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Approximation of the Value of an Asset Inscribed on the List of Intangible Cultural Heritage of UNESCO: Estimation of a Hedonic Price Model for the Fiesta of the Patios in Cordoba

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Abstract

The city of Cordoba (Spain) stands out due to the fact that it has different inscriptions both in the List of World Heritage Sites and the List of Intangible Cultural Heritage (LICH) of UNESCO. In 2012 the Fiesta of the Patios was inscribed on the LICH. Currently, this event held during two weeks in May involves visits by the public to traditional dwellings. This event is becoming a magnet for tourists from outside the city and has established itself as a further tourist attraction, with the risk that it may lose part of its authenticity. This paper aims to use the hedonic price methodology to examine the externalities deriving from the "Fiesta" in order to verify whether the possible benefits/disadvantages of its existence are capitalised in real estate prices and quantify these effects. The results indicate that the "Fiesta" constitutes an added value for housing properties.

Keywords: UNESCO; Hedonic Pricing Model; Patios of Cordoba.

JEL classification: L83; Z30; A13.

1. INTRODUCTION

Until the early 21st century, recognition of cultural heritage focused almost exclusively on monuments and sites, buildings and art works considered to have special historic or artistic value[1]. In pursuit of its role as guardian of the historic heritage of humanity (initially due to the threats posed by military conflict), UNESCO established the World Heritage List in 1972 with a clear object-based and historicist approach. With time, UNESCO progressively introduced a paradigm change regarding heritage preservation that has led to

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the introduction of a new category of heritage (Bortolotto, 2011), expanding the concept of Heritage of Humanity to include living cultural practices and expressions. Ever since UNESCO adopted the Convention for the Safeguarding of the Intangible Cultural Heritage (2003) and established a specific list of Intangible Heritage, this type of heritage is capturing increasing attention not only at a global level but also at a local level due to the social and economic benefits deriving from inclusion in the List. Places that had no specific tangible testimony of their history now have a way of recognising and raising awareness of their importance if they possess intangible heritage. In addition and as in the current case, sites already included in the World Heritage list may now be complemented with the inclusion of heritage features in the List for the Safeguarding of Intangible Cultural Heritage.

Recognition as World Heritage and Intangible Cultural Heritage under the 'UNESCO brand' generates certain expectations among local communities regarding generation of economic wealth and local development, fundamentally based around their tourism attraction, while tourism itself has been transforming towards new approaches characterised by the concepts of 'cultural tourism' and 'heritage tourism'. Traditions, festivals, rituals, gastronomy, arts and crafts and other expressions of 'living culture' offer 'authenticity' and 'significant experiences' for visitors and tourists, while at the same time leading to a growth or increase in local socio-economic infrastructure (hotels, restaurants, shops, small traditional craft businesses, etc.).

The city of Cordoba is particularly significant to analyse the influence that recognition by UNESCO can have on the local economy. The Mosque-Cathedral of Cordoba was declared a World Heritage site in 1984, with extension to include the entire Historic Centre in 1994. In addition, in 2012 the 'Fiesta of the Patios' was inscribed on the List for the Safeguarding of Intangible Cultural Heritage. Finally, in 2018 the Omeyan city of Medina-Azahara was also declared a World Heritage site. It is interesting to note that UNESCO has made declarations of intangible cultural heritage in various places already inscribed as World Heritage sites and the effect of double declaration on local tourism and economic development. Various studies have highlighted this effect, including Bille (2012) regarding the cultural space of the Bedu and Wadi Rum (ICH in 2008) in the Petra Archaeological Park, declared a World Heritage Site in 1985; and López-Guzmán *et al.* (2017) on the traditional weaving of the Ecuadorian toquilla straw hat (ICH in 2012) in the historic city of Cuenca, recognised as a World Heritage Site in 1999.

In this paper we will describe first of all the evolution and current significance of the Fiesta of the Patios in Cordoba in order to subsequently analyse the concept of cultural and economic value in relation to intangible cultural heritage and the techniques used to perform this evaluation. Then we will describe the theoretical hedonic price model proposed, the data used and the variables defined. Finally, we will set out the results obtained and discuss their scope and possible subsequent lines of research.

2. THE FIESTA OF THE PATIOS IN CORDOBA

Although it has existed as a cultural expression since the early 20th century, the Fiesta of the Patios in Cordoba was inscribed in the List of Intangible Cultural Heritage of Humanity in 2012. Currently, it consists of two prominent elements: the Patio Competition and the Fiesta of the Patios in Cordoba. The competition includes awards in various categories relating to the plants and floral decorations of the patios, windows and balconies.

In general terms, for readers not familiar with the event, the Fiesta of the Patios is a traditional festive celebration in May (get-togethers, singing, dancing, food and drink) by residents of the patios together with family and friends. The patio houses are communal, family or multi-family dwellings or sets of individual houses with a shared patio located in the older parts of the city. The patios are decorated with a multitude of plants that fill the spaces with colour and charm and require continuous care by their inhabitants, who also maintain other ornamental and structural elements such as walls, columns, wells, basins and fountains. In the past the dwelling opened its doors for the purpose of the festival in itself, although for some years now and particularly since its recognition as intangible heritage, the patios are also opened and exhibited for tourism purposes, with tourists paying to enter and view these spectacular spaces.

Although earlier popular initiatives may have existed, the first Fiesta of the Patios at an institutional level was in 1921, when the Cordoba City Council organised the first Patio Competition with only three participants. It was intended as a showcase to display the typical use of flowers and other ornaments in spaces where the city's middle and upper class could enjoy flamenco singing and guitar performances and eat typical local dishes. During the Dictatorship of Primo de Rivera the Competition was substituted by a May Cross competition. The original event was later restored during the Second Republic. The inhabitants were responsible for decorating and caring for the patios, receiving a 'donation' from visitors and awards which were not of major relevance. During the Fiesta of the Patios, which never numbered more than 37 or 38, "there is singing and dancing of Sevillanas, flamenco singing is heard and wine and snails are served" (Colmenarejo Fernández, 2014, p. 74), the embodiment of typical Andalusian and Cordoban customs. After the Civil War the original competition resumed once more, although with fewer dwellings participating and frequent interruptions, reaching its peak of splendour during the 1960s. With the arrival of democracy the competition consolidated its presence, with annual participation of between 20 and 25 patios, an annual municipal budget to fund the event and even municipal rehabilitation policies to prevent abandonment and depopulation of the historic city centre, introducing progressive changes to the folkloric image of the fiesta as an asset of intangible heritage. Accordingly, while in the 1960s there was a maximum of 22 patios, as from 1979 the number of participants steadily increased until reaching nearly 50 since the early 21st century. This process has received support from the City Council. The budget devoted to the event has increased by 1,500% since 1979, including payments in kind (maintenance), rehabilitation grants, and even tax deductions and discounts on water bills, incentives and expenses totalling a little over 500,000 euros in 2017.

