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Value of Bundled Recreation Amenities in Southern Arizona Communities: A Hedonic Pricing Approach

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Value of Bundled Recreation Amenities in Southern Arizona Communities:

A Hedonic Pricing Approach

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ABSTRACT

Value of Bundled Recreation Amenities in Southern Arizona Communities:
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The primary purpose of this study was to examine the contribution of family-recreation amenities to home valuation in Southern Arizona communities. Although recreation amenities have become a frequent addition to housing developments, little research exists regarding the value these amenities contribute to home valuation. The sample consisted of 600 homes in master-planned communities and 600 homes in comparable traditional subdivisions. Using the hedonic pricing method, this study examined whether the inclusion of recreation amenities provides additional value to homes after structural and locational characteristics were controlled for. Blocked multiple regression analyses were used to determine the contribution of both individual and bundled recreation amenities to home valuation. The results of this study revealed a positive significant relationship between the bundle of community parks, neighborhood parks, and trails located within master-planned communities and home valuation, accounting for 17.45% of home value in this sample. In addition, the inclusion of family-recreation programming was found to contribute 6.82% of home value within master-planned communities. The findings suggest the inclusion of recreation amenities may be an appropriate way to revitalize communities, to increase the tax base for new housing developments, and to attract residents during a time of economic recession.

Keywords: hedonic pricing method, recreation amenities, home valuation, master-planned communities, bundled recreation amenities, family recreation

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Value of Recreation Amenities in Southern Arizona Communities: A Hedonic Pricing Approach

Parks and open spaces have long been considered valuable community assets. The value associated with parks and open spaces is associated with far more than the beauty and environmental benefits associated with such amenities. Recent studies have attempted to estimate a monetary value associated with parks and open spaces through examining sales prices of homes in close proximity to these amenities (Anderson & West, 2006; Crompton, 2001, 2005; Nicholls & Crompton, 2005). Parks and other related recreation amenities near homes may provide not only an increased value for these homes, but also opportunities for families to recreate together near their homes.

Hornig (2005) stated, "One of the key elements required for family development is simply time spent together" (p. 47). He determined it is not only important how families interact, but it is also important for families to have a place in which to interact (Hornig, 2005). There is an abundance of literature suggesting both parents and children are overscheduled and families are underconnected (Anderson & Doherty, 2006; Doherty & Carlson, 2003; Oaks, 2007), leaving very little time for recreating together as a family. With the restricted availability of family time, it is important for families to have access to both spontaneous and formal recreation opportunities close to their homes. Community recreation amenities inviting family-recreation participation are not limited to parks and open spaces. The increasing frequency of the inclusion of trails, swimming facilities, and family-recreation programming in master-planned communities (T. Murphy, personal communication, February 20, 2009) suggests these amenities may be important to both families and communities.

Master-planned communities are ideal for estimating the value associated with a variety of recreation amenities due to the inclusive nature of such communities. Master-planned

communities are real estate developments in which amenities are bundled and integrated directly into the communities to afford residents access to as many amenities as possible (McGuirk & Dowling, 2009; T. Murphy, personal communication, February 20, 2009). These communities have become increasingly popular in portions of Australia and Great Britain (Costley, 2006; McGuirk & Dowling, 2009; Rosenblatt, Cheshire, & Lawrence, 2009; Siembieda & Sturmer, 2009), in addition to the numerous developments in the United States. The value these amenities bring to homes within these communities has not yet been ascertained; existing methodologies used in estimating the value of parks and open spaces can be used when estimating the value of amenities in master-planned communities.

Nonmarket valuation has frequently been used as a method for evaluating the value of resources not generally traded in the marketplace because the values of these resources are difficult to determine (Aabo & Audunson, 2002; Crompton, 2001; Duke, 2008). In lieu of a market price for recreation amenities, an appropriate surrogate for measuring amenity value is the related value of homes located in close proximity to recreation amenities (Alexandrakis & Berry, 1994). Revealed preference techniques such as hedonic pricing methods determine value based on inferences derived from actual expenditure patterns (Ruijgrok, 2006). This technique allows for structural and locational characteristics such as square footage, property size, and proximity to nearby schools to be controlled, allowing the remaining value to be attributed to other variables.

Recent studies have utilized nonmarket valuation techniques in an attempt to discover the economic contribution of park and open space amenities, structural amenities, and locational characteristics when determining the market value of residential property (Anderson & West, 2006; Crompton, 2001; Handy, Boarnet, Ewing, & Killingsworth, 2002; Jim & Chen, 2006).

Studies on park and open space amenities have tended to focus primarily on the size of parks (Cho, Bowker, & Park, 2006), proximity to homes (Crompton, 2001), and availability of the parks for resident usage (Jim & Chen, 2006).

