1
5		1				1
6	G		1	B		1
…	…	…	…	…	…	…

3 GIS for the Representation of Market Prices

The use of GIS for analysis and the estimate studies is known in the bibliography [7].

In the case that interests us, the geographical representation instrument is used for constituting a user interface easy to manage in evaluation questions even for non-professional persons, like municipal employees for the verification of taxation levels of real estate assets.

As mentioned, 66 properties were collected on the territory of Salerno, the city chosen as example for the proposed application.

The result of the geo-referenced information is summarized in Fig. 2 (next page).

It has proceeded, therefore, to export the vector data in GIS. The graphic interface has been enhanced by downloading a plug-in supported by the software QGIS called OpenLayers. This plug-in allows us to attach the maps directly from the Web from different sources: OpenStreetMap, Google Maps, Bing Maps, Apple Maps, MapQuest, OSM/Stamen. Among these, it is chosen the Google map, especially the satellite view (Google Satellite), geo-referencing it compared to the same reference system (Fig. 3).

Completed the GIS export is therefore almost completed the connection between the computerized databases and the geographical data; this means that any geographic

Fig. 2. Properties surveyed in the database and geo-referenced in the GIS instrument

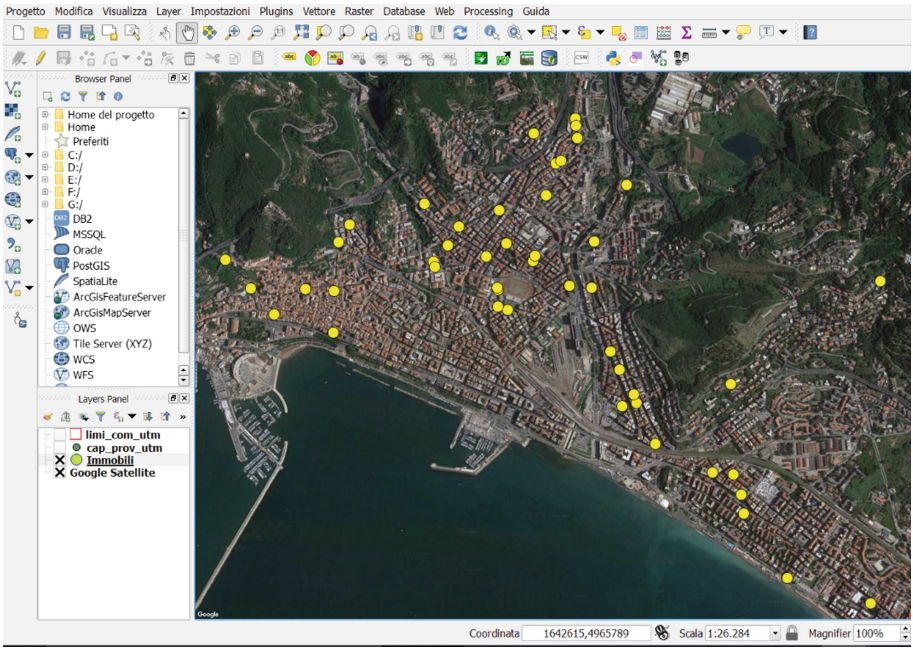

Fig. 3. Graphic interface in QGIS with identification of some properties

datum represented on the map is associated with the respective data string of the computerized database.

The main feature of a GIS instrument, in fact, it is precisely the ability to associate attributes to the components of a map; therefore, in this case the data present within the computerized databases were associated with each point that representing a building (see Fig. 4).

