1. Introduction: methodological approach

The general purpose of this study was to supply technical tools aimed to improve the environmental quality and to reverse the progress of urban deterioration. Although the public sector should establish the policy and general environmental planning, the extension of the problem is such that it exceeds the possibility to be solved only by means of public resources. That is why it is necessary to relate the improvement of environmental quality with profitability criteria. In such a way the private sector will be interested in reaching this purpose. This policy will allow to obtain important qualitative results and will make possible the success of a long-term activity in this field.

From the methodological point of view, an appropriate tool is the econometric technique called “hedonistic prices”. This method intends to discover and establish the relative importance of every attribute of a good that explains its price. The hedonic studies applied to housing indicate that dwelling attributes are numerous and may be classified in groups from their nature (Adair et al., 1996). For example, the price $P_h$ will be in function of a determined group of characteristics (Azqueta Oyarzún, 1994).

$$P_h: f (F, N, E)$$

Where:

- $F$: physical attributes of the property (area, materials, number of rooms, age, etc)
- $N$: neighbourhood characteristics (services, equipment, etc)
- $E$: other environmental features (air pollution, noise, green spaces, etc)

There are a number of interesting recent applications of this method in the urban real-estate market (sale and rent of houses). Examples of this are the works of Adair et al. (1996) and Hoesli et al. (1997), and the study of the influence on property prices of
environmental disasters (Beron et al., 1997), adjacent productive activities (Palmquist et al., 1997) and urban woods presence (Tirvainen, 1997).

2. Study case

The study case considers a number of single-family houses built in the foundational area of La Plata, capital city of the Province of Buenos Aires, founded in 1882 about 60 kilometres south of Buenos Aires. It was considered an adequate example, due to the fact that clear environmental considerations had been taken in its design. La Plata was designed according to the sanitary principles in fashion in the European cities on the late last century. That is reflected in the width of its avenues, the richness and the spatial frequency of public green spaces and the application of specific sanitary rules (Morosi et al., 1984; Garnier, 1992).

The foundational area of city of La Plata is a square of 5,196 meters of side. The original plan assigned 58% of the surface for buildings, 35% for streets and avenues and 9% for green squares and parks. Thus La Plata was the town with greater proportion of green areas in the country.

Having in mind the particular characteristics of La Plata and the difficulty to obtain accurate register of its environmental variables (water and atmospheric pollution, level of noise, etc.) we emphasised the aspects referred to forestation and green spaces as indicators of urban environmental quality.

3. Attained results

From this preliminary application of the hedonic model, it arises that the average appraisal value of houses was U$S 89,730, which can be explained through the significant variables shown in Table 1. The “ranking of option” is showing, in a simplified way, the weight of each estimated coefficient. For example, GPS3 and GPS2 have got, respectively, the highest positive and negative coefficient values.
Table 1

<table>
<thead>
<tr>
<th>Type of variable</th>
<th>Name</th>
<th>Explanatory variable</th>
<th>Unit</th>
<th>Ranking of option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristics of The House</td>
<td>CSUR</td>
<td>Surface area.</td>
<td>M²</td>
<td>+ 7</td>
</tr>
<tr>
<td></td>
<td>SSUR</td>
<td>Semi- covered surface area.</td>
<td>M²</td>
<td>+ 9</td>
</tr>
<tr>
<td></td>
<td>BATH</td>
<td>Bathrooms and/or toilette.</td>
<td>Nº</td>
<td>+ 2</td>
</tr>
<tr>
<td></td>
<td>CLO</td>
<td>Closets.</td>
<td>Yes/No</td>
<td>+ 3</td>
</tr>
<tr>
<td></td>
<td>FS</td>
<td>Free Space.</td>
<td>%</td>
<td>+ 8</td>
</tr>
<tr>
<td>Urban Services</td>
<td>TRA 3</td>
<td>Distance from the house to the nearest bus stop.</td>
<td>M</td>
<td>- 2</td>
</tr>
<tr>
<td></td>
<td>EDU 2</td>
<td>Distance from the house to the nearest primary school.</td>
<td>M</td>
<td>+ 5</td>
</tr>
<tr>
<td>Environmental Variables</td>
<td>NEG</td>
<td>Distance from the house to negative impact areas.</td>
<td>M</td>
<td>+ 6</td>
</tr>
<tr>
<td></td>
<td>NTR</td>
<td>Trees in front of the house.</td>
<td>Nº</td>
<td>+ 4</td>
</tr>
<tr>
<td></td>
<td>GPS 2</td>
<td>Distance from the house to the nearest park or recreational green space.</td>
<td>M</td>
<td>- 1</td>
</tr>
<tr>
<td></td>
<td>GPS 3</td>
<td>The housing is facing a public green space.</td>
<td>Yes/No</td>
<td>+ 1</td>
</tr>
</tbody>
</table>

As indicated by the high value of each attribute, the environmental behavior is significant for the economic housing valuation. By one side, NEG shows that to be far from a negative impact zone is economically appreciated. On the other hand, three variables in relation with vegetation and green spaces must be taken into consideration: the number of trees in front of the house (NTR), the distance to green spaces as the “Bosque” (the city park) (GPS2) and the quality of being in front of a green space as a square or a park (GPS3). GPS2 has negative sign: an additional block of distance reduce the average valuation. The fact of being owner of a lot that faces a green space constitutes the variable whose coefficient surpasses in value all other attributes considered.

Although the size of the lot was not a significant variable according to the model, the percentage of free space in it (FS) resulted an appreciated house attribute.

The city of La Plata is provided with a system of squares of at least one hectare. Those squares are symmetrically distributed and separated from each other six blocks. That pattern does not exist outside the foundational area. It has been observed that the distance between the houses and its nearest green space, when rank or magnitude are
not considered, is not significant for the foundational area audits outskirts. That may be explained because the observations have been done in a zone where all the houses, according to the original city plan, are very close to the mentioned green spaces.

4. Final comment

All intangible economical valuation methods are debatable and subject to controversy. Among other reasons, in spite of the existence of a developed theory and a specified methodology expressed through equations, it is unavoidable to make certain subjective decisions. They involve professional, ethic and cultural attitudes, in relation to the definition of urban environment and its attributes. Besides, these variables must reflect the users and tenants views about housing and its attributes. In short, there is a numerical evaluation of aspects with an important subjective component.

It seems risky to affirm, as it could be understood from the application of the model, that an additional unit of the measured attribute increases or diminishes the value of the property in an exact amount. It seems properly to say, as stated in the international antecedents consulted, that the estimated value is “associated” to a unit of the considered attribute. In the real estate field, each attribute is expressing a series of interdependent qualities. For example, the higher value of a lot of land facing a square may not only arise from its environmental advantages but also from the more pragmatic fact that, according to municipal regulations, it is possible, in these places, a greater exploitation of the lot. That means potentially a higher rate of return of the investment.

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References