Alexandrakis and Berry (1994) determined there were premiums homeowners were willing to pay in order to have access to amenities located within master-planned communities. There is a scarcity of research, however, related to the composition of amenity packages that are part of residential communities and how either individual amenities or bundles of amenities may be related to home valuation. The purpose of this study, therefore, was to examine the relationship between recreation amenities and home valuation in Southern Arizona communities. Hedonic pricing methodologies form the basis for the analysis and measure the contribution of a variety of recreation amenities to home valuation.

Review of Literature

Master-Planned Communities

A recent trend in residential housing development has shown an increase in master-planned communities, more so than traditional subdivisions. Most master-planned communities require large tracts of land in order to develop these comprehensive communities; thus, due to land availability, the Southwestern United States has become a popular location for these communities (Alexandrakis & Berry, 1994). Master-planned communities are subdivisions in which amenities are included directly into the development (T. Murphy, personal communication, February 20, 2009). Often these amenities include retail shopping, small businesses, and schools. In addition, many communities have also established a place for families to recreate through the inclusion of extensive amenities appropriate for family-

recreation use. Some of these amenities may include playgrounds, skate parks, ball fields, water parks, or trails (T. Murphy, personal communication, February 20, 2009).

In light of the economic downturn, developers of master-planned communities are beginning to alter the types of amenities incorporated into the communities. Burney (2011) stated, "golf courses, expensive to maintain and often not used by many residents, are disappearing in favor of large community open spaces and other parks" (p. 65). In addition, a recent survey of master-planned community developers found half of those developers surveyed were planning to increase their amenity budgets to include more trails and community parks during 2011 (Bulik, 2011). Although master-planned communities have included a plethora of amenities in hopes of attracting families to reside and recreate there, the extent to which the addition of extensive recreation amenities adds value to the residential properties they surround is unclear.

Economic Theory and Nonmarket Valuation

Nonmarket valuation has been widely used in a variety of fields and is generally accepted as a valid method for estimating total economic value ("Non-market valuation," n.d.). The strength of nonmarket valuation lies in its straightforward analysis and its ability to estimate the comparative value of a wide variety of goods and services ("Non-market valuation," n.d.). Many tangible goods and services have values that are readily attributable and are easily measured within a market economy. Nonmarket goods are less tangible and, therefore, their worth is more difficult to assess. Nonmarket valuation allows the economic worth of these goods to be assessed through revealed or stated preferences of consumers (Aabo & Audunson, 2002; Crompton, 2001; Duke, 2008).

In order for value to be determined for nonpublicly traded goods, basic economic theory assumes involved persons will act in a rational manner (Aabo & Audunson, 2002). Just as the invisible hand guides the process of exchange in a market economy, Herrnstein (1997) suggested each party in a transaction maximizes their utility as they each move toward the best possible combination of goods, services, and money for themselves and ultimately the society around them.

Similar to the early ideas of utilitarianism, these transactions for nonmarket goods are completed for the purpose of increasing the pleasure of the individual (Dare, Welton, & Coe, 1987). Aabo and Audunson (2002) concluded the following:

> An individual's economic behavior can be based on a compromise between self-interest, claims of morality, social norms, and the pursuit of various other objectives. It indicates that the individual's utility, which he tries to maximize, can be understood as the overall end result which reflects a balance among a variety of considerations. (p. 10)

Therefore, regardless of whether individuals participate consistently in available opportunities, they are weighing the opportunity cost of the availability of goods and will act in a rational manner according to their individual preferences. In order to ascertain the value associated with these goods and services, nonmarket valuation techniques are used.

Nonmarket Valuation Techniques

Two techniques are commonly used to determine the economic value of nonmarket goods: stated preference and revealed preference techniques. Stated preference studies rely on formal surveys to estimate amenity values directly by asking individuals their willingness to pay for a nonmarket good (Aabo & Audunson, 2002; Duke, 2008). Revealed preference studies use

techniques that analyze transaction data to infer amenity values through observed behavior (Aabo & Audunson, 2002; Crompton, 2001; Duke, 2008).

Stated preference techniques. Stated preference techniques utilize a cost-benefit analysis assigning value to services not generally traded in a market economy (Chen & Jim, 2008; Crompton, 2001; Duke, 2008). Stated preference techniques have been frequently used to determine the value of forests and parks, based on stated values derived from user surveys and questionnaires (Ahmad, 2009; Amirnejad, Khalilian, Assareh, & Ahmadian 2006; Christie, Hanley & Hynes, 2007).

Stated preference techniques are able to, in principle, capture the total value for both users and nonusers of a public good (Aabo & Audunson, 2002; Duke, 2008). These preferences are measured through the presentation of hypothetical situations to evaluate willingness to pay for specific goods and services (Chen & Jim, 2008). Hypothetical situations are often presented in either political or economic scenarios asking survey participants to "state their willingness to pay [for the service], contingent on a specific hypothetical scenario and description" (King & Mazzotta, 2000a, para. 2). Hypothetical situations which are more realistic and appropriate to the situation tend to elicit more honest responses from survey participants (Hider, 2008).