Immobili :: Features total: 66, filtered: 66, selected: 0

	STRINGA	testo_id	ID	Pertinenza	Atto	Indirizzo	n° civico	Tipologia	Piano	Superficie
1	6	6	6	No	C:\Users\P...	Via Calata ...	36	Appartame...	2	110
2	9	9	9	No	C:\Users\P...	Via C. Sor...	27	Appartame...	2	87
3	23	23	23	No	C:\Users\P...	Via Madon...	80	Appartame...	3	-
4	80	80	80	No	C:\Users\P...	Vicolo Giu...	14	Appartame...	3	-
5	98	98	98	Si	C:\Users\P...	Via Fabrizi...	79	Appartame...	5	132
6	124	124	124	No	C:\Users\P...	Via Paolo ...	22	Appartame...	6	67
7	154	154	154	No	C:\Users\P...	Via Sichel...	22	Appartame...	1	115
8	172	172	172	No	C:\Users\P...	Via Irno	211	Appartame...	1	61
9	181	181	181	No	C:\Users\P...	Via Giovan...	64	Appartame...	2	91
10	191	191	191	No	C:\Users\P...	Via Vincen...	17	Appartame...	3	62
11	200	200	200	No	C:\Users\P...	Via Luigi C...	57	Appartame...	3	63
12	206	206	206	No	C:\Users\P...	Via Ernest...	4	Appartame...	3	113
13	225	225	225	No	C:\Users\P...	Via Casa D...	24	Appartame...	PT	97
14	244	244	244	No	C:\Users\P...	Via Madon...	21	Appartame...	6	148

Fig. 4. Excerpt of the attribute table

The component of the computerized database is descriptive, alphanumeric, non-spatial, it expresses the value of a quantity, and it is manifested in several attributes that describe the characteristics of the property. The GIS instrument automatically associates a new ID for each geographic feature, so it was appropriate to link the ID automatically generated by the GIS with that built in database.

4 The Institutional Market Values and the Real Market Prices

One of the major innovations introduced by the reform of the land register was the creation of the Property Market Observatory (OMI) within the Land Agency (D. Lgs. 30th August 1999, n. 300 art. 64, paragraph 3) that, in addition to the management of cadastral data, also contains the office where public deeds are stored ("Conservatoria" of property registers).

The OMI is responsible for the production of updated data related to the sale and rent values of real estate on a local scale but also national, thereby providing a support for analysis and studies in the appraisal sector.

This instrument is run by the Central Directorate of the Property Market Observatory which is composed of the Observatory Area of Market Values, of the Methodologies Observatory Office, of the Bank Data Management Office, of the Analysis and Studies Office.

Regardless of the draft revision of the urban Land Registry promoted by the Government, the OMI has divided each municipality in representative areas of the urban structure (Central Area, Near Centre Area, Suburban, Rural). In each area, they have been identified homogeneous zones with respect to property values.

For each OMI zone, they have been identified:

- the maximum and the minimum real estate value; their relative deviation should never exceed the multiplier of 1,5 excluding the particular situations that go beyond ordinariness;
- the type or types prevalent;
- the prevailing conservation status (good, normal, poor).

