

The Impact on Property Values of Distance to Public Parks and Open Spaces: Findings from Beyond
North America

Abstract

The review sought insights from twelve European, eleven Chinese and three other international studies undertaken in the new millennium. Results from the twelve European studies consistently confirmed that price declined with distance from parks. Five of them unequivocally reported this expected relationship; while the remaining seven reported that some analyses showed a significant relationship, but others did not. None of the studies showed a negative premium. Several analyses reported premiums were higher for smaller houses or for multi-family dwellings. Differences in premiums were associated with proximity to different types of open space. An extension of this differentiation, which did not emerge from a complementary U.S. review, was a demonstration of the importance of including a qualitative dimension i.e. the perceived attractiveness of a park.

Results from the eleven Chinese studies were similar. Six of them revealed the expected relationship; mixed results emerged from the remaining five studies. But the premiums were generally smaller than those reported in the U.S. and European studies, which provided confirming evidence of the differing premiums associated with different markets.

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Introduction.

Multiple studies in North American contexts have demonstrated that many people are prepared to pay a premium to live close to a park. The long history of analyses that purported to measure the premium commenced with the measures on properties proximate to Central Park in New York City that were published in the annual reports of the Central Park Commissioners each year from 1856 through 1873. Inevitably they were crude, because they lacked the research tools available to contemporary researchers. However, Central Park was the bellwether urban park in the U.S. and it stimulated similar parks in many other U.S. cities. Results of the annual Commissioners reports that ostensibly documented a premium were a prominent feature of discussions in other cities, whenever the merit of investing in new urban parks was discussed.

The magnitude of the premium is of interest to multiple stakeholders: Planners, park advocates, land speculators and developers, business leaders, government officials, and taxpayers. Consequently, it remained a topic of interest to researchers, so many other studies were subsequently published. For the most part, they reported that parks had a positive impact on property values. Thus, for example, a review of this literature published at the end of the 20th Century concluded:

A positive impact of 20% on property values abutting or fronting a passive park area is a reasonable starting point guideline. If the park is large (say over 25 acres), well-maintained, attractive, and its uses mainly passive, then this figure is likely to be low. If it is small and embraces some active use, then this guideline is likely to be high. If it is a heavily used park incorporating such facilities as athletic fields or a swimming pool, then the proximate value increment may be minimal on abutting properties, but may reach 10% on properties two or three blocks away (Crompton, 2001, p. 29).

This review was confined to studies undertaken in the U.S, because no analyses were found that were based in other geographical locations.

In the two decades following that review, five methodological advancements launched a new era in which more sophisticated studies emerged: (i) Hedonic models became more robust, typically incorporating a much more comprehensive range of variables; (ii) the statistical tools associated with hedonic analysis became progressively more sophisticated, which has allowed the array of potential factors that may contribute to a property's value to be expanded; (iii) multi-listing services' electronic data bases became available, so almost all analyses used market sales data as the dependent variable, rather than assessed values which predominated in the earlier studies; (iv) the development of Geographic Information Systems (GIS) enabled distances between residential dwellings and parks to be measured along street networks, rather than by the less accurate method of straight lines; and (v) almost all analyses

used market sales data, rather than assessed values which predominated in the earlier studies.

A recent review of this post-millennium scientific literature was comprised of 33 studies undertaken in U.S. contexts that incorporated a measure of distance from parks to residential dwellings. It concluded the premium was lower than the 20% suggested in the 2001 review, “A premium of 8%-10% on properties adjacent to a passive park is a reasonable point of departure” (Crompton & Nicholls, 2019, p.1).

Study Objectives.

In contrast to previous eras, in the past two decades multiple studies in Europe and China have investigated this issue. Hence, this study extends the existing work by reviewing 26 studies that were undertaken outside the United States. The study’s parameters mirrored those that defined the recently published review of findings in U.S. contexts (Crompton & Nicholls, 2019). Thus, parks were defined broadly to include open spaces, forests, wildlife habitats, and natural preserves, but findings related to trees or wetlands were not considered.

Studies were identified from a comprehensive search of the literatures dating from 1997 in the fields of land economics, resource economics, landscape architecture and urban planning. ‘Snowball’ searches extended the search by using the references from those studies to international studies reported in other fields. The first section of the paper reviews European studies; this is followed by Chinese studies; and it concludes with studies from other geographic contexts. A summary of results is given in Table 1.

Insert Table 1

European Study Results.

In Europe, the first five chronological analyses addressed the impact of urban forests on property values. Two early studies were reported by the same researcher investigating their impact in different towns in Finland. Most green spaces in Finland are formed from preserved areas of the natural landscape, usually in the form of forest vegetation. The first study was conducted in Joensuu (48,000 population), where 34% of the town’s area was green space, mostly forest (Tyrväinen, 1997). The dependent variable was price per square meter of sales of row house apartments for a three-year

period. The hedonic analysis estimated the influence of distances to the nearest (i) wooded recreation area, which had maintained trails and paths for jogging and skiing, lights, and benches; and (ii) forest park area, which were smaller and often merely strips of land used for screening between residences. There was no premium associated with the forest park areas. However, distance to a wooded recreation area was significant at the 10% level, whereby a 100-meter increase in distance decreased an apartment's price by 42 Finnish markka per square meter (6 markka = 1 Euro). The author concluded the impact of small parks was limited to 200 meters, while that of larger parks extended further.

