



Original article

Transforming the economic value of hillside housing—A case study of Seoul, South Korea



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ARTICLE INFO

Article history:

Received 20 September 2016
 Received in revised form 18 January 2017
 Accepted 2 March 2017
 Available online 23 March 2017

Keywords:

Effect of higher elevation
 Hillside housing
 Panel analysis
 Real estate value
 Urban forests

ABSTRACT

This study examines transforming real estate value of urban hillside for residential developments, drawing on two-fold panel analyses: a random-effect panel modeling and a growth-curve panel modeling, in Seoul, South Korea from 1990 to 2015. The results reveal the reduced gap between the land values in hillside and low-lying residential sites as moving toward 2015, evidenced by the rapidly growing rate of increase of land value in the former, whereby the parabolic curvature of the land value trajectory increased from 0.00152 to 0.00156, compared to that of the latter, whereby the equivalent to that decreased from 0.00224 to 0.00214. The results also suggest that the negative effect of higher elevation has decreased to approximately zero (−0.625% per 10-m increment) and projected to turn positive, in hillside residential sites, while the equivalent to that in the low-lying residential sites has been exacerbated (−3.786% per 10-m increment). By helping the understanding of the past, current and future hillside housing development—how the hillside sites have been and will be reevaluated by passage of time, this study will provide practical lessons in planning urban housing and natural amenity resources.

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1. Introduction

On urban hillsides, the mountainous or hilly parts of cities, housing has been developed for two reasons. First, unlawful squatter settlements have formed, as those lands were unclaimed for formal property developments (Ha, 2001; Downs, 1969; Turner, 1968). Hillside was viewed as undesirable from both supply and demand sides in the housing market, because impediments to easy construction, such as harsh topography, smaller and irregularly-sized land parcels, meant high costs, which deterred property developers, and inconvenient access to city core or public transportation was seen as a disincentive to homebuyers (Leonard, 2000; Salleh et al., 2015; Kim et al., 1996).

Second, hillside luxury housing has been developed, as the sites are attractive for their pleasant environments (Moser, 1991; Abbott and Pollit, 1981). The hillsides often abut urban natural reserves, sometimes as a form of urban forests, and thus provide a precious amenity for densely developed metropolitan areas, where such type of natural resources are rare (Konijnendijk, 2008; Olshansky, 1998; Rouillard, 1987; Scullin, 1983). Hillside housing could be developed increasingly in accordance with the lifestyle of emerging

knowledge workers in cities. Due to the advancement in telecommunication and the dominance of footloose knowledge-driven jobs, people have concerned less on the accessibility to workplaces, but more on the quality of the living environment, including issues of health, leisure, and recreation opportunities in choosing where to live (Lloyd and Clark, 2001). Consequently, the public's desire to be near nature has grown (Lawton et al., 2013; Kim et al., 2005), and this demand would spur luxury hillside housing developments more in many countries (Ling and Dale, 2011).

In Seoul, most hillside housing had been characterized as informal, substandard settlements. These shantytowns, unofficially known as *dal-dong-neh*, meaning “towns close to the moon”, emerged with Seoul's accelerated urbanization and industrialization, and has persisted to date (Ha, 2010b). While the hillside areas of Seoul have long been potential reservoirs of desirable qualities, developers were slow to recognize that, which limited development to only a few wealthy hillside neighborhoods (Kang, 2010; Park, 2006; Song, 2013).

Recently, however, the longstanding perception of hillside housing has begun to change. The latest wave of housing developers have come up with a new marketing strategy which frames the hillside sites as part of the quality of life and health narrative, by pointing out their scenic views and proximity to the few preserved urban forests. Distance from public transit has been reformulated as quieter, peaceful living, and lower pollution (Cho, 2016; Yim, 2016).

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Developers have introduced more sophisticated luxury building types, such as single-family detached houses with private yards and terraced housing, targeting the more affluent exclusively. This strategy has led formation of several wealthy neighborhoods on hillside areas, for example, one of the residential complexes in Nam Mountain (Namsan) was ranked as the most expensive real property in Seoul (Kim, 2016; Kim, 2015; Jung and Choi, 2009).

While reducing housing density and improving the quality of housing in hillside redevelopments is sensible in terms of protecting urban natural resources, the projected luxury hillside developments may have unwanted social and economic repercussions. For example, the polarization between the original poor tenants and today's wealthy communities is likely to increase, with gentrification and displacement to follow (Choi, 2014; Oh and Kim, 2007). The financial success of these housing developments is likely to encourage continued cutbacks of natural preserves, and thus its diminishment as a public amenity in order to benefit for-profit private developers. In particular, the Korean government's enactment of the Greenbelt Repeal Plan in 2015, which was meant to ease land scarcity and promote housing developments, is expected to further stimulate the conversion of hillside land into residential districts, consequently, the natural environments in the city could eventually dwindle to a fraction of the original size (Ministry of Land, Infrastructure and Transport, 2015; Seoul Department of City Planning, 2013).