Following an initial unsuccessful campaign based on the architectural and tangible features of the patios, the Fiesta was eventually inscribed on the List of Intangible Heritage of UNESCO in 2012. The inscription was justified on the basis of the characteristics of this festive ritual deriving from a traditional way of life which is relevant to the local identity and focused mainly on involvement by the residents themselves, who are responsible for the decoration and regular care of these cultural spaces where the festival is celebrated, transmitting this practice from generation to generation. It was the associations of caretakers and friends of the patios who presented the application to UNESCO[2].

Some studies have highlighted that the total spending of tourists in the city of Cordoba during the time of the Patios exceeds 31 million euros, including accommodation, transport, restaurant spending and the cost of the entry tickets. However, this includes all spending in

Cordoba during the month of May, without differentiating between spending solely due to the Fiesta of the Patios and spending due to other tourism influxes. Martin (2013) estimated the spending associated with tourism linked to the Patios at 2.4 million euros, to which spending by locals must be added (240,000 euros) and the indirect and induced effects of both, totalling a little over 4 million euros. In fact, in 2013 approximately 80,000 people visited the Patios, of which approximately 52% were from outside the city (González Santa Cruz and López-Guzmán, 2016, p. 187), generating 1.3 million visits to the Patios during the two weekends of the Competition with an average of 260,000 visits per day and a total of 38,629 overnight stays by 33,007 tourists whose sole motive for visiting Cordoba was the Fiesta of the Patios (Martin, 2013, p. 2)[3].

Now we begin to consider the negative aspects of the event in its current format: this festival designed to preserve the traditional lifestyle of common people in Cordoban society is transforming into a tourist attraction to meet the needs of the potent local tourism industry, to the extent that the risk exists of converting the event into a virtual 'theme park' due to the excessive numbers of visitors, the loss of authenticity and the weakening of its local festive dimension (Manjavaca Ruiz *et al.*, 2017, p. 7; Cabello Montoro, 2017, p. 832).

Following the failure of the first object-based application, it was modified due to political pressure and "successfully defended by the State before the Intergovernmental Committee, formally complying with the principles of the Convention," becoming an economic tourism resource which benefits the local political classes and above all tourism and restaurant businesses in Cordoba, as opposed to the beneficiaries from the viewpoint of UNESCO, the owners of the patios or the locals in general who go out to 'do the rounds' of the patios. In other words, "we are witnessing an unprecedented process of commodification of symbolic features, whereby cultural elements are converted into a cultural product promoted by different political or business interests, …, not due to the value obtained from their use but rather their exchange value in the market" (Carrera Diaz, 2017, p. 16).

3. THE VALUE OF CULTURAL HERITAGE

From an economic viewpoint, the value of cultural heritage may be defined in relation to the amount of well-being generated for society as a whole, an approach which is valid for both tangible and intangible heritage. Accordingly, it includes market benefits deriving from goods or historical areas due to their use as a tourism resource and benefits that are external to the market economy. Determining the value that society (the users) grant to a heritage asset is essential for correct decision-making, given that they are the beneficiaries of safeguarding and protection of the heritage and in the majority of cases it is society itself that directly or indirectly pays for such measures.

Preservation and conservation of these assets involves expenses and payments by public authorities and to a lesser extent the private sector, which must compete with other alternative applications for funding in areas such as education, health, etc. In general, economic stakeholders do not receive any monetary flow from mere preservation. In any case it is only partial, given that a significant part of the social value of the asset does not accumulate in the form of potential economic benefits of tourism activities, for example. For a correct evaluation the application of a cost-benefit analysis may be less prejudicial.

Consideration of an adequate valuation, comparison with the preservation and/or conservation costs and, even incorporation of the cost of the damage in the event of its

disappearance, may have a decisive effect on economic decisions which, to a large extent, are the main reason for the deterioration or disappearance of a significant part of cultural heritage. In other words, a correct valuation may allow resolution of the problem that different consumers or users may have very different preferences and very different responses may arise in light of the different policies adopted relating to creation of heritage assets and changes made to such assets.

Firstly, it should be mentioned that certain authors consider there to be a clear dichotomy between the economic value of heritage elements and their cultural value understood as an intrinsic and objectifiable value, as opposed to more relativist views. Without forming an opinion regarding the proposals existing in relation to this latter concept, it seems evident that it is ever-changing, contextual, relative and, as was highlighted by Throsby (2001), composed of multiple attributes: aesthetic, spiritual, social, historical, symbolic and authenticity. It represents a subjective valuation, and if these attributes can be measured on quantitative or ordinal scales, regardless of the fact that certain heritage elements may be found anecdotally which have a high cultural value and a low economic value or vice versa, it seems clear that there is a high correlation between the possible scale of preference resulting from this series of attributes and that deriving from preferences on economic scales. Both value concepts will be intimately related in the majority of situations, to the extent that they may be considered as two sides of the same coin.

Focusing more on the economic valuation, the scales of preference will differ from one individual to another and from one group of users to another, but there is a certain consensus regarding the groups of beneficiaries of protection or safeguarding policies (Pagiola, 1996; Seragelden, 1999).

The first group consists of inhabitants of the direct area of influence of the heritage element in question, such as residents, neighbours, shop owners, business owners, etc.