The second study was undertaken in Salo (25,000) and neighboring Halikko (9,000) (Tyrväinen & Miettinen, 2000). The sample comprised three years of sales data of terraced houses, and the same variables were used in the hedonic analysis. The findings were the reverse of those in Joensuu. Distance to forest parks had a significant influence, whereby an increase of one kilometer led to a decrease of 5.9% in price. The distance decay was consistent with that reported by other studies in that the impact was strongest within 100 meters and most of the premium accrued in the first 300 meters. In contrast to the earlier study, wooded recreation parks had no impact. The authors offered an explanation for the apparent contradictory results: "Proximity to a recreational area may not have been as relevant a variable in Salo as in Joensuu, since the recreational opportunities in Salo were rather poor—there were only two rather small recreational areas in the town. In Joensuu, in contrast, there were several larger wooded recreational areas with facilities within the town limits" (Tyrväinen & Miettinen, 2000, p. 218).

In another early millennium study in the Netherlands a sample of 2813 terraced house sales was drawn from eight different communities. This may have been the first study to include a measure of quality. Its results indicated that properties directly bordering natural spaces that were classified as attractive conveyed a premium of 12% more than spaces of the same land use that were not classified as attractive (Luttik, 2000). Attractiveness was determined by the study's author from on-site observations. Since, 'beauty is in the eye of the beholder' his classification may or may not be consistent with the criteria used by any given individual house buyer. Nevertheless, the result suggested that measures based on land use alone were not sufficiently specific to accurately represent how property buyers perceived them.

Premiums were calculated for eight parks of varying sizes and types in England that had recently been renovated with substantial capital investment (Savills Residential Research, 2005) In each case, the value of properties at three different locations were compared: Overlooking the park; within two blocks; and in the same area but more distant from the park: "The three locations were selected very carefully, to eliminate the impact of as many externalities as possible, including features that might affect value positively such as shops and schools and features known to detract from property values such as busy

roads or industrial estates” (p.17).

 Table 2

The results are shown in Table 2. The authors noted that generally, “Relatively higher values can be seen where properties overlook the park rather than backing on to it” (p.84). While premiums for properties overlooking three of the parks were substantial, those at five of the eight parks clustered from 4% to 7%. These decayed to between 0% and 3% within two blocks. The dramatic decay at Queens Square, Bristol, was attributed to the tall buildings surrounding the park which effectively blocked any views of it from surrounding streets. Retention of the high premium for properties within two blocks of Mesnes Park was attributed to, “Housing layouts that allow for greater sight lines into and out of the park and for more reference to other adjacent spaces allowing the park’s influence on value to spread further than just the streets that overlook the park” (p.81).

Prague, a city of 1.5 million in the Czech Republic, is relatively rich in urban greenery. Using a data base of 1,701 apartment sales in a three-year period, a hedonic analysis measured the impact of urban forests on sales price (Melichar et al., 2009). The decrease in price as distance increased was statistically significant, but it was modest. A 1-kilometer increase in distance from the nearest forested area, led to an average 1.6% decrease in sales price. The larger the size of an urban forest or park and the greater the density of trails, the lower was the price, reflecting the disamenity of proximity created by large numbers of visitors.

Members of the same research team subsequently expanded the scope of their study using a larger data base of 8,568 apartment sales in a later three-year period (Melichar & Kaprová, 2013). Urban forest land accounts for 10% of the area of Prague, but in addition to measuring distance to the nearest urban forest, they measured it to the nearest protected area and the nearest agricultural land. There are 89 small scale specially protected areas in Prague, which account for 9% of the city’s green area and 4% of its total area. The study revealed that the effect of agricultural land was not significant, but the other two open space forms were significant. An additional meter from an urban forest decreased the sales price by 1082 korunas (\$48), while for special areas price decreased 1815 korunas (\$81). Again, however, increased size had a negative impact on housing price.

In contrast to Prague, another eastern European city, Lodz in central Poland, is relatively poorly

endowed with open space. An analysis of apartment sales data reported that the proximate distance of eight different types of green spaces had a differential impact on apartment price: Small parks and small forests (less than 4.5 acres); medium parks and medium forests (4.5 – 50 acres); large parks and large forests (over 50 acres); a single urban mega forest (3,200 acres); and cemeteries. Four of the eight open space variables were statistically significant. The strongest impact was exerted by the mega forest and large parks. For each 1% increase in distance the decreases in prices of an average apartment were 3% and 1.5%, respectively. Neither other parks, nor large or medium forests had a significant impact. Small forests were significant, but the authors attributed this finding to omitted variable bias, since most of them were on the edge of the city and proximate to unofficial open green spaces and agricultural land. Cemeteries had a negative impact, with a 1% increase in distance to a cemetery translating into a 2% increase in apartment price (Czembrowski & Kronenberg, 2015).

