

Research Paper

The Effect of an Urban Park View on the Price of Apartment

- A Case of Songdo Central Park -

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도시공원의 조망 여부가 아파트 가격에 미치는 영향

- 송도 센트럴 파크를 사례로 -

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요약 : 세계 곳곳에서는 새로운 도시들이 계속 건설되고 있으며, 도시로 이주하는 사람들의 수 또한 급증하고 있다. 현재 약 54 퍼센트의 세계 인구가 도시에 살고 있으며, 2050년까지 66 퍼센트로 증가할 것으로 예측된다. 따라서 도시지역 관리는 전지구적 지속 가능한 발전에 있어 가장 중요한 과제 중 하나라고 볼 수 있다. 효과적인 도시지역 관리를 위해서는 도시 주민들에게 미학적, 정신적 그리고 보건적 혜택을 제공하는 도시 내 녹지지역의 유지관리가 핵심이다. 그러나 녹지지역의 경제적 가치 평가의 어려움으로 인해 사회에서는 이러한 녹지지역 혜택의 필요성을 충분히 인식하지 못하고 있다. 이에 본 연구는 송도 센트럴 파크가 제공하는 미학적 혜택의 경제적 가치를 추정하기 위하여, 공원 조망이 주변 아파트 가격에 긍정적인 영향을 미치는지에 대해 헤도닉 가격 기법을 사용하여 분석하였다. 분석 결과, 아파트 가격과 송도 센트럴 파크 조망 간에 양의 상관관계가 존재하며, 조망이 있는 아파트의 가격이 조망이 없는 아파트의 가격에 비해 5 퍼센트 정도 높은 것으로 추정되었다. 또한 송도 센트럴 파크와의 거리 또한 아파트 가격에 영향을 미치는 것으로 추정되었다.

주요어 : 지속가능발전, 친환경도시, 도시공원, 경관 조망, 헤도닉 가격 기법

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Abstract : Around the world, a lot of people are migrating to the urban areas, and new cities are continuously being constructed. Currently about 54 percent of the world's population live in the urban areas, and by 2050, it is expected to increase to 66 percent; thus, managing the urban areas is one of the most important challenges of sustainable development in the 21st century. The key to successful urban management is to preserve the urban green spaces, which provide aesthetic, psychological and health benefits to the urban citizens. However, the benefits of the urban green spaces are not fully appreciated within the societies due to the difficulty of economic valuation of the urban green spaces. This study examined whether the view of the Songdo Central Park has a positive influence on the prices of the surrounding apartments, using the hedonic pricing method. The results showed that a positive relation exists between the view of the Songdo Central Park and the price of apartment. The price of an apartment with the view of the Songdo Central Park was 5 percent higher than that of an apartment without the view. In addition, it was estimated that the proximity to the Songdo Central Park has an influence on the housing price as well.

Keywords : Sustainable Urban Development, Urban Park, Landscape View, Hedonic Pricing Model

I. Introduction

Around the world, a lot of people are migrating to the urban areas, and new cities are continuously being constructed. According to a UN report, currently around 54 percent of the world's population lives in the urban areas, and by 2050, the urban population is expected to increase to 66 percent (UN 2014). Accordingly, the demand for sustainable urban development is ever growing, and the 11th goal of Sustainable Development Goals (SDGs) sets the target of constructing sustainable cities. Therefore, managing the urban areas is one of the most important challenges of sustainable development in the 21st century.

The urban green spaces – usually in the form of urban parks – provide aesthetic, psychological and health benefits to the urban citizens, which are crucial for creating sustainable cities. The Millennium Ecosystem Assessment (2005) refers to these benefits as 'ecosystem services,' categorizing it into four functions of supporting, provisioning, regulating and cultural services. All four services are equally crucial for enhancing the human welfare, but the cultural services should

be preserved with greater concern as there are socio-economic means to substitute the provisioning and regulating services, while the cultural values cannot be replaced (Plieninger et al. 2013).

However, the benefits of the cultural services – aesthetic, recreational, historical, etc. – are not fully appreciated within the societies; thus, an economic assessment of this service is required to understand the true value of it (Chen et al. 2012). Measuring the trade-off between cultural services and other financially profitable goods is a difficult task as it does not have readily observable prices for comparison. Nonetheless, it has become imperative to conduct an economic valuation of the cultural services for urban planning policies as lack of quantified evidence may lead to an underestimation of environmental necessities during the decision making process.