The second group consists of visitors to the zone, such as tourists and also travellers. The final group is made up of the rest of people. This classification may be adapted for operational purposes, further subdividing these groups into subgroups depending on the level of income, place of origin, academic or professional link with the heritage element in question or any other defining characteristic that may be of interest in the context under analysis.

However, preservation and safeguarding is also undertaken to benefit a fourth group, future generations, which are often not taken directly into consideration. The principle of intergenerational equity, which is fundamental in the field of natural resource management, also plays a relevant role here.

The social value of cultural heritage derives from its utility for users and should be considered as the aggregate of different components of varying nature. The first component is the value deriving from direct enjoyment or use of the heritage, in both a recreational and an aesthetic sense. There may also be a non-use value associated with the mere existence of the heritage element and its preservation per se and bequest value for future generations regardless of its use, due to the importance society grants it as an identifying element and a vehicle for integration. But it is at this point that the main difficulties arise, given that there are certain costs and benefits that may be extremely difficult to quantify in monetary terms as they are linked to cultural considerations of an ethical nature – a tradition which is considered important to bequeath to future generations – or relating to sociability.

If monetary valuation is possible, the value may be identified in relation to the market price, if it exists, although in any case rather than a measure of the value these prices are only

an approximate indicator of this value (Throsby, 2001, p. 23). Unfortunately, the social value of cultural heritage in general and intangible heritage in particular incorporates a use value and a range of different non-use values (existence, option and bequest value), giving rise to the same conceptual issues posed by natural and environmental heritage, which tend to be non-market, public or quasi-public goods which are not appropriable and subject to externalities.

Accordingly, the economic valuation methods used in environmental economics face challenges very similar to those inherent in the case of cultural heritage and may therefore be applied to valuation of cultural heritage, whether tangible or intangible.

Regardless, the value society grants to a heritage element is derived, as mentioned previously, from the well-being it generates; the use that may be made of it by consumers and/or users. For this reason, the principle of decreasing marginal utility is also applicable, namely that society will place higher value on a historic site or intangible cultural manifestation in the event of scarcity of heritage than when the range is extensive. In this latter situation the value deriving from its preservation will be reduced, although the concept of scarcity is relative and will depend upon subjective aspects of the society or group of users in question.

However, in addition, the value deriving from its use does not necessarily have to be positive. It may be negative when consumers suffer prejudice due to the existence of the heritage element, as occurs for example when the number of tourists attracted by the heritage site reduces the well-being of citizens living in the surroundings. This prejudice may be very present in the minds of the residents in contrast to the perception of other groups of users.

4. HERITAGE VALUATION METHODS

We have seen the different types of heritage value that exist, but it is not enough to be aware of these categories, we also require resources to measure each of them. Logically, if the heritage element is listed on the market, we can use the price as an indicator of its utility, but not as a measure of its value. However, heritage elements and intangible cultural manifestations as in our case are not listed on any market or in any event, the sale price does not necessarily match the value society grants to it. The cost of entering a patio does not reflect the value it has for those who do not visit it. In any case it may be a measure of the minimum value for visitors, given that it does not include consumer surplus, nor any non-use value categories.

The economic value of private and public goods is also not equivalent to the production cost, but is rather determined in relation to the willingness of persons to pay for those goods, with such willingness to pay determining the economic value of those goods. However, the problem of economic valuation of cultural heritage is fundamentally due to the fact that they are public or quasi-public goods: they are not market goods and there is no price or if there is, as mentioned previously, it does not reflect the total economic value but rather only part of the use value. In this sense, there are two main groups of techniques may be used to measure the value: direct or declared preference methods obtained from surveys and indirect or revealed preference methods, with the highlights among these being the Hedonic Price Method (HPM) and the Travel Cost Method (TCM). These methods are based on the idea that a public good which does not have a market value – such as a historic

setting or intangible element – may be valued on the basis of the willingness of persons to pay for the good, measured based on their behaviour.

The hedonic price method estimates the preferences of consumers, examining the effect of non-market goods on the market prices of other goods. The basic idea is that persons may acquire goods on the market which may be interpreted as an aggregation of a heterogeneous series of multiple characteristics or attributes. These characteristics may not be marketed separately due to the absence of formal markets and explicit prices. The approach is to estimate the implicit prices of the characteristics that define the varieties of a single good. More specifically, it tends to be used in relation to the prices of real estate with regard to a series of factors that include the physical attributes of the property, its location, social factors of the surrounding area and, as in our case, environmental or cultural heritage features. Hedonic pricing has been used since the 1960s to measure the effect of air or water quality on the value of real estate and more recently, in projects that seek to measure the effect on the value of real estate of the proximity of a heritage and/or cultural event.

This method allows measurement of both use and non-use values. Even owners who do not visit the site or event of interest may be willing to ask/pay more to live near it, or to have the future possibility of visiting it. Evidently, in order to measure the effect on real estate prices of the different factors considered a regression analysis is used, which involves use of a large sample size and a large number of attributes for each property. However, logically non-use value cannot be inferred for all users, given that as from a certain distance property prices will not be affected by the heritage feature considered. In other words, a person from a municipality other than Cordoba itself may grant a non-use value to the patios but it is not reflected in the price of their property. Accordingly, it only allows us to measure the effect on the properties of users that are residents in the city itself, excluding other groups of users such as tourists and visitors from outside the city.

4.1 Theoretical basis

Although from a very early stage in the development of economics studies have been made of the value of properties in relation to their characteristics, it was not until the work of Lancaster (1966), Ridker (1967), Griliches (1971) and Rosen (1974) that data on the value of residential properties began to be used to estimate the benefits of changes in environmental quality measurements (air pollution), providing the first empirical evidence that air pollution affects property values.

The work of Rosen (1974) and Myrick Freeman (1974) provided a theoretical basis to derive measurements of well-being for public goods based on the differences observed in the prices of residential properties. Since then, it has been applied for numerous different aspects of environmental valuation and more recently for valuation of tangible and intangible heritage. Like other non-market valuation methods, it has only very recently been extended to valuation of cultural heritage. However, as Nijkamp (2012) points out, its use in this context is quite promising due to the availability of large databases of transaction values in the real estate market which also specify the characteristics of the property sold.