In Castellón, Spain, increasing distance to the nearest urban green area exhibited a significant negative effect on the prices of 810 residential dwellings (consisting of both houses and flats) (Morancho, 2003). Specifically, every 100m increase from a green area resulted in a price decrease of approximately 328,000 pesetas (\$2,261). Green space size was insignificant. The nature of green spaces in the city was not described and average property price was not stated.

A study in Aberdeen, Scotland, employed data from flats (mean sales price £45,544), non-detached (£93,179) and detached (£121,906) housing within 800m of the city's five parks (Dehring & Dunse, 2006). This appears to be the first study that differentiated premiums by property type (almost all U.S. studies had focused solely on single family [detached] homes). When all parks were considered simultaneously, prices of flats demonstrated the expected decline in distance from a park, with a flat next to a park selling for 17.6% more than a similar flat 800m away. The coefficient on the park distance variable was insignificant for detached housing. These findings supported the authors' hypothesis that park proximity was more valuable to those living in higher density housing without private gardens/yards. Similar results were recorded when each of the five parks was analyzed individually. The distance variable was significant for all five parks for flats (suggesting premiums of 9%-62% for flats situated on the edge of a park); for two of the five parks for non-detached houses; and for one of the five parks for detached houses. The findings supported the density-related hypothesis for four of the five parks, i.e., the proximity premium was largest for flats in those four cases. The research also demonstrated that types of open space were valued differently, with larger parks that had an array of facilities and amenities being more highly valued than areas of amenity green space.

The case of Belfast, Northern Ireland, had features that differentiated it from other contexts in that it is an “ethnocratic city’... where public open space has heightened security and territorial relevance and can promulgate or be used to spatially regulate ethno-segregation” (McCord et al., 2014, p. 119). The data set comprised one year’s sales of apartments (512), terraced (1817), semi-detached (1,224), and detached (301) homes. Park distance premiums were calculated in seven 250-500m bands from the nearest public open space, relative to a location beyond 2,500 meters. The findings showed parks exhibited a major influence on house prices, but the magnitude differed among the four housing types:

- Semi-detached sales showed an initial price premium of 15.7% within the 250- meter band, which diminished to 6.4 at 500 meters. Open space impact was negative beyond the 750 band until finally turning positive (4.5%) 2,000 meters.
- This convoluted pattern also emerged for detached houses. Within 250 meters, open space had a negative impact of -27%, but this became positive (24.2%) at 500 meters. Properties in the other bands were not influenced.

The apartment and terrace properties showed a more consistent and robust park influence:

- Terraced properties within 250 meters showed a premium of 42%, decreasing to 26.9% at 500 meters and 8.4% at 750 meters. That was the limit of parks’ influence.
- Apartment sales exhibited the strongest premiums: 38% within 250 meters; 48.8% at 500 meters; and 35.4% at 750 meters. The values continued to decay, but at 2,500 meters they still displayed a premium of 14%.

The authors suggested the more robust influence on terraced and apartment properties reflected their smaller lots and lack of garden space, so accessibility to public open space was more valued than it was to those who resided in semi-detached or detached houses. Further, the remarkably high premiums for apartments possibly also reflected the views they offered, but this was not measured.

An analysis in Aalborg, Denmark, tested the hypothesis that green space is not a uniform environmental amenity, but rather a set of distinct goods with very different impacts on the housing price (Daams, Sijtsma & van der Vlist, 2016). The city’s green spaces were classified on the basis of accessibility, level of required maintenance, and desirability of land use in neighboring lots. This resulted in eight categories: Parks, lakes, natural areas on the periphery of the city, cemeteries, sports fields, common areas created by home owner associations, agricultural fields and green buffers shielding residents from negative externalities of noise, pollution et al. Parks and lakes were associated with a large price premium, but sport fields and agricultural fields had no significant effect. Common areas had a positive significant

effect on apartment prices but not on house prices, suggesting that houses had gardens leaving them indifferent to the existence of common areas. Cemeteries and green buffers had a significantly negative effect on apartments.

To this point, relatively few studies had recognized that effects of a category of green space e.g. parks, were not homogeneous. Those which did recognize this nuance included land use or physical characteristics to evaluate different effects. A study in the Netherlands advanced Luttik's (2000) earlier work by capturing how property buyers perceived natural green spaces (Panduro, & Veie, 2013). The authors combined land use data with value mapping survey data that measured perceptions of the most attractive Dutch natural spaces. Their definition of natural spaces comprised parks and recreation areas, forests, open dry nature, open wet nature, coastal water bodies, inland water bodies, and agricultural areas. The value mapping process identified 8,613 attractive areas within Dutch municipal borders, which represented 6.83% of all the total area of natural spaces in their land use data.