In the Republic of Korea, the average park area per person is 8.6 m², which is below the minimum threshold of 9 m² of green space per person suggested by the World Health Organization (WHO 2010). In order to address this issue, the Korean government started to increase the share

of area designation for urban parks and green spaces in newly constructed cities. Songdo city, a new city developed on 1,500 acres of reclaimed waterfront land, has a masterplan for 40 percent green space-to-built space ratio with 100 acre of land designated for recreational parks (New Songdo City 2016). From the planning period, Songdo city has focused on providing urban parks with various aesthetic amenities for the residents.

This study examined whether the view of the Songdo Central Park (SCP) – a representative urban park of Songdo city – has a positive influence on the prices of the surrounding apartments. The apartments adjacent to the SCP were selected as a sample, and the hedonic pricing model (HPM) was used to estimate the effect of the view of an urban park on the prices of apartments. The result of this study will provide a basis for the economic assessment of the SCP, and assist in the formation of future policies related to urban green space allocation. Section 2 presents the literature review of the previous studies. Section 3 discusses the methodology and the data. Then, Section 4 presents the results and the analysis. Finally, Section 5 concludes.

II. Literature Review

There exist a multitude of definitions for cultural services, which is a fairly new field of research (Milcu et al. 2013). Among the various definitions, this study follows the definition of Millennium Ecosystem Assessment(2005), which states cultural services as “the nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experience, includ-

ing, e.g., knowledge systems, social relations, and aesthetic values.” Specifically, this study focuses on the aesthetic experiences provided by the SCP through the view of the park.

Bound & Hunhammar(1999) discussed the ecosystem services in the urban areas, and highlighted that the recreational and cultural aspect of the urban ecosystem services are the most valued services. Furthermore, Fuller et al. (2007) explained that a green view increases job satisfaction and reduces job stress: emphasizing the role of cultural services in enhancing human well-being.

The cultural services, especially the aesthetic landscapes, have no market to determine its economic value; thus, the economic values are estimated indirectly. For the economic valuation of aesthetic landscapes, HPM and travel cost methods (TVC) are often adopted (De Groot et al. 2010). Previous studies that evaluated the value of aesthetic landscape mostly used HPM, which assumes that a utility from a specific environmental resource around the residential area affects the housing price; thus, houses with higher utility are likely to have higher prices. In other words, HPM can identify the economic value of the aesthetic landscape reflected in the housing price. Moon et al.(2009) argued that TVC could also estimate the economic value of the environmental resources. However, HPM has a stronger theoretical validity as it estimates the economic value based on realized data of house sale prices, which reflects the consumers’ economic activities.

The most common usage of HPM is to measure the variations in housing prices by adjacent environmental amenities (Diafas et al. 2005). Morancho(2003) used various regression techniques of HPM to estimate the economic value of

green spaces in the city of Castellon, Spain. Sander & Haight(2012) examined the influence of urban parks on housing prices of North and South Dakota, United States. Furthermore, Oh & Lee(2003) showed that, in the Republic of Korea, being in close proximity to the public transportation and the green spaces had a positive impact on the price of apartment.

In order to integrate the aesthetic values of the urban parks, previous studies have included the concept of 'view' as an environmental variable that affects the housing price. Hwang et al.(2008) examined the effect of visibility of Han river on the housing price, and the results showed that the housing price of the apartments with a view is 5.9 percent higher than the apartments without a view. Yu et al.(2007) showed that the oceanic view resulted in 15 percent premium on the housing price. Kim et al.(2007) analyzed that the economic value of a park view accounts for 4 to 7 percent increase in the housing price of adjacent apartments. Jim & Chen(2009) examined the housing price in Hong Kong, and the results show that the harbor view increases the housing price by 2.97 percent; however, the mountain-view would decrease the housing price by 6.7 percent. The previous studies have reached a consensus that the view of a landscape impacts the housing price; however, the magnitude and the direction of the impact varies by the type of the landscape.

III. Methodology

1. Site Selection and Data

The Korean government has a strong drive for cultivating Songdo city into an eco-city with extensive green spaces and neighborhood diversi-

ty. Among other things, the SCP (37.392, 126.638) is a symbolic urban park that represents the motivation behind the creation of Songdo city. The research area has been limited to District 1 of Songdo city, shown in Figure 1. The reason for this is that District 3 was not completed, and at the time of the study, District 1 was the only residential area available within the vicinity of the SCP.