Let us assume, in accordance with Myrick Freeman *et al.* (2014), that each individual's utility is a function of that person's consumption of a composite commodity $\boldsymbol{z}$ and vectors of amenities and attributes associated with the house that person occupies, including both structural characteristics ($\boldsymbol{S}$) typical of the property (size, number of rooms, facilities, type

of construction, etc.) and the characteristics of the neighbourhood (***N***) where the house is located (density of commercial activity, crime rates, population density, etc.) and, for example, the environmental amenities of the location or relating to its historic, heritage or cultural relevance (***Q***).

Assuming that the housing market is in equilibrium - that is, that all the persons have made their utility-maximising residential choices given the prices of alternative housing locations, and that these prices just clear the market given the existing stock of housing and its characteristics, the price of the i^{th} property (P_i) can be taken to be a function of the structural, neighbourhood and the environmental and/or heritage services of that location:

$$P_i = P(\boldsymbol{S}_i, \boldsymbol{N}_i, \boldsymbol{Q}_i) \tag{1}$$

meaning that for the individual, the utility of the individual that occupies the j^{th} house would be given by

$$u = u(z, \boldsymbol{S}_i, \boldsymbol{N}_i, \boldsymbol{Q}_i) \tag{2}$$

where it is assumed that the demands for characteristics are independent of the prices of other goods. The individual maximises the utility $u(\cdot)$ subject to the budget constraint, leading us to the first order condition for the choice of an element q included in $\boldsymbol{Q}$ given by

$$\frac{\partial u}{\partial q} \Big/ \frac{\partial u}{\partial z} = \frac{\partial P_i}{\partial q} \tag{3}$$

Once we have estimated the hedonic price function ***P(S, N, Q)*** for a specific zone, its partial derivative with respect to any of the characteristics contained in the vectors ***S***, ***N*** or ***Q*** gives the implicit marginal price of that characteristic, namely, the additional amount that any household would be prepared to pay to move to a property with a higher level of that characteristic, other things being equal. An individual maximises utility by simultaneously moving along each marginal price schedule until reaching a point where the marginal willingness to pay for an additional unit of that characteristic just equals the marginal implicit price of that characteristic. If an individual is in equilibrium, the marginal implicit prices associated with the housing bundle actually chosen must be equal to the corresponding marginal willingness to pay for those characteristics.

In recent decades a number of studies have been made to value the effect of environmental or heritage externalities on housing prices. Smith and Huang (1995) and Simons *et al.* (1997) offered an overview of different studies performed since the 1960s to value air quality, groundwater contamination, existence of overhead power lines, landfills and noise pollution. Applications to cultural heritage are more recent, initially being applied to housing with historic value (Ford, 1989; Moorhouse and Smith, 1994; Deodhar, 2004; Ruijgrok, 2006) and proximity to heritage sites (Ijla *et al.*, 2011)[4].

Nonetheless, the hedonic theory does not provide a basis to determine the functional form to be used. Cropper *et al.* (1988) suggests linear, semi-log and double-log functions instead of quadratic functions when certain explanatory variables are omitted. If this function is not linear, the marginal implicit price of a characteristic is not constant, but rather depends on its level and perhaps also the levels of other characteristics. Other authors have opted for flexible functional forms; for example, Goodman (1978) used a Box-Cox transformation of the dependent variable, while other authors opted for more complex

models, such as Halvorsen and Pollakowski (1981), who proposed estimation of a quadratic Box-Cox function. Using Monte Carlo methods applied to more than 540 different hedonic price models, Kuminoff *et al.* (2010) concluded that more complex functional forms such as quadratic Box-Cox transformations are better than linear, log and semi-log functional forms.

In our case, as mentioned previously, the housing market is considered as a reference to value the degree of well-being obtained by inhabitants of the city of Cordoba due to the existence of the Fiesta of the Patios, experimenting with different functional forms.

4.2 Sample used

In order to estimate the hedonic price function, we used a sample of 1,299 houses on sale in real estate agencies of the city of Cordoba during January of 2018. We deleted from the sample all houses located in peri-urban zones, both because it was considered that their distance from the Historic Centre invalidated the analysis and also because of the high internal variability due to the presence of zones with illegal constructions. Consequently, we have not included in the analysis any houses in the following districts: "Periurbano Este-Campiña" (Pedanía de Alcolea) and "Periurbano Oeste-Sierra" (El Higuerón, Las Jaras, Santa María de Trassierra and Villarrubia neighbourhoods), consisting of a total of 87 houses. Furthermore, due to the same reasons we also omitted another 122 houses located in the El Brillante, El Naranjo and El Patriarca neighbourhoods, the most outlying zones of the Norte-Sierra District and also considered part of the peri-urban zone. As a result, the sample consisted of 1,090 houses distributed in 56 neighbourhoods of the city (Annex 1).

For each house we had the offer price, the built surface area, the number of rooms, the number of bathrooms, the construction type (rooftop apartment, duplex, flat or single-family house, interior or exterior, used or new) and the number of stories of the building, along with the availability of a garage, garden, storage room, heating, air conditioning, lift, swimming pool, built-in wardrobes or terraces. The exact address was only available for part of the sample; in the majority of cases only the street or the district was available. In addition, we have only obtained information on the year of construction for 517 of the properties so this variable has not been used, although an estimation of the model for the sample size suggests that it is probably not particularly relevant.

Each house has been codified with its district and neighbourhood in such a manner that additional information obtained from other sources has been included regarding the neighbourhood where it is located[5]. For example, information has been obtained regarding some of the social characteristics of each neighbourhood from the "Social Diagnostics" studies performed by the Municipal Social Services of the city of Cordoba, obtaining indicators regarding the perception citizens have regarding certain crimes or activities (drug consumption, theft, prostitution, gender-based violence, racism, begging and violent fights)[6]. These studies have also been used to extract information on the population density of the neighbourhood, its surface area, an indicator of the general satisfaction of its residents, the percentage of the population with university studies, the average size of the families residing in the houses and the income level declared for each neighbourhood.

