Proceedings of the XXXVIII IAHS World Congress

Visions for the Future of Housing

Mega Cities

April 16-19, 2012 Istanbul Technical University

edited by

Oktay Ural
Muhammed Şahin
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International Association for Housing Science

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Pioneer through the ages

IAHS HOUSING İSTANBUL 2012

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The Economic Value of Residential Land in Historical Areas: An Application of the Residual Method to the Secondary Market

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Key words: Residual method, secondary market, depreciation rate, appreciation in second-hand housing.

Abstract

Land value bears significant weight in house prices in historical town centers. An essential aim for regulating the mortgage market, particularly in the financial and property crisis that countries such as Spain are undergoing, is to have at hand objective procedures for its valuation, whatever the conditions (location, construction, planning).

Of all the factors contributing to house price make-up, the land is the only one whose value does not depend on acquisition cost, but rather on the location-time binomial. That is to say, the specific circumstances at that point and at the exact moment of valuation. For this reason, the most commonly applied procedure for land valuation in town centers is the use of the residual method: once the selling price of new housing in a district is known, the other necessary costs and expenses of development are deducted, including those of building and the developer's profit. The value left is that of the land.

To apply these procedures it is vital to have figures such as building costs, technical fees, tax costs, etc. But, above all, it is essential to obtain the selling price of the new housing. This is not always feasible, on account of the lack of new-build development in this location. This shortage of information occurs in historical town cities, where urban renewal is slight due to the heritage-protection policies, and where, nevertheless there is substantial activity in the secondary market.

In these circumstances, as an alternative for land valuation in consolidated urban areas, we have the adaptation of the residual method to the particular characteristics of the secondary market. To these ends, there is the proposal for the appreciation of the dwelling which follows, in a backwards direction, the application of traditional depreciation methods proposed by the various valuation manuals and guidelines.

The reliability of the results obtained is analyzed by contrasting it with published figures for newly-built properties, according to different rules applied in administrative appraisals in Spain and the incidence of an eventual correction due to conservation state.

1 Background

Real estate appraisal has paramount importance in the Spanish socio-economic context, as property is the families' most valuable asset. Householders tend to purchase their properties with external funding, especially in the last decades. In Spain, house ownership is substantially higher compared to neighbouring countries. Spanish property ownership accounts for 83% as opposed to the 65% EU average, according to Eurostat, the statistical office of the European Union.

When it comes to real estate appraisals, determining the price of land becomes a thorny endeavour due to subjectivity factors. The price of land is subject to a wide variety of factors such as location, urban development, market-related issues or physical factors.

The most reliable valuation method is the sales comparison approach, in which market value is estimated by comparing properties similar to the subject property that have recently been sold, are listed for sale or are under contract, as The Appraisal Institute [1] defines. This method obtains market value by finding similarities between the appraised property and other available properties, whose sale price is known. Applying this method to find out the price of land is nothing short of complex because there is no information available regarding land transactions or bids. Land markets traditionally lack in transparency.

Therefore, the residual method emerged as an alternative to land valuation. The method is based on the principle of residual value, defined in the Spanish mortgage valuation regulation: "The value of a property's production factors will be the difference between the asset's production factors and values of the remaining factors."

The application of the residual method –whose fundamentals will be explained below– requires information that is not always available, such as the sale price of new homes. Submission and publication

1.1 Residual method

Several authors have reflected on the static residual method and its application. One of the authors, García Erviti [2], stated:

To overcome the impossibility to apply the comparison method in appraisals of lands that do not comply with the necessary criteria, the residual method is an adequate alternative. The method considers that land value is part of the total property value that could eventually be built in that site. Knowing the value of the built property, and taking away costs and promotion expenses, as well as business margins, we may obtain the value of land as a "residue" of the property development analysis (...) The residual method is therefore a model reproducing the patterns of the real estate market in a specific urban area, analyzing the process that generates sale prices of other properties constructed in the same market.

The methodology can be translated in the following mathematical expression:

$$V_s = V_v - (C_c + G + B) \quad (1)$$

Whereas:

V_v - Sale price of the terminated dwelling
V_s - Land value
C_c - Construction costs
G - Promotion expenses
B - Property developer's profit

Both G and B can be obtained knowing the value of the land and the construction, therefore having the market ratio "K" and based on the mathematical expression (1), the following formula is obtained:

$$Vs= (Vv / K) – Cc \quad (2)$$

Roca Cladera [3] stressed the strong reliance upon the residual method in new property developments, stating the following hypothesis in the case of the second-hand market:

- Land value's independence of its construction.
- Estimated construction value calculating the actual replacement cost (not the reproduction of the actual building), by using the 1987 cadastral regulation tables in force "that do not always reflect the market reality."