The data collection was conducted in two steps. For the first step, a field survey was conducted to determine whether the site is suitable for the study. In this process, interviews with several real estate managers, and the local residents were conducted to identify the fundamental fac-



Figure 1. Location of Songdo Central Park

Source: National Geographic Information Platform(2015)

tors that may influence the housing prices. Furthermore, the visibility of the SCP from the apartments, the walking distance to the stations and the schools were examined as well.

For the second step, the data collection was conducted. Most of the data were readily available on the internet, such as housing prices, specification of houses, and walking distance to various destinations. The housing price of March 2016 was collected from a real estate website (Real Estate 2016). The total number of available sample were 224 apartments. In terms of the distance, Google Maps was employed as it can measure both the direct distance and the walking distance from point A to point B (Google Maps 2016). In this study, the walking distance was used as it follows the actual pedestrian paths; thus, the distance is more natural and accurate for the residents. Lastly, the key independent variable was the visibility of the SCP from each apartment. This data was collected manually during the site survey by examining whether the SCP can be seen from each apartment.

2. Hedonic Pricing Model

The HPM is based upon the hypothesis that the view of the SCP has a positive impact on the housing price of the adjacent apartments. In order to examine this hypothesis, ordinary least square (OLS) method was applied for a double-log function with the dependent variable as the housing price, and the view variable as a dummy. The selection of independent variables is explained in the following paragraphs. The basic form of the double-log function is shown in equation (1).

$$\ln P = \alpha + \sum \beta_i \ln X_i + \gamma D \quad (1)$$

Based on the literature review, numerous variables were found to be used in estimating the

Table 1. Description of Selected Variables

Variables	Unit	Description
Price	KRW 10,000	Price of apartment
Sqmeter	m ²	Size of apartment
Floor Ratio	%	(Floor/total number of floors)×100
Building Area	%	(Building area/land)×100
Subway	m	Distance to the subway station
Park	m	Distance to the SCP
View	Dummy	1 for view 0 for no view

housing price, but there was no universally accepted rule of variable selection. This study selected appropriate variables based on previous studies and the field survey. The selected variables are summarized in Table 1.

The price variable was the price of the adjacent apartments, and it was the dependent variable of the model. The sqmeter variable was the actual size of the apartment, which was a primary factor that influences the price of an apartment.

The floor ratio variable was the ratio between the floor on which the house was located, and the total number of floors in the apartment. This variable was used to account for two factors. First, the floor on which the house is located has an influence on the housing price (Moon & Ha 2005). Second, as the height varies for each apartment building in District 1, the differences in height had to be considered. For example, the characteristics of a 5th floor of 15 story-building would be different from a 20 story-building; thus, a ratio of the floors was considered to account for the differences.

The building area variable was the ratio between the size of the building and the available land, which was designated by the city plan. This influences the price of the apartment as the level of restriction on the building area can influence the sense of openness, the amount of sunlight,

and ventilation for the apartments. The subway variable was the distance from the apartments to the nearest subway station. The close proximity to a subway station influences the price of the apartment as an easy access to the public transports is preferred by the residents. The park variable was considered to take into account the accessibility to the SCP. If the park is close enough, the residents would not only view the park, but also visit the park for recreational purposes. Lastly, the view was the key variable in this model, and it was used as a dummy to consider the impact of having a view and not having a view of the SCP on the housing price.

IV. Results and Analysis

The regression results, shown in Table 2, presented all the independent variables to be statistically significant with the price of the apartment.

The *sqmeter* variable had a high positive correlation with the price of apartment that when the area of the apartment increases by 1 percent, the price of the apartment will increase by 1.36 percent, *ceteris paribus*. Jim & Chen(2009) showed similar result that, in Hong Kong, the housing price increases by 1.49 percent for every 1 percent increase in the area of the house, *ceteris paribus*. This could be explained by the fact that Songdo city is a newly built eco-city with an international business district; thus, the houses have a premium that can be matched with the high housing prices of Hong Kong.

The *floor* ratio variable had shown positive relation with the housing price, and similar result could be seen in Moon et al.(2009). Based on the result, it could be seen that the residents prefer higher floors, and the field survey supported this

fact as the higher floors have better sense of openness.