Finally, three additional variables were incorporated relating to the Fiesta of the Patios. The first of these is whether the dwelling is located in one of the patios that have entered the competition in recent years - which was verified in the case of 15 of the dwellings included in the sample. An indicator was also established for the average weighted distance of each

neighbourhood to the locations of the patios that took part in the competition in 2017. This was done in the following manner: firstly, the minimum distance between the boundaries of each neighbourhood and each of the nine neighbourhoods with patios participating in the competition was measured. Secondly, an approximation was made of the distance to the centre of each district, adding the radius of the source and target neighbourhoods to the above distance based on a circular approximation of the corresponding neighborhood. The distances obtained in this manner were weighted for each neighbourhood according to the density of patios (number of patios/km²) in the target neighbourhood to give an average weighted distance to the patio zones. The inverse of this distance has been used as the indicator. A dummy variable has also been incorporated which takes into account for each dwelling the fact that the neighbourhood where it is located is included in the Historic Centre declared a World Heritage site, given that its special protection may have some impact on the value of the property.

4.3 Functional form

As commented above, the majority of the empirical studies have used linear, logarithmic or semi-log models, although some authors have highlighted the advantages of the Box-Cox transformation. In our case we have started out with a logarithmic model for non-dichotomous variables:

$$P_i = e^{\beta_0} e^{\sum_{j=1}^{k} \beta_j d_{ji}} \left(\prod_r x_{ji}^{\theta_i} \right) z_i^{\gamma} e^{\varepsilon_i} \qquad i = 1, \dots, n \tag{4}$$

where d_{ij} are dichotomous variables incorporated in the model, x_{ji} are the measurable variables and z_i is the variable representing the inverse indicator of the weighted distance to the neighbourhoods with patios included in the competition as defined previously. The variable ε_t is a random disturbance which we assume is distributed normally with null average, constant variance and serially uncorrelated. The magnitudes β_i (i=0,..,k), θi (i=1…,r) and γ are ($k+r+2$) parameters that must be estimated with the sample data. Taking Napierian logarithms in (4) it is possible to write:

$$Ln\ P_i = \beta_0 + \sum_{j=1}^{k} \beta_j\ d_{ji} + \sum_{j=1}^{r} \theta_i\ Ln\ x_{ji} + \gamma\ Ln\ z_i + \varepsilon_t \tag{5}$$

which is the linear regression model that may be estimated using MCO techniques. In our case this model has been estimated using stepwise regression until selecting an optimal series of regressors. After selecting the regressors we have applied transformations in the dependent variable – price per m² – of the Box-Cox form, using the variable given by:

$$P_i^{(\lambda)} = \frac{P^{\lambda} - 1}{\lambda\ p^{\lambda-1}} \qquad con\ \lambda \neq 0 \tag{6}$$

and, in addition,

$$P_i^{(\lambda)} = p\ Ln\ P_i \qquad con\ \lambda = 0 \tag{7}$$

where λ is a parameter to be determined and p is the geometric average of all the observations of P_i. A value of λ=0 implies a logarithmic transformation of the variable, while in the extreme case of λ=1 we will have a linear transformation. In our case we have generated a grid of values of $\lambda \in$ (-1, 1), estimating the successive regressions with the transformed prices and retrieving for each of them the sum of squared errors of the estimation (SSE).

Figure from Annex 4 offers a graphical representation of the SSE for each value of λ, where it can be seen that the minimum value of the sum of squared errors in regression (SSR) is around zero. It can therefore be concluded that the most adequate functional form is very close to the logarithmic transformation of the dependent variable and accordingly, this form (5) is the one we will use to evaluate the results of the estimation.

4.4 Results of the estimate

Model (5) has been estimated using MCO techniques with the 1,090 observations. Nonetheless, there are 10 observations with atypical values determined using the Mahalanobis distance. These values correspond to dwellings with extremely low prices – less than €500/m² - or extremely high prices – more than €2,100/m². Using the Cook distance, we have chosen to omit them from the sample because they resulted in abnormally large values with a significant influence on the estimates. Accordingly, the final model has been estimated using 1,080 observations, the results of which are set out in Table no. 1.

Table no. 1 – Estimated Hedonic Price Model (Dependent variable Ln price_m2)

Variable	Coefficient	Stand. Error	Statistical t	Probab.
Constante	8.7886	0.3650	24.0787	0.0000
Ln Superf_Con	-0.3215	0.0286	-11.2460	0.0000
Dum_ascen	0.2130	0.0166	12.8248	0.0000
Ln Renta	0.2827	0.0302	9.3480	0.0000
Dum_gar	0.1581	0.0163	9.6725	0.0000
Ln Num_hab	-0.0667	0.0266	-2.5099	0.0122
Dum_tipo	-0.2062	0.0214	-9.6317	0.0000
Dum_calef	0.0708	0.0146	4.8556	0.0000
Ln Num_ban	0.1744	0.0239	7.2993	0.0000
Lnprost	0.2984	0.0482	6.1933	0.0000
lind_pat	0.1405	0.0225	6.2440	0.0000
Dum_pisc	0.1235	0.0204	6.0595	0.0000
Dum_aire	0.0647	0.0166	3.8942	0.0001
Lnrinas	-0.1409	0.0372	-3.7831	0.0002
ES_patio	0.1272	0.0562	2.2648	0.0237
Dum_RMB	0.0895	0.0277	3.2372	0.0012
Peri_barr	-0.0330	0.0095	-3.4691	0.0005
Ldensidad	-0.0214	0.0084	-2.5389	0.0113
Dum_trast	0.0322	0.0148	2.1768	0.0297
Patri_hum	0.0779	0.0341	2.2854	0.0225
$R^2 = 0.5596$				

After estimating the model we have performed different contrasts to analyse the validity of the estimates. Firstly, we have sought to verify the homoskedasticity of the

disturbances via the White Test (1980). Performing the auxiliary regression with cross-products (191 regressors), the contrast statistic has the value 245.21. The critical value will be defined by a distribution χ^2 with 191 degrees of freedom, which would be 224.24 with a significance level of 5%, making it impossible to maintain the homoskedasticity hypothesis and leading to the conclusion that the random disturbances are heteroskedastic. To correct this problem we have reestimated the model, performing White's asymptotic transformation of the variance-covariance matrix of the estimates, given that the sample size assures the efficiency of the MCO estimators.