However, the author concludes that in a highly dynamic scenario with strong demand in the second-hand market, an exorbitant price of old dwellings re-values land for new property developments.

International literature does not shed light on the possibilities for applying residual method in the second-hand market. The appraisal manual of the European Group of Valuators Association (TEGOVA) [4] introduced the use of this method in land appraisal or properties likely to be rehabilitated. However the Association does not contemplate its application in the second-hand market.

The American Appraisal Institute's appraisal guidelines [1] mention the residual method in land appraisals claiming that:

Land shall be subject to adequately promote its optimal use. Revenues attributable to invested capital are deducted out of the total transaction result, the result being revenues attributed to land. Revenues are capitalized in order to obtain an estimated land value.

The guidelines mainly focus on property under exploitation; therefore an update of recurrent income is always required.

1.2 Depreciation

Roca Cladera, 1987 [5] carries out an in-depth study of different depreciation procedures, classified based on the different depreciation causes (namely on physical or economic grounds) and the purpose of the appraisal.

Some years later, the same author [6], presented -against the common trend - the dichotomy between depreciation and deterioration: "depreciation is based on deterioration but it is certainly not deterioration". Property depreciation not only depends on physical-constructive factors, but mainly on economic factors, such as the relationship between new property developments and second-hand properties at a certain moment in time: depreciation occurs because of the property's use.

The work aims at proving the opposite: the value of second-hand property depends on depreciation.

2 Goals

Given the shortage or total lack of data related to the sale of newly-built residential dwellings in historic centres of some cities such as Madrid, this paper aims at finding new proceedings allowing us to find the residual land value in the second-hand market. The main goals are:

- Setting up a methodology for an objective appraisal of second-hand property.
- Creating a list of values of Madrid's municipal area.
- Drawing a comparison between results and land values obtained after applying the residual method for new property developments.

The study aims at analysing the real estate market, namely closed-block dwellings for they represent the vast majority in this study, which is limited to Madrid's historic centre, i.e.: the so-called "Cinturón de Ronda" (The First Beltway), where there is a genuine shortage of new property developments in order to collect data to calculate land value. Image 1 bellow reflects the early 20th century borders:

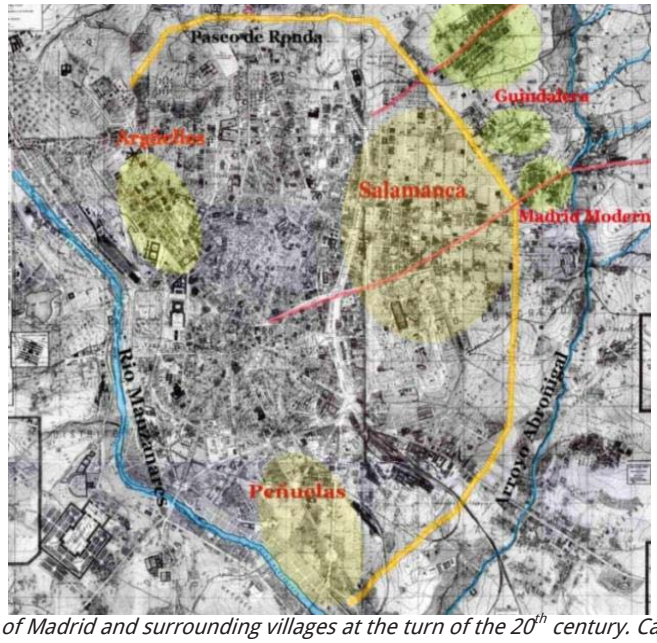

Figure 1: Map of Madrid and surrounding villages at the turn of the 20th century. Cañada García, F

3 Methodology: application of the residual method in real estate secondary market

The research strictly followed the cadastral regulation for the application of the residual method, namely in quantifying the market ratio "K", (which involves promotion expenses and profits, as set above in 1.1) for the analysed districts, in the last Evaluation Proposal.

3.1 Reference values: residual method applied to new property developments

In order to obtain the reference values, we used average housing values per district, published by the Spanish appraisal company Tasamadrid [7], ranging between 5,940€/sq. m and 3,774€/sq. m. Additional required data, such as construction costs, property developer's expenses and profit have been collected in compliance with the Cadastral Appraisal Regulation, published by the Spanish Ministry of Economy and the Treasury.