The extant literature on urban hillsides has aimed to tackle the two main points. One strand has measured public willingness to pay for urban forests and scenic views of hills and mountains reflected in residential real estate values (Jim and Chen, 2010; Jim and Chen, 2009a; Benson et al., 1998; Baranzini and Schaefer, 2011; Wen et al., 2012; Wen et al., 2015). Other scholars have delved into the historic and sociopolitical background of the formation and redevelopment of substandard hillside housing (Ha, 2002; Kim et al., 1996; Kim, 1998 among many).

However, a gap remains between these two areas of scholarship. The hedonic studies have recognized such itemized features—urban forest and/or scenic views—as urban amenity, and been limited to quantifying the current externality effects of those, with cross-sectional analytical modeling. The latter type of studies, on the other hand, have considered the hillside as less desirable or illegitimate sites, and focused on documenting and revealing the illegality of housing developments and their sub-standard living conditions, suggesting policies to address the issues. None of the studies have negotiated these two contrasting views, claiming that while technology, societal, economic and cultural value systems have changed, earlier factors related to hillside development that were viewed as constraints have been diminished and offset by strengths, resulting in the positive transformation of the value of hillsides as residential sites.

In this study, using panel analyses on land value data of the past 26 years in Seoul, it is suggested that hillside areas have been reevaluated as advantageous residential sites, in comparison with low-lying urban areas. Under this overarching inquiry, the study focuses first on comparing the changes of assessed land value of particular residential parcels, and second, on comparing the changes of the elevation premium—the price drop or increment associated with 10-m elevation increase—on the value of land parcels, developed or redeveloped in three different types of terrain: Low Land, Moderate Hills, and Higher Hills, in the period from 1990 to 2015. The three-group categorization is first based on the definition by the Seoul city government and further stratified for more precise analysis in this study. The 10-m increment was chosen for convenience in the interpretation, as it approximates the average height of two-story buildings.

This study will contribute to the extant literature on hedonic and housing studies, as it includes the time-scale in the analyses

and illustrates the temporal nature of the general preferences on urban amenities. Hedonic studies on housing have revealed the externalities generated by specific urban amenities, however, have not considered or recognized that the findings only apply to a certain period of time. This study assesses the changes in the value of the totality of urban hillside as residential sites by passage of time, using analyses of data accumulated through a long period of time.

The next section provides a brief history of the urbanization and re/development of the hillside areas of Seoul, and literature review on hedonic studies on urban forests. This is followed by a two-step analysis: first, a one-way panel modeling with time fixed-effect and parcel random-effect, and second, a growth-curve panel modeling in multilevel structure, to assess general trends in land value and to explain the changing relationship between land value and the land elevation of development sites, over the 26 years of study period.

By helping the understanding of the past and current hillside housing development—how the hillside sites have been reevaluated by passage of time, and by helping the projection of its future, this research will also provide practical lessons in planning urban housing and natural amenity resources. While this study focuses on case in South Korea, the finding and policy implication may be applied to other countries that underwent rapid urbanization during the second half of the 20th centuries.

2. Background and literature review

2.1. Historical context

In Seoul, the capital of South Korea, of the current total urban area of 605 square kilometers, almost 32% is hilly terrain (defined as between 40 and 200 m above sea level), and nearly 8% is mountainous land (defined as higher than 200 m above sea level). The remaining 60% is considered Low Land, that is, less than 40 m above sea level (Chung, 2011). As of 2014, approximately 60% of the hilly and mountainous zones were designated as greenbelts, totalling an area of 149 square kilometers (Seoul Department of City Planning, n.d.).

At the end of the World War II, Seoul experienced rapid urbanization and industrialization, similar to many other major Asian cities that were previously under colonial rule (Hsu and Cheng, 2002; Rapley, 1997; Salleh et al., 2015). In the increasing land scarcity and housing shortages, the surrounding hills and mountains of Seoul, which remained largely untouched green and forested spaces, attracted informal residential settlements (Kim et al., 1996). Meanwhile, a small fraction of hillside land was also developed as wealthy residential neighborhoods alongside the sub-standard development, mostly in the 1920s and 30s by colonial rulers who took advantage of the bucolic qualities of hillsides, and in the 1960s and 70s by personnel and employees of institutions in nearby locations, including United States Army base and central government agencies (Song, 2013).

The redevelopment of substandard hillside housing became necessary for coping with continuing population growth over the next decades of unprecedented economic advancement (Chung, 2011; Shin et al., 2008). Exacerbating the pressure, in 1971, the city government designated the remaining undeveloped hills, knolls, and mountains as a greenbelt, in order to protect the natural environment and to limit urban sprawl (Yang, 2014). The Housing Improvement and Redevelopment Act in 1973 and the Joint Redevelopment Act in 1983 provided the legal framework for urban renewal in Seoul. On the cleared hillside land, the city government allowed for higher floor area ratios (FAR) than before—up to 300% of parcel footprints, which produced buildings as tall as 15 and 20 stories on average (Kim et al., 1996). Despite this change, homebuyers did not initially value the newly developed hillsides, because

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