 Figure 1

Figure 1 shows the price effects relative to the price of properties located 8 kilometers or more away from the attractive open spaces. The premium falls from 16.04% for properties in the first 500 meters to 1.6% for properties at 6-7 kilometers away. The study also considered the impact of views but, because the Dutch landscape is so flat and highly urbanized, views had no substantive effect on price. The 7-kilometer area of impact is much greater than has been reported in other studies, suggesting that attractive green spaces have a much wider range of impact than ordinary green spaces. The authors conclude that when attractiveness is not controlled, the distance over which open spaces are capitalized is underestimated. They observe: "Measures of proximity to natural space, based on land use data only, are unlikely to capture the distance to nearby natural space that could effectively add considerable value to a property's price... When many people live within 7 kilometers of attractive open space, it provides an aggregate welfare that is higher than would be assumed if only the welfare provided to the population within 3.2 is taken into account" (p.406). They illustrate this in Figure 2 which shows the number of houses added when their perceived attractive open space distances are used compared to the 3.2-kilometer buffer identified in a conventional hedonic study the authors cite that did not incorporate attractiveness. Clearly, adding another 66,782 (156,169-89,389) houses even at low premiums ranging from 3.7%-1.6% (Figure 1) substantially increases the value of the tax base attributable to the attractive open space.

Insert Figure 2

Chinese Study Results

From 1949 until the 1980s, housing in China was considered a welfare good that was assigned by a central government administrative process, rather than a commodity to be bought, sold, or rented by citizens. Private housing was non-existent; pragmatism prevailed so most housing consisted of monotonous ferro-concrete blocks of apartments of six stories or less. The nondescript and monotonous blocks were laid out “like rows of military camps with minimal facilities” (Chen & Jim, 2010, p.228) so amenities and landscaping rarely were considered. Economic reforms in the late 1980s launched private housing. In 1993, the National Construction Department issued a national greenery coverage ratio that required all new housing projects to allocate 30% of the site to greenery coverage (Chen & Jim, 2010).

Welfare allocation of housing was eventually abolished in 1998. Since then people have purchased apartments with attributes that they prefer, which has kindled an interest in landscaping and proximate amenities as developers recognized they entered into buyers’ purchasing decisions (Chen & Jim, 2006). As a result, new commercialized residential housing precincts are comprised of well-designed buildings with intra-lot and semi-private green spaces (Jim & Chen, 2006). Housing prices in China are not publicly available and are often considered to be a business secret, so data relating to them are difficult to obtain. As a result, sample sizes tend to be small.

Nevertheless, eleven studies have emerged in the new millennium relating to the impact of green spaces on apartment prices in China. Seven of them focused on a cluster of four cities in south China that constitute part of the most populated metropolitan area on the planet: Hong Kong (7.35 million), Shenzhen (10 million) Guangzhou (14.5 million), and Macau (650,000).

A proximity premium of 14.9% was found in Hong Kong (Jim & Chen, 2010). In this case, proximity was defined as the availability of a public park within an 800-meter radius from an apartment block. 1,471 high-rise units sold in 2005-2006 were analyzed. Park proximity was the third most influential factor in determining price after square footage and floor. The authors suggested, “The scarcity of neighborhood parks in the city has pushed their hedonic value to an exceptionally high level” (p.662). However, another Hong Kong study, reported that the availability of green belt within 300 meters, which was “a generally

acceptable walking distance for families” (Hui, et al., 2007, p. 2338) did not change the price in its sample of 2,957 apartments. In contrast, a sea view raised the price by 4.6%.

In Macao which, like Hong Kong, has special administrative area political status, sales of apartments showed an increase in price of approximately 5% if an apartment was within 200 meters of a public park (Sheng et al., 2013).

In Shenzhen, sale price data were collected by surveying apartment owners from 55 residential developments (Chen & Jim, 2010). The authors reported that an increased distance of 1 kilometer from an urban park decreased housing values by a relatively small 1.7%. A second measure, which was dichotomous, noted whether or not an urban park was within 500 meters of an apartment. It was not statistically significant. Two reasons were offered to explain the lack of impact of proximate parks. First it was suggested that their benefits were offset by negative effects “such as noise generated by users, gathering of unruly people and increase in crime rate” (Chen & Jim, 2010, p. 235). Second, they were perceived to be unattractive: “The design of urban parks is usually simple and bland”(p.237) and they tended to receive minimal maintenance. Thus, they perhaps merited the notorious description of “Dispirited city vacuums called parks, eaten around with decay, little used, unloved” (Jacobs, 1961, p. 120).