The results of the new estimated model, which only affect the estimated standard errors but not the estimation, are set out in Annex 3. In order to analyse the possible existence of multicollinearity, firstly we calculated the Pearson correlation coefficients of the regressors. They were between -0.792 and 0.755, not high enough to cause multicollinearity. In addition, all the coefficients estimated are significantly different to zero at a 95% confidence level, a conclusion which is reinforced by the joint significance test based on Snedecor's F (F=79.88).

Accordingly, we can reject the null hypothesis of the coefficients with a confidence level close to 100%. Nonetheless, calculating the variance inflation factor (VIF) for each estimated coefficient, it was confirmed that all of them are between 1.071 and 4.187, rejecting the presence of multicollinearity. It is also possible to analyse the presence of autocorrelation, although in this case with a cross-sectional sample it makes little sense. Using Durbin-Watson statistics, which have the value DW = 1.8914, it was verified that it falls asymptotically in the first-order autoregressive autocorrelation null hypothesis rejection zone. However, due to the data limitations, the analysis of the possible existence of a special autocorrelation remains pending. Finally, possible specification errors have been contrasted using the Ramsey test. The F-statistic associated with the contrast, with 1 and 1,059 degrees of freedom, gives a value of F=2.5809, while the value defining the critical region is 3.8502 with a 95% confidence level. It can therefore be affirmed that the model is correctly specified. The final estimated model explains 55.96% of the variance of the dependent variable. The coefficients of the dummy variables reflect the changes representing compliance or otherwise with the condition proposed in relation to the dwelling.

4.5 Valuation of the Fiesta of the Patios

The effect of the variables introduced to measure the effect of cultural heritage can now be analysed. Firstly, when a dwelling is an integral part of the patio, which as mentioned previously is true in the case of 15 properties, the coefficient of the variable Es_patio measures this effect. The estimate is significant with a confidence level higher than 97%, indicating a clearly positive effect on the price per m². These dwellings would have a price 13.6% higher than other dwellings with similar characteristics located elsewhere.

The fact that the dwelling is located in the zone included in the World Heritage declaration– which covers four neighbourhoods of the historic centre – is measured using the coefficient of the variable Patri_hum, the inclusion of which in the model is significant with a confidence level higher than 97%. In fact, its estimate of 0.0779 indicates that it also has a positive effect on the price per square metre, meaning that a dwelling located in these four neighbourhoods has its value increased by 8.1% compared to a dwelling with the same characteristics located in other zones of the city, even if it is in other parts of the historic centre.

However, perhaps even more interesting is the inclusion of the variable lind_pat. This is the Napierian logarithm of the indicator of the average weighted distance of each neighbourhood to the neighbourhoods with patios participating in the competition in 2017. The coefficient is significantly different to 0 with a confidence level of practically 100%. Let us look now at its interpretation. This variable matches the variable z_i in equation (5). Deriving equation (5) with respect to z_i we retrieve the marginal willingness to pay w_i defined as:

$$\frac{\partial P_i}{\partial z_i} = w_i = \gamma \frac{P_i}{z_i} \tag{8}$$

for each element of the sample, meaning that the marginal willingness to pay is not constant but rather depends upon the level reached by the variable z_i, which in our case is just the inverse of the average weighted distance to the patio zones. Accordingly, in reality we can affirm that there is a function $w=w(z_i)$ that will determine the combinations between the indicator of proximity to the patios and the implicit marginal price deriving from the same.

Making the predictions of the prices per square metre of the dwellings – taking into account that the distribution is log-normal – we can estimate this function using (9). Annex 3 sets out the estimated function, corrected for heteroskedasticity using White's transformation, and the figure corresponding to the combinations of the proximity indicator and the implicit marginal price.

After estimating the function w = w(z), we can obtain the profit or benefit that Cordobans obtain from bringing their place of residence closer to one location or another. To do so, we simply integrate the area under the estimated curve:

$$\int_{z_1}^{z_2} w(z)\, dz \tag{9}$$

Taking into account this result, we can evaluate the effect of being closer to the patio zones. For example, moving to live from a distance of 2,000 metres to a distance of 1,500 metres from the patio zone increases the price per square metre of the property by 63.1 €/m²; In other words, an average property with a built surface area of 115.12 m² would increase its value by €7,264.20.

As the distance is shortened, the value obtained from improvement of the location increases. Moving from an average weighted distance of 1,000 metres to 500 metres improves the price per square metre by around €150.16 /m², equivalent to an increase in the value of an average property of €17,286.60.

The proximity of the patio zones results in an increase in property values and accordingly provides a means of measuring the valuation that Cordobans grant to such proximity.

5. CONCLUSIONS

The studies carried out have concluded that dwellings located near the patio zones obtain a higher average market value than those with similar characteristics located in areas further away. This result must be interpreted correctly. Cordoba is not a monocentric city but rather has various zones which are generally relatively modern and in which the income levels and accordingly the average house prices are higher. These zones are well-equipped

with shops, wide avenues, public parks etc. located in highly heterogeneous zones. On the contrary, many of the neighbourhoods located near the zones of the patios participating in the competition have medium or low-medium income levels. It may therefore be affirmed that the results obtained are not due to any type of spurious relationship.

The use of offer prices instead of, for example, valuation or purchase prices, cannot be considered as a deficiency in this study. Muñoz Fernández (2012, p. 254) analysed the relationship existing in Cordoba between offer prices and valuation prices, concluding that the time series of both prices may be lineally adjusted, with a coefficient of determination of 99.6%.

However, as we have seen it is not only the proximity of the patios which is relevant but also the fact that the dwelling is located in a patio or in addition it is located within the zone declared a World Heritage site by UNESCO. Evidently, these results differ from other studies made in Cordoba to explain the behaviour of housing prices (Brañas-Garza and Caridad y Ocerin, 1996; Caridad y Ocerin and Ceular Villamandos, 2001; Muñoz Fernández, 2012) given that this appears to be a new phenomenon deriving from the accumulation of the UNESCO brand in Cordoba and the tourism boom that the city is currently experiencing.