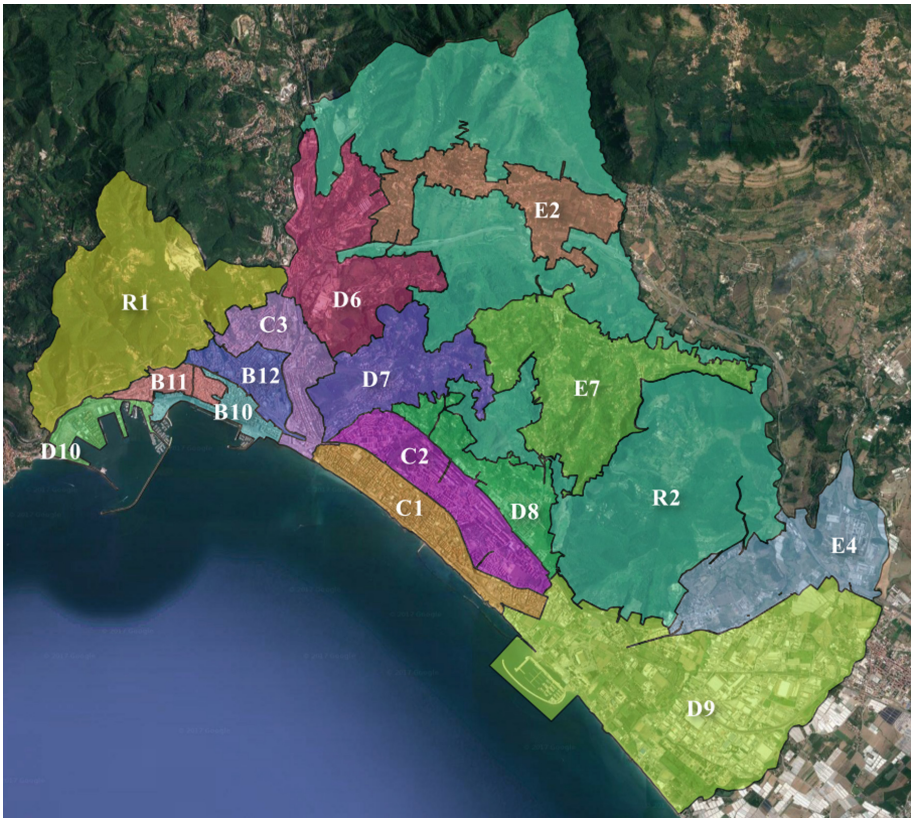

Fig. 5. The OMI zones for the town of Salerno

For the city of Salerno, the subdivision zones for the market analyzes are illustrated in Fig. 5.

It is chosen the B12 area for the development of the test model for its significant concentration of data about prices recorded directly from the market.

The OMI for the area of interest provides the following technical and commercial indicators relating to the last update (first half 2016), as shown in Table 4.

To proceed to the comparison between the OMI values and the market prices, it is chosen the most common kind of construction, the civil one, getting the following average datum of € 2.500 for the B12 interest area.

Table 4. OMI market values

Database of real estate quotation							
Answer to your interrogation: year 2016 - semester 1							
Province:	SA						
Municipality:	Salerno						
Zone:	Central/Railway Station - DALMAZIA street - E. CATERINA street - PRUDENTE street- NADDEO square- LANZALONE street -P.SSA SICHELGAITA street- C. SORGENTE street						
Zone code:	B12						
Most common typology:	Civil buildings						
Function:	Residential						
Typology	Conservation state	Market value (€/m^2)		Area (Gross/Net)	Rent Value (€/m^2 a month)		Area (Gross/Net)
		Min	Max		Min	Max	
Civil buildings	Normal	2.300	2.700	G	5,5	8,0	G
Cheap buildings	Normal	2.200	2.600	G	5,1	7,6	G
Parking garages	Normal	1.250	1.700	G	4,0	5,8	G
Private garages	Normal	1.500	2.100	G	5,1	7,1	G

The surveyed market prices, opportunely updated to the first half of 2016 through the time series extracted from appropriate bibliography [8], are arranged around the mean value as shown in Fig. 6 (2D model) and Fig. 7 (3D model, next page).