In Guangzhou, the largest city in south China, a sample was drawn from four residential precincts which had generous amounts of green spaces (27%-30% of the land area) (Chen & Jim 2006). A hedonic analysis included a dichotomous measure indicating whether being located within 500 meters of a large wooded area impacted property values. Contrary to expectation, it did not. The authors suggested this was because although it was a protected area, it was not accessible to the general public for recreational use.

Two other studies in Guangzhou incorporated a park distance proximity measure. The first considered residences in high-density developments and found a significant negative effect on distance to the nearest park in old town areas, but no significant effect in new areas of the city or for the city as a whole. The authors suggested the premium in the older areas (equivalent to a price decrease of 6.6% with a doubling of distance to the nearest park) reflected the “grave shortage” of open space in those locales (Chen & Jim, 2007). A more recent analysis of apartment transactions revealed a consistently significant positive impact of location within a 500-meter radius of a park (of about 1%) across three different model specifications (Chen, 2017).

Wuhan is the largest city in central China and is renowned for its attractive landscapes in which lakes, hills and parks are prominent. An analysis found that proximity to the city’s two large lake-based

recreation areas, which were widely recognized symbols of its tourism and recreation activities, had a significant positive effect on apartment price (Jiao & Yaolin, 2010). The added values to properties within 100 meters were 41 (\$6) and 21 (\$3) yuan per square meter. This decayed to 5.1 and 3 yuan in the outer 700 to 800-meter zone. Proximity to one of the nine large city parks also had a positive effect on housing price, but proximity to the 26 smaller district parks and to the forested hills did not exert a significant impact.

In Hangzhou, the impact of the city's renowned West Lake on prices also included a variable representing the quality of each of 660 gated community's local sports facilities (Bu, Qin, & Wen, 2014). Quality was graded on a 5-point scale from 1 (quite bad) to 5 (very good) by the authors. This characteristic had a significant positive impact in all eight models presented.

Proximity to a Beijing city park resulted in an average proximity premium of 10.9% (Biao, Bin, Canquiang, & Gaodi, 2012). It declined with distance from the city center (from 14.1% in the zone closest to the city center to 0.5% in the zone furthest out). The authors suggested this reduction was a result of the reduction in population density and an increase in the amount of green space as distance from the center increased. The exact meaning of proximity in this analysis was not clear, since it was variously described as distance to the nearest park, location in close vicinity to a park, and location on the edge of a park. Additionally, there was a lack of clarity regarding the source of the housing data, including price, which appears to be based on the opinion of a small set of estate agents and home buyers/sellers rather than actual market transactions.

Recognizing that size of park areas often influences the range and magnitude of a proximate premium, investigators in Jinan City refined the proximate measure by using a size-distance index to measure the impact of three types of greenery: Plazas, parks, and forests (Kong, Nakagoshi, & Yin, 2007). The three categories reflected the city's classification system for its public green spaces, which occupied almost 20% of the 6 million population city's area. Almost all the plazas and parks were located in the built-up parts of the city, whereas most of the forest lands were on hills on the city's fringe. Since the structural form of the apartments in each cluster was identical, the dependent variable was property price per square foot. Proximity was measured by straight-line distance from the property to the boundary of the nearest green space. Results showed the size-distance index of forests to be statistically significant, raising the value of dwelling units by 5% for each percent increase in the index. However, the indices for plazas and parks were not significant. Including both distance and size variables assisted in interpreting how they combined to influence price, but the trade-off was that the index made it difficult to separate out the individual effects of the two variables.

The authors also measured proximity by travel time (minutes) to the public spaces by foot or by public bus. This produced antithetical results from the size-distance index. The measure was significant for plazas and parks, but not for forests. Each 1% reduction in travel time to parks and plazas led to an increase of 1.6% and 1.8%, respectively. It took much longer to travel to the outer fringe forests. However, the size-distance index suggested that even though they were not easily accessible, their larger size gave them a distance range that impacted housing values.

Results from Other International Studies.

Elsewhere in the world, the existence of a park in Tokyo larger than 10,000 square meters within a 450-meter radius of the block in which a single-room dwelling was located was insignificant across five different model specifications, although two variables representing the area of nearby park land did reach statistical significance (Hoshino & Kuriyama, 2010).

In Queensland, Australia, an analysis of the impact of Noosa National Park (NOP) upon the value of nearby single-family residential land values in 641 blocks concluded: "The presence of an urban national park can increase land values in the vicinity of the park by 6%-7%" (Lisle, Pearson, & Tisdell, 2002, p. 167). However, properties within close walking distance of the park did not experience a premium. The authors explained: "Disamenities of such a well-known park [located in a resort town] including parking problems and 'unsavory' characters may result in the direct distance to NOP not being a significant explanatory variable in relationship to price" (p. 155). Other disamenities noted in the study were overcrowding with tourists, nuisance animals, weeds and insects. The values were set by assessors and not by a market sale price, and it was unclear to what extent the appraisers considered the potential of a park proximity premium in their assessments.