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ANNEX 1

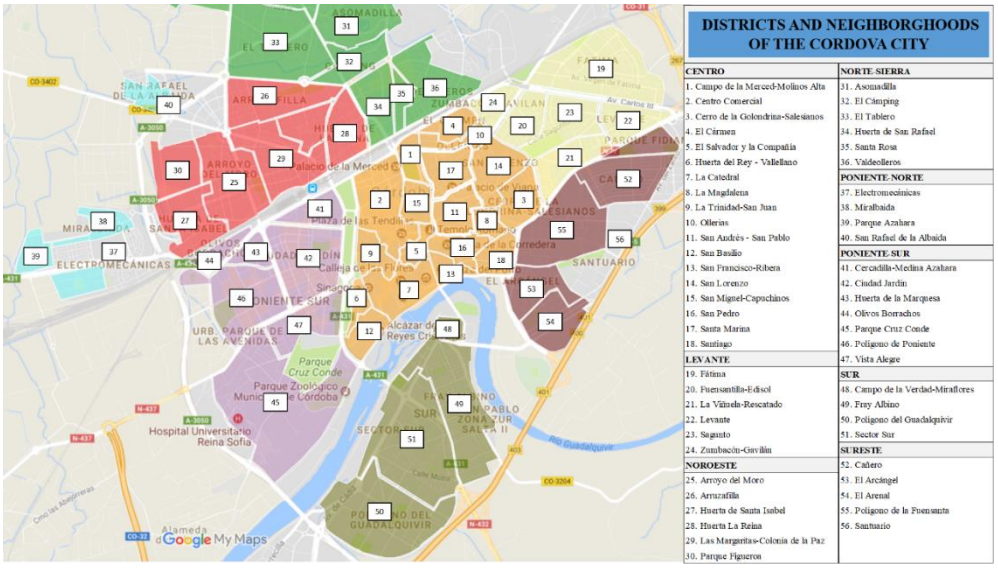
Sample distribution by districts and neighbourhoods

Districts / neighbourhoods	No. Of dwellings	Mean price (€/m²)	Stand. Desv. of Price (€/m²)
Centro	345	1,617.6	442.0
1. Campo de la Merced-Molinos Alta	3	1,971.1	345.3
2. Centro Comercial	100	1,782.7	477.7
3. Cerro de la Golondrina-Salesianos	7	1,252.8	404.3
4. El Carmen	18	1,537.9	459.5
5. El Salvador y la Compañía	2	1,932.7	332.7
6. Huerta del Rey - Vallellano	7	1,560.5	167.5
7. La Catedral	6	1,707.5	367.2
8. La Magdalena	4	1,273.2	234.8
9. La Trinidad-San Juan	4	1,487.9	212.8
10. Ollerías	57	1,602.0	394.2
11. San Andrés - San Pablo	11	1,548.4	405.3
12. San Basilio	39	1,607.0	415.5
13. San Francisco-Ribera	3	1,674.3	162.8
14. San Lorenzo	19	1,374.6	358.7
15. San Miguel-Capuchinos	3	1,646.3	221.7
16. San Pedro	44	1,535.9	453.9
17. Santa Marina	12	1,512.4	357.4
18. Santiago	6	1,420.4	166.5
Levante	99	1,305.3	319.0
19. Fátima	42	1,298.5	282.1
20. Fuensantilla-Edisol	2	1,858.4	204.1
21. La Viñuela-Rescatado	19	1,364.7	404.5
22. Levante	28	1,239.6	280.2
23. Sagunto	6	1,242.8	229.7
24. Zumbacón-Gavilán	2	1,439.5	289.5
Noroeste	138	1,823.1	555.3
25. Arroyo del Moro	8	2,096.2	311.3
26. Arruzafilla	11	1,865.9	418.2
27. Huerta de Santa Isabel	13	1,894.9	292.8
28. Huerta La Reina	75	1,883.3	584.8
29. Las Margaritas-Colonia de la Paz	29	1,583.6	580.1
30. Parque Figueroa	2	1,243.8	160.4
Norte-Sierra	210	1,742.7	471.0
31. Asomadilla	1	1,461.6	0.0
32. El Cámping	4	1,686.4	362.0
33. El Tablero	76	2,017.2	445.4
34. Huerta de San Rafael	4	1,759.0	293.9
35. Santa Rosa	52	1,585.7	395.1
36. Valdeolleros	73	1,574.8	427.8
Poniente Norte	30	1,340.7	432.4
37. Electromecánicas	3	1,355.7	238.2

Districts / neighbourhoods	No. Of dwellings	Mean price (€/m²)	Stand. Desv. of Price (€/m²)
38. Miralbaida	9	1,367.3	378.0
39. Parque Azahara	11	1,154.7	453.8
40. San Rafael de la Albaida	7	1,592.3	388.5
Poniente Sur	176	1,605.6	513.1
41. Cercadilla-Medina Azahara	11	2,062.2	578.2
42. Ciudad Jardín	92	1,445.6	508.5
43. Huerta de la Marquesa	2	1,966.7	433.3
44. Olivos Borrachos	5	1,869.9	709.1
45. Parque Cruz Conde	27	1,580.2	370.8
46. Polígono de Poniente	33	1,853.0	374.3
47. Vista Alegre	6	1,635.7	236.4
Sur	45	1,175.6	413.4
48. Campo de la Verdad-Miraflores	11	1,537.5	339.1
49. Fray Albino	8	1,201.7	357.3
50. Polígono del Guadalquivir	4	1,048.5	81.0
51. Sector Sur	22	1,008.3	384.4
Sureste	47	1,293.8	431.3
52. Cañero	17	1,380.9	462.8
53. El Arcángel	4	1,128.3	117.2
54. El Arenal	5	1,950.8	277.7
55. Polígono de la Fuensanta	17	1,106.6	281.4
56. Santuario	4	1,064.1	167.3
Totales	1,090	1,597.6	497.1