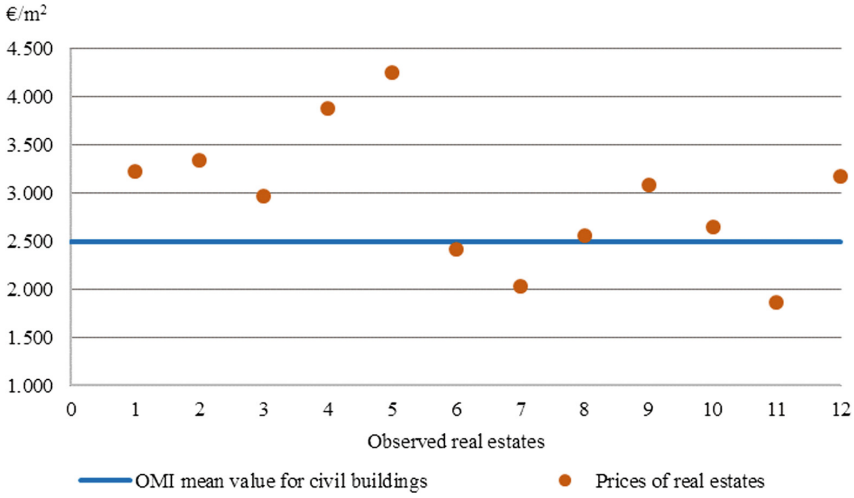

Fig. 6. OMI main value for the B12 zone and updated prices

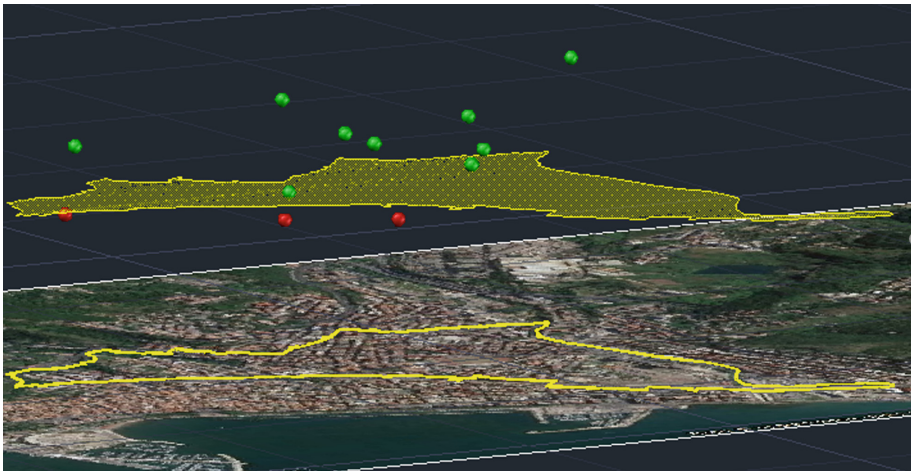

Fig. 7. OMI main value (plane in yellow) and the updated prices (higher prices in green, lower prices in red) (Color figure online)

It is immediately evident that the average datum is basically less than the recorded market prices, according to a percentage deviation that is shown in Fig. 8.

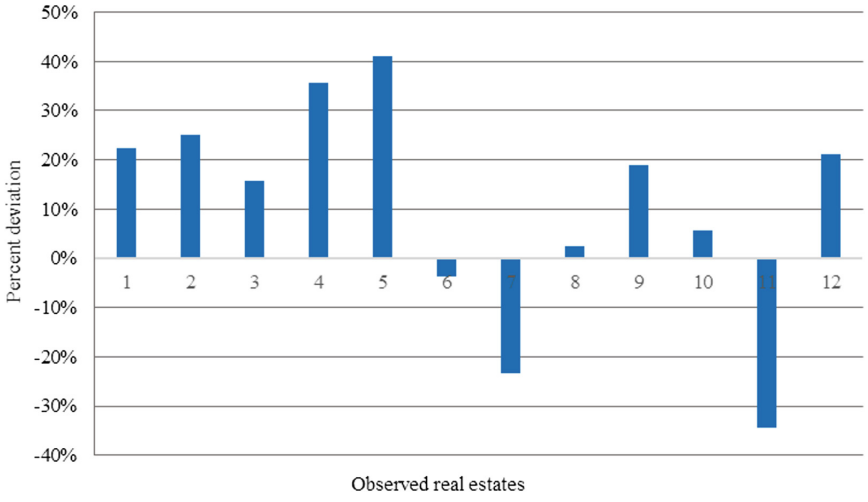

Fig. 8. Percentage difference of the updated prices compared to OMI average datum

This shows that, for 9 owners, a possible taxation based on OMI average value is reductive of the tax impact potentially anchored to the real price of sale. While, for 3 owners the use of the OMI average datum entail a tax burden greater than that deserved.

It outlines therefore a tax scenario that should guarantee a mild taxation for most owners. However, some citizens would be in a position disadvantaged, forced to disburse a surplus than the actual value of their assets; this is even more strange if we consider that they own the properties with the worse characteristics in the survey sample. So, the reform would lead to an increase in taxes for the poorer segments of the population and therefore holders of less valuable properties.

5 Conclusions

The computerized database built with over 500 contracts of sale signed after January 1st, 2008 is an important database for monitoring the real estate market in the region of Campania (Italy). With the model for data classification, through hyperlinks, we can directly view the documents from which the classified information is taken. The GIS interface of the database allows us to bring on the map all the data, greatly facilitating the management of the same also for operators that do not have specific skills in appraisal.

The application of the two instruments, carried out by way of example for the town of Salerno, has made possible to compare the level of residential real estate market recorded from supervisory government bodies (Tax Agency) with the real market prices. This is a fundamental prerequisite to check the consistency of government data that will be used as a reference for the modification of the tax base in the tax asset. The comparison between institutional values and market prices shows that the government guidelines are on average lower than real market. However, for a minority of properties, the average governmental datum exceeds the actual value and for this reason the adoption of this would lead to an unjust taxation. A compensatory model is being processed [9–11]; it allows you to review the distortions, to maintain constant, the overall revenue that the government gets from property taxes (like the Government claims to be able to do), ensuring all owners to pay in relation to the actual value of the property.

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