A similar lack of premium for homes proximate to large reserves was reported in an analysis undertaken in Adelaide, Australia. The authors reported that sales value increased by AU\$11 for every additional meter a property was from a large reserve. In Australia, reserves are natural bushland that remain in a natural state. Most studies have reported that proximity to natural areas increases sales price. This contrary finding was attributed by the authors to: "Factors such as the heightened fire danger associated with native bush and presence of poisonous snakes found in these areas" (p.198).⁷⁰ In contrast, small playground areas embedded in neighborhoods that were frequently watered and remained green in this water-restricted environment added value to house prices (Hatton MacDonald et al., 2010).

Discussion.

The paper reviewed twenty-six international studies that investigated the relationship between distance and home value. International studies, now constitute a substantial portion of the empirical literature, whereas previously these analyses almost exclusively originated in the U.S.

Results from the twelve European studies consistently confirmed that price declined with distance from parks. Five of them unequivocally reported this expected relationship; while the remaining seven reported that some analyses showed a significant relationship, but others did not. None of the studies showed a negative premium. The complementary U.S. study reported increases in the size of a park was likely to result in higher property premiums (Crompton & Nicholls, 2019), but the only international studies that addressed this issue reported contrary findings i.e. park size had a negative impact on property premiums. The authors attributed this to the disamenity created by large numbers of visitors being attracted to the parks (Melichar et al. 2009; Melichar & Kaprová, 2013).

Several analyses reported premiums were higher for smaller houses or for multi-family dwellings suggesting that park proximity was more valuable to those living in higher density housing without private gardens (Dehring & Dunse, 2006; McCord et al. 2014; Czembrowski, & Kronenberg, 2015; Panduro, & Veie, 2013). This was consistent with the findings in the U.S. review. Also like the U.S. review, differences in premiums were associated with proximity to different types of open space (Czembrowski, & Kronenberg, 2015; Daams, Sijtsma & van der Vlist, 2016; Dehring & Dunse, 2006; Panduro, & Veie, 2013), but an extension of this differentiation which did not emerge from the U.S. review was a demonstration of the importance of including a qualitative dimension i.e. the perceived attractiveness of a park (Luttik, 2000; Panduro, & Veie, 2013).

Results from the eleven China studies were similar. Six of them revealed the expected relationship; mixed results emerged from the remaining five studies. The residences in all the Chinese studies (and in the Japanese study) were high-rise, comparatively small, apartments. This contrasted with the U.S. where they were predominantly single-family homes, and with the European studies where samples were comprised mainly of mixed types of housing. Since the U.S. and European analyses consistently showed higher distance premiums to be associated with smaller properties than with those on larger lots, it was expected the Chinese analyses would show relatively large proximate premiums associated with distance. However, this was not the case. The premiums that were identified were generally smaller than those reported in the U.S. and European studies.

Reasons offered for the relatively small premiums included negative effects such as noise by users, unruly behavior, crime, and neon lights, which are accentuated by the extraordinary density of

apartments (Chen & Jim, 2010; Hoshino & Kuriyama, 2010; Jiao & Liu, 2010; Kong et al., 2007); the substitute effect of gardens, private clubs and swimming pools within the boundaries of apartment clusters, since the exceptionally high densities focus residents' attention inwards upon their immediate environments (Jim & Chen, 2009; Chen & Jim, 2010); and the mediocre quality of local parks in terms of both initial design and on-going maintenance (Chen & Jim, 2010).

In aggregate, the Chinese studies constitute a substantive body of work that provides a different cultural perspective. The lack of public accessibility to residential sales data means that samples in the Chinese studies are small, so the opportunity to undertake sub-analyses to identify nuances are more limited. However, they did provide some confirming evidence of the differing premiums associated with different sub-markets within a region (Jim & Chan, 2007; Biao et al., 2012).

The most interesting finding from the three international studies that were undertaken elsewhere was reported in the two Australian analyses. Both measured the impact of large natural parks and reported that sale values declined with proximity to the parks because of traffic and parking disamenities, or risk of bush fires and the presence of poisonous snakes in the area.

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Table 1

Summary of International Study Findings Relating to Proximate Distance to Parks.

European Studies			
Author (Year)	Setting	Sample Size	Findings
Tyrväinen (1997)	Joensuu, Finland	1,006 apartments	Wooded recreation park premium of \$4.50 per meter of house area for every 100m decrease in distance. No premium for forest parks.
Tyrväinen & Miettinen (2000)	Salo, Finland	590 terraced houses	Increase of 1 kilometer distance from a forest park, results in a loss of 5.9% in value. No premium for recreational parks.
Luttick (2000)	8 different communities in the Netherlands	2,813 apartments and houses	Proximate premium was significant in only one of four communities in which it was measured.
Savills Residential Research (2005)	England	8 renovated parks	Premiums for properties overlooking three parks were 34%, 19%, and 16%, but those at the other five parks clustered between 4% and 7%.
Melichar et al. (2009)	Prague, Czech Republic	1,701 apartments	Increase of 1 kilometer distance from an urban forest, resulted in a decrease of 1.6% in sales price; most of the premium was within 500 meters; the larger the size of forest or park and the higher the density of trails, the lower the price.