The *building* area variable showed a negative correlation with the housing price, and Yoon & Yu(2001) presented a similar result that the building area has a negative correlation with the housing price. The ratio of building area impacts the availability of open space as it is an indicator to show the distance from one apartment to the next apartment. In other words, if the ratio is high, the apartments are built closely; thus, harming the sense of openness and the residents would feel enclosed within the apartments.

The *subway* variable had a negative relation with the housing price. Oh & Lee(1997) included the distance from the apartments to the subway in their research, and reported a negative correlation with the housing price. The magnitude of the coefficient was the second highest in this model, and a possible explanation would be that as other public transportation – buses and taxis

Table 2. Estimation Results of HPM

Variables	Double-log Model
(ln) sqmeter	1.356*** (0.036)
Floor ratio	0.051*** (0.012)
Building area	-0.004*** (0.001)
(ln) subway	-0.094** (0.044)
(ln) park	-0.083*** (0.031)
View	0.050*** (0.014)
Constant	2.439*** (0.144)
Number of observations	224
Adjusted R ²	0.889

Note1: Numbers in the parenthesis are standard errors.

Note2: Significance level is the following:

*** p<0.01, ** p<0.05, * p<0.1

– in Songdo city was not well organized; thus, the residents preferred the subway for its convenience, which was reflected in the housing price.

In the case of *park* variable, it was negatively correlated to the housing price. Ko et al.(2011) examined the impact of distance from the apartment to the park, and the result showed that as the distance to the park increases, the housing price decreases. As urban parks provide various amenities, the residents would not only enjoy the view of the park, but also visit the park for recreational purposes. In other words, the accessibility to the park is valued by the residents, and this was reflected in the housing price.

Lastly, the empirical result accepted the hypothesis that the view of the SCP has a positive impact on the housing price. As view variable was a dummy, the coefficient was interpreted as the difference between the apartments with and without a view of the park. Based on the results, *ceteris paribus*, the price of an apartment with the view of the SCP was 5 percent higher than that of an apartment without the view of the SCP. For example, a house of 97.6m² had an average sales price of approximately KRW 441 million, then the price difference between an apartment with a view and without a view would be approximately KRW 22 million.

This result could be theoretically validated as other studies have also reported a positive correlation between the view of an aesthetic landscape and the housing price. In Kim et al.(2007), the results showed that the view of a park increases the housing price by 4 percent, while the view of a river and mountain increased the housing price by 4 percent and 6 percent, respectively. While in Yoon & Yu(2001), the view of a park's influence on the housing price was estimated to be about

1.8 percent. On the other hand, in Lee & Ko(2011), the value of a park's view was estimated to be much higher, at about 9 percent. Luttik (2000) examined a case in the Netherlands, and the results showed that the view of a park increases the housing price by 8 percent, while the close proximity to the park results in a premium of additional 6 percent.

V. Conclusion

This study examined whether the view of the SCP has a positive influence on the prices of the surrounding apartments. Based on the empirical results, the hypothesis that the view of the SCP has a positive relation with the price of the apartment was accepted. It was estimated that the price of the apartments with a view of the SCP was 5 percent higher than that of the apartment without a view. In addition, it was estimated that the proximity to the SCP has an influence on the price of the apartment as well.

The findings of this study could provide a basis for the urban park management and further, support the effort of preserving the urban ecosystem. More importantly, the results of this study has been limited to the aesthetic value of the SCP, which is a small portion of the actual value of the SCP. In other words, if all factors are considered, the value of the urban park for the nearby residents would be much higher.

The main findings of this study showed that the residents value the view of the SCP. Furthermore, the price of an apartment was influenced by the proximity to the SCP and the public transport system, which implies that the residents also value the accessibility to the park and subway stations. The residents living around the SCP

are willing to pay an extra price to enjoy the recreational and aesthetic amenities provided by the urban park. Therefore, an urban park not only improves the life quality of the residents, but also increases the economic value of the apartments. This is an important finding which shows the importance of the urban parks as a valuable urban infrastructure, and a necessity in the urban lifestyle.

The limitation of this study was the insufficient available data, which compromised the number of samples. For more solid assessment, more data and samples are required. Furthermore, this study had focused on only one urban park; thus, the results were case-specific. In order to generalize the findings of the impact of urban parks on the housing price, additional studies should be performed in other new cities with urban parks and green spaces.

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