- Construction costs (Cc): Basic Construction Module (BCM) x typology ratio
- Property developer's expenses and profit: market ratio K, pursuant to expression (2)

In the selected area, construction costs -including technical fees and property development taxes- range between 824.88€/sq. m and 959.43€/sq. m.

As residual value can be calculated using the following mathematical formula: Vs = (Vv / K) - Cc, applying these values we obtain the impact on each district, ranging between 3.283 €/sq. m and 1.871 €/sq. m.

3.2 Market study

The study covers the following features:

- 5 districts / 31 municipal neighbourhoods
- surface: 2,722 hectares (4.5% of the municipal district)
- population: 715,743 habitants (21.8% of Madrid's total population)

Adequacy in selecting these criteria is confirmed once we see that out of the 6,449 promoted properties in Madrid in 2008, only 9.4% of them (605) where located in the districts included in this study. With the exception of Arganzuela –a traditionally industrial district, turned residential in the last decade– real estate promotions account for 1.5% (95).

In order to apply the method, whose approval is the ultimate goal of this study, we have selected a typical dwelling, common in the city, with the following criteria:

- built surface: 100 sq. m +/-15%
- dwelling located in a residential condominium
- intermediate floors (excluding attics, first and ground floors)
- apartments with exterior facings

Homogeneity of witnesses is essential to benchmark results because, despite working with impact criteria (€/built sq. m), land value is affected by fluctuations of different factors, such as the dwelling's surface.

6 witnesses have been selected per neighbourhood to assess 181 properties. Their goal was to gather the following data:

- built surface (offered and recorded in the cadastre)
- bid price
- date of construction
- existence of annexed properties
- building category
- state of conservation

3.3 Calculation of depreciation due to age

This technique considers every property to have an estimated useful life (100 years in the case of residential dwellings). Mortgage regulation takes into account a linear depreciation, according to the common procedure of assets amortization, as it aims at appraising it for accounting purposes. However, cadastral regulation takes into consideration an exponential formula, whereby the first years of a dwelling's life experience a greater loss in value,

whereas during the final years, residual value stabilizes. However, in the mortgage regulation the latter tends to disappear. Real Estate appraisal suggests an exponential depreciation with different ratios and less accuracy as it will be explained bellow.

For every witness, the system calculates depreciation after applying the three binding regulations in administrative appraisals in Spain: cadastral, mortgage and city planning. Besides, taking into account the state of conservation of the properties, a corrective ratio in relation with the dwelling's age has been applied. Therefore, for every methodology, two different values have been obtained: one value taking into account conservation state, and another value without taking the latter into account.

With the six depreciation ratios, -Dpi- six values are deducted per witness after applying the residual method in compliance with the following hypothesis: depreciation affects each and every component of the sale price, excepting the land value, which remains the same. Land value is the same both for new property developments and second-hand dwellings. Therefore, taking into account the second assumption (2) and considering the differential effect of market ratio K over Vs and Cc, for the second-hand market, one can deduct that:

$$V_s = \frac{V_{v2} - K \times C_c \times Dp.}{1 + (K - 1) \times Dp.} \quad (3)$$

Whereby: V_{v2} - Value of the dwelling for sale in the secondary market.
Dp - Depreciation ratio

4 Discussion of results

Table 1 reflects average values obtained in the six depreciation procedures analyzed, after confronting them with the reference values, that are calculated based on the market of new property developments. As indicator of reliability of the different procedures, the study collected the standard deviations in the 31 neighbourhoods.

	Refer. value	Cadastral R.		Mortgage R.		Town planning R.	
		Real age	Cor. Age	Real age	Cor. Age	Real age	Cor Age
Land value (€/m²)	2,385	2,772	2,386	2,408	2,307	2,697	2,197
Deviation f/reference(%)	-	16.3%	0.1%	1.0%	-3.2%	13.1%	-7.9%
Standard deviation (%)	-	16.6%	16.8%	18.0%	12.3%	18.4%	17.4%

Table 1: summary of obtained results in the different methodologies

Values are evenly distributed in the different procedures used (see Figure 2) with a major difference: although mean values remain the same, the gap between extreme values increases. Districts with high values tend to increase in value, whereas cheaper districts' prices tend to decrease, thus increasing the chart's trends of distribution of reference values (see Figure 3).