ANNEX 2

Geographical location of the different neighbourhoods and districts



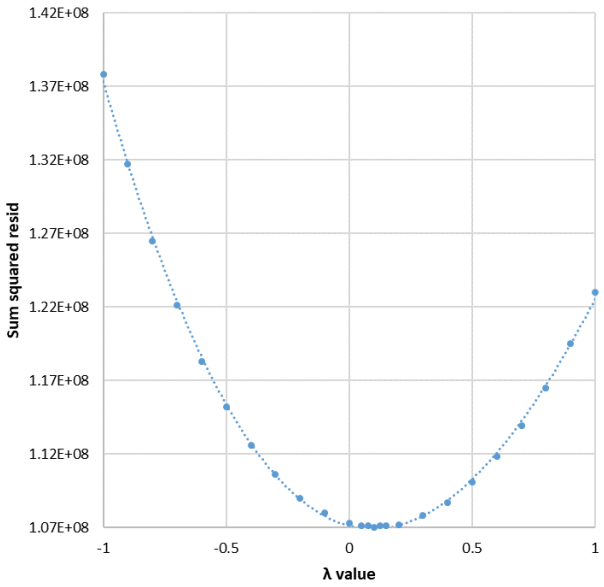
ANNEX 3

Variables statistical description

Variable	Definition	Mean	Standard deviation	Max.	Min
Precio	*Total Price of the dwelling house (€)*	204427.55	124019.51	865000	31000
Superf_Con	*Constructed area (m²)*	129.9	78.76	790	37
Precio_m2	*Surface price(€/m²)*	1597.59	497.12	3656.25	325
Num_hab	*No. of rooms*	3.34	1.46	21	1
Num_ban	*No. of bathrooms*	1.87	0.96	14	1
Dum_ati	*Top floor =1 / No top floor = 0*	0.04	0.21	1	0
Dum_dupl	*Duplex = 1 / No Duplex = 0*	0.01	0.12	1	0
Unifamiliar	*Detached house= 1 / Other = 0*	0.18	0.39	1	0
Dum_tipo	*Flat = 1 / No flat = 0*	0.78	0.42	1	0
Planta	*Floor*	1.96	1.73	7	0
Dum_int	*Interior = 1 / Exterior = 0*	0.05	0.21	1	0
Dum_usado	*Used = 1 / New = 0*	0.98	0.12	1	0
Dum_ascen	*Lift = 1 / No lift = 0*	0.59	0.49	1	0
Dum_gar	*Garage =1 / No = 0*	0.42	0.49	1	0
Dum_pisc	*Swiming pool = 1 / No = 0*	0.2	0.4	1	0
Dum_jard	*Garden = 1 / No = 0*	0.17	0.38	1	0
Dum_trast	*Storage room = 1 / No = 0*	0.49	0.5	1	0
Dum_terr	*Terrace = 1 / No = 0*	0.75	0.43	1	0
Dum_arm	*Closets = 1 / No = 0*	0.76	0.43	1	0
Dum_aire	*Air conditioning= 1 / No = 0*	0.78	0.42	1	0
Dum_calef	*Heating = 1 / No = 0*	0.37	0.48	1	0
Peri_barr	*Perimeter of the neighborhood (Km)*	2.59	0.87	5.36	0.95
Radio_barr	*Radius of the neighborhood (m)*	308.4	106.89	583.6	139.34
Has_barr	*Surface of the neighborhood (Has)*	33.47	22.42	107	6.1
Lnprost	*Log. Prostitution*	4.59	0.15	4.7	3.77
Lndroga	*Log. Drug consuption*	4.11	0.3	4.7	3.24
Lnmend	*Log. Homelessness*	3.49	0.49	4.7	2.3
Lnrac	*Log. Racism*	4.62	0.05	4.7	4.28
Lnrob	*Log. Robberies*	3.38	0.36	4.58	2.3
Lnrinas	*Log. Argues*	4.25	0.23	4.7	3.63
Lnviom	*Log. Misogynist violence*	4.63	0.06	4.7	4.34
Lsatis	*Log. Satisfaction*	2.71	0.29	3.91	2.3
Lporuniv	*Log. % university students*	3.49	0.36	4.37	2.3
Lmedhog	*Log. Mean size of the dwelling*	1.27	0.09	1.63	1.1
Ldensidad	*Log. Population density (Hbtes/Km²)*	4.84	1.09	6.2	1.1
RENTA	*Rent level of the neighborhood.(from 1 to 5)*	3.28	1.18	5	1
Dum_RA	*High rent= 1 / No = 0*	0.25	0.43	1	0
Dum_RB	*Low rent = 1 / No = 0*	0.04	0.2	1	0
Dum_RMA	*Medium to high rent= 1 / No = 0*	0.33	0.47	1	0
Dum_RMB	*Medium to low rent = 1 / No = 0*	0.26	0.44	1	0
ES_PATIO	*Patio= 1 / No = 0*	0.01	0.12	1	0
DM_patios	*Weighted average distance to patios (m)*	1588.73	625.58	3021.38	172.7
lind_pat	*Log. Inverse of weighted average distance to patios*	-7.29	0.4	-6.37	-8.14
Patri_hum	*Located in World Cultural Heritage site = 1 / No = 0*	0.05	0.21	1	0

ANNEX 4

Transformation of Box-Cox in the price per m²



Notes

[1] This paper does not consider recognition also granted by UNESCO in relation to natural heritage.

[2] The non-profit organisations 'Claveles y Gitanillas' and 'Amigos de los Patios Cordobeses' have undertaken to safeguard the fiesta and its inherent cultural spaces and the annual organisation of the ritual (UNESCO, 2012).

[3] Taking into account the number of patios in the competition, the average visits per patio during the weekends was around 5,500 people, giving an idea of the level of saturation of the event. In 2016, the queues to visit the patios were such a frequent occurrence that the City Council was obliged to create a unit of security guards to regulate the flow of visitors during the two weeks of the event, devoting a total of 3,190 hours in 2017 and with a forecast of 5,390 hours for 2018 with a total cost of €75,406.

[4] See Nijkamp (2012), for example, for a summary of applications in the field of cultural heritage.

[5] Although the districts match the census districts of the National Statistics Institute, the neighbourhoods are aggregations of urban areas performed by the City Council to establish Neighbourhood Councils and are not equivalent to the sections in the census.

[6] These variables have taken the percentage of residents which in the surveys performed declared that they had never witnessed those activities.

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