Melichar & Kaprová (2013)	Prague, Czech Republic	8,568 apartments	Each meter from an urban forest and a small protected area resulted in a decrease of \$48 and \$81, respectively. No premium for agricultural land. Increased size had a negative impact on housing prices.
Czembrowski & Kronenberg (2016)	Lodz, Poland	9,346 apartment sales	4 of 8 open space variables were statistically significant. For each 1% increase in distance to the city's mega-forest and large parks, the decreases in an average apartment's price were 3% and 1.5%, respectively. Cemeteries had a negative impact with a 1% increase in distance resulting in a 2% increase in price. The significant impact of small forests' was deemed to be an erroneous statistical artifact; neither other parks nor large or medium forests had a significant impact.
Panduro & Veie (2013)	Aalborg, Denmark	12,928 sales; 50% houses, 50% apartments	Parks and lakes had a large premium; sport fields and agricultural fields had no significant impact; home-owner community spaces had a significant impact on apartments, but not houses; cemeteries and green buffers had a significant negative impact on apartments.
Daams et al. (2016)	Attractive open spaces in The Netherlands	203,344 single-family properties	Premiums for attractive open spaces ranged from 16.04% within 500 meters to 1.6% at a distance of 6 to 7 kilometers.
Morancho (2003)	Castellón, Spain	810 houses & apartments	Every 100m from a green area decreased price by 2,261. Size of green space was insignificant.
Dehring & Dunse (2006)	Aberdeen, Scotland	8,521 apartments and houses	Premium for apartment next to a park was 17.6% more than a similar apartment 800m away. Range for the 5 parks in the study was 62% -9%. No premium for single-family homes. Larger premiums in dense housing areas.
McCord et al. (2014)	Belfast, Northern Ireland	512 apartments 1817 terraced	Apartment premiums: <250m, 38%; 250-500m, 48.8%; 500-750, 35.4%; decaying to 14% at 2,500 meters.

		1224 semi-det. 301 detached	<p>Terraced premiums: <250m, 27%; 250-500m, 24.2%; 500-750m, 8.4%; no premiums beyond 750m.</p> <p>Semi-detached: <250m, 15.7%; 258-500m, 6.4%. Negative premiums beyond 750m</p> <p>Detached: >250m, -27%; 250-500, +24.2%. No impact beyond 500m.</p>
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China Studies			
Author (Year)	Setting	Sample Size	Findings
Jim & Chen (2010)	Hong Kong, China	1,471 apartments	14.9% premium for apartments within 800m of a park.
Hui et al. (2007)	Hong Kong, China	2,957 apartments	No premiums for properties within 300m of a park.
Sheng et al. (2013)	Macau, China	277 apartments	Premium of 200m within 200m of a public park.
Chen & Jim (2010)	Shenzhen, China	358 apartments	1k distance from a park decreased value by 1.7%, but no significant premium within 500m.
Jim & Chen (2006)	Guangzhou, China	758 apartments	No premium within 500m of a large wooded area.

Jim & Chen (2007)	Guangzhou, China	521 apartments	Premium of 6.6% in older areas with minimal supply of parks. No premium in newer areas which had more green areas.
Chen (2017)	Guangzhou, China	968 apartments	1% premium within 500m of a park.
Jiao & Lui (2010)	Wuhan, China	304 apartments	Premium of \$3-\$6 per square meter within 100m of large lake-based recreation areas, decaying to 50-80 cents at 800m. No premium for 26 smaller parks.
Wen et al. (2014)	Hangzhou, China	2,473 apartment sales in 290 housing clusters	Proximity to smaller sport facilities has a significant positive impact.
Biao et al. (2012)	Beijing, China	Apartment sales from 76 housing clusters	Average premium of 10.9%, decaying from 14.1% in city center location to 0.5% in outer zones where green space was more plentiful.
Kong et al. (2007)	Jinan City, China	Apartment sales in 120 housing clusters	For proximate forests, an increase of 5% per square foot for each percent increase in a size-distance index. No premiums for plazas or parks. A 1% reduction in travel time to parks and plazas, resulted in an increase of 1.6% and 1.8% in value for plazas and parks, respectively.

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Other International Studies			
Author (Year)	Setting	Sample Size	Findings
Hoshino & Kuriyama (2010)	Tokyo, Japan	2,370 single room dwellings; monthly rentals	No premium for parks larger than 2.5 acres within 450m.
Pearson et al. (2002)	Queensland, Australia	641 blocks of vacant land	Premium of 6%-7%, but no premium for properties immediately adjacent to the park.
Hatton MacDonald et al. (2010).	Adelaide, Australia	3 years of house sales	Proximity to large bush reserves had a negative impact on sales prices; proximity to watered playground areas embedded in neighborhoods had a positive impact.