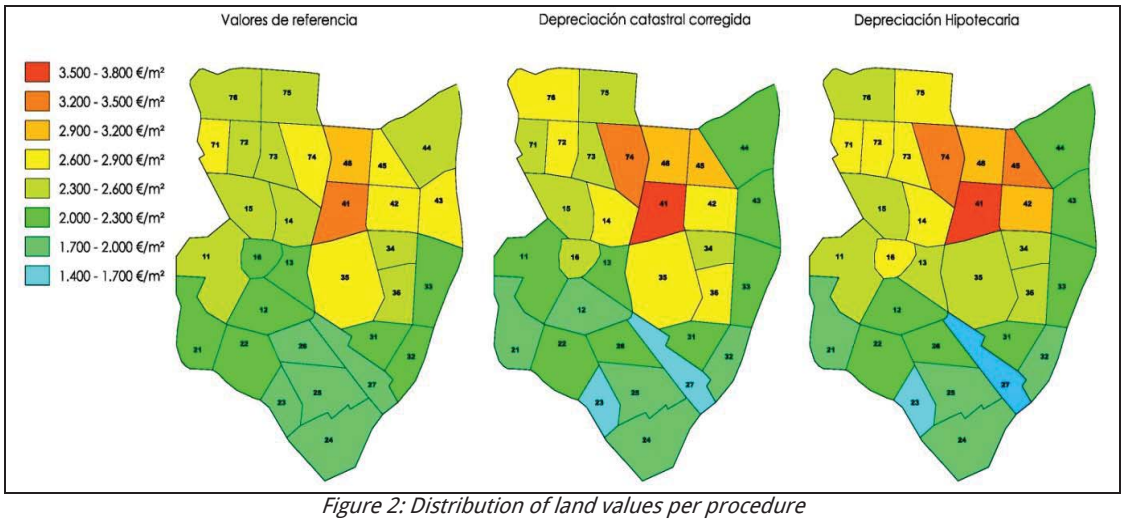

Figure 2: Distribution of land values per procedure

5 Findings

In light of the obtained results, one can assert that there is a factual relationship between sale prices in the secondary market and the new housing market. After applying the residual method to obtain land value in the secondary market, an average 2,835 €/sq. m reference value has been obtained, calculated based on new property developments, although there is significant fluctuation depending on the neighbourhood, around 20% in some extreme cases such as Atocha, which is an insignificant case as only two witnesses took part in the study. Therefore, the study's main hypothesis is validated: depreciation due to age, state of conservation and/or cost of reform, affects the construction, expenses and profit. However, land value remains the same. In this line of thought, the most accurate depreciation methods for an ulterior application of the residual method are:

- cadastral methodology, after having corrected the age factor due to state of conservation
- mortgage methodology, age factor at a 50% and a maximum of 0.5

The study's findings suggest that it is possible to calculate land value when there are no new property developments subject to the application of the residual method, as defined by the binding regulation.

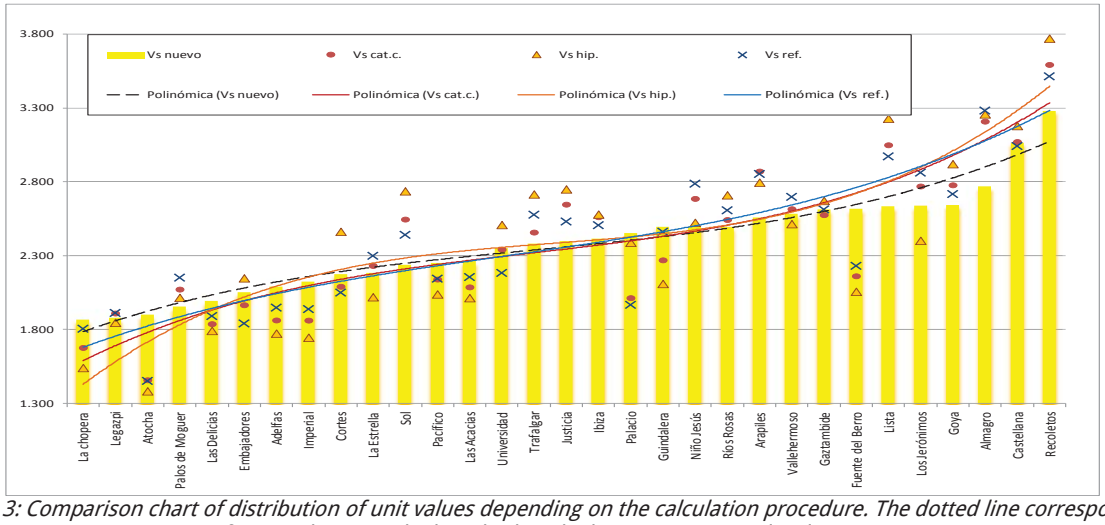

Figure 3: Comparison chart of distribution of unit values depending on the calculation procedure. The dotted line corresponds to reference data –residual method applied to new property developments-.

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