Table 2

Premiums Associated with 8 High Quality Parks in England

Park Location	Size of Investment (£million)	Size (Acres)	Indexed Values		
			Overlooking	Within two blocks	More distant, but in the same area
Mesnes Park, Newton-le-Willows	1	21	119	119	100
Queen Square, Bristol	3.7	3.2	116	101	100
Boston Square Sensory Park, Hunstanton	0.3	1.2	107	100	100
Hulme Park, Manchester	3	40	107	103	100
Mowbray Park, Sunderland	3.8	18.5	134	134	100
Mile End Park, London	21	89	107	103	100
King George Recreation Ground, Hertfordshire	2.5	20.7	106	102	100
Lister Park, Bradford	4.5	55	104	102	100

Figure 1

Percentage Effect of Nearest Attractive Natural Space on Property Price by Distance to the Property in the Netherlands

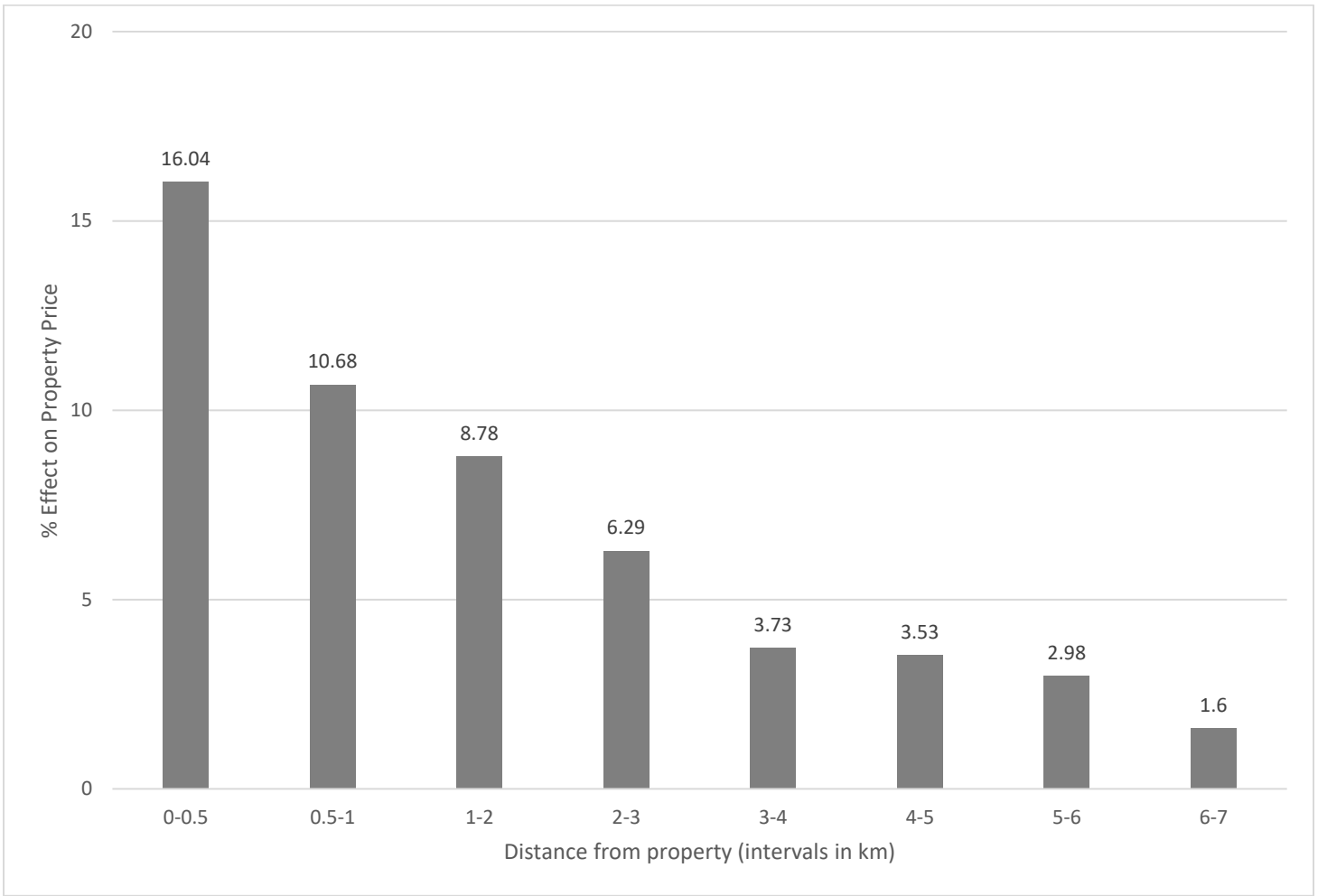


Figure 2

Additional Number of Houses that Received a Premium when Perceived Attractiveness of Open Space was Measured Rather than Physical Distance.