Although stated preferences have been used extensively to measure the total economic value for library services (Aabo & Audunson, 2002; Hider, 2008), forest amenities (Amirnejad et al., 2006; Christie et al., 2007), and farmland (Duke, 2008), this practice is often considered controversial by economists and policy makers (Hider, 2008; King & Mazzotta, 2000a). The controversy stems from the tendency for respondents to overstate their willingness to pay, sometimes called strategic response, as well as the limitations in generalizability of data (Hider, 2008). Strategic response occurs when respondents state their preferences in such a way to bias

the results intentionally, usually to further a specific cause (Hider, 2008). Economists and policy makers rarely use the results, even though the method is capable of determining a value of nonmarket goods that incorporates both use and nonuse values (Hider, 2008).

Revealed preferences techniques. Revealed preference techniques are commonly used to ascertain the economic value of nonmarket goods. These techniques analyze transaction data to make inferences about amenity values through the observed behavior of individuals (Aabo & Aundunson, 2002; Crompton, 2001; Duke, 2008). The most common approach to measuring revealed preferences is the *hedonic pricing method*, define as "a powerful and appropriate research tool to assess the value of environmental benefits and resources, to estimate the worth of urban welfare, and to explore factors accounting for household allocation" (Jim & Chen, 2006, p. 425). In other words, the hedonic pricing method determines willingness to pay for goods and services by inferring the value based on revealed preferences and actual expenditure patterns (Ruijgrok, 2006).

Hedonic pricing method has been most commonly applied to situations where the value of local amenities is reflected in the market value of residential property (King & Mazzotta, 2000b). The value of a home is made up of a number of different components. Both structural and locational attributes are the most frequently studied characteristics in conjunction with residential property values (Crompton, 2001; Jim & Chen, 2006). Once these nonenvironmental factors are controlled for, then differences in price can be attributed to available amenities (King & Mazzotta, 2000b). Structural characteristics are the properties of an existing structure providing additional value to the land (Crompton, 2001). Lot size, age of home, number of rooms, and square footage are pertinent in assessing the value of residential properties (Cho et al., 2006; Crompton, 2001).

Locational characteristics are also considered an important factor in hedonic analyses as they are contributing factors toward determining property value. Jim and Chen (2006) substantiated the recommendations of previous researchers by including the distance to city center and distance to a major retail shopping center as two locational characteristics generally influencing property values. Schools also influence the price of nearby properties (Alexandrakis & Berry, 1994; Crompton, 2005; Nicholls & Crompton, 2005). Other locational variables may include size of park and open space amenities (Anderson & West, 2006); proximity to parks, green space, and water bodies (Jim & Chen, 2006); and views of amenities (Jim & Chen, 2006). Some studies have also considered population density (Anderson & West, 2006) and exposure to noise and traffic (Jim & Chen, 2006).

The ability of the hedonic pricing method to control for structural and locational characteristics enables the revealed amenity preferences of homeowners to be investigated. Although other nonmarket valuation techniques can be beneficial in determining current usage and nonusage patterns, hedonic pricing methods are instrumental in isolating amenities valued by homeowners at the time of purchase. The future option value of the availability of amenities is thus capitalized into the purchase price of a home, reflecting their revealed preferences (C. Bowles, personal communication, May 8, 2009; Chen & Jim, 2008). Hedonic pricing methods have a distinct advantage over stated preference techniques because the data reflect actual preferences of real consumers, thus eliminating the need for hypothetical preferences.

Hedonic pricing and master-planned communities. Alexandrakis and Berry (1994) studied the impact of master-planned communities on home values. Using the hedonic pricing method, 73,716 of the homes sold between 1980 and 1991 were assessed. This extensive range of time allowed for economic cycle differences to be assessed in times of both economic upturn

and downswing during an entire economic cycle. The study found not only were prices in master-planned communities significantly higher than home prices in other locations, but also that those price increases were due to a premium attributed to amenity packages included within the communities (Alexandrakis & Berry, 1994).

Current economic conditions mimic those experienced in the 1980s during the recession downswing of the cycle. As the United States has entered a nationwide recession, housing prices have declined. Alexandrakis and Berry (1994) found "since competitive pressures are more potent on the downswing as the economy slides toward recession . . . [housing] premiums probably come close to approximating the value of the amenity package that these master-planned communities provide" (p. 22). This suggests that a downswing in the economy is an appropriate time to assess the value of specific amenities while they are more likely to be subject to competitive pricing pressures.

Amenity Valuation and Proximity to Residential Property

The hedonic pricing method has frequently been used to assess the value of a variety of recreational amenities in close proximity to residential properties (Chen & Jim, 2008; Cho et al., 2006; Lutzenhiser & Netusil, 2001; Treiman & Gartner, 2006). Upon controlling for structural and locational characteristics, the value residents place on specific amenities can be estimated by examining how the amenities contribute to the overall price of the home (King & Mazzotta, 2000b).

Amenity valuation has contributed to the literature as evidenced by the quantity of studies emerging from a number of scholarly journals. Recent studies have assessed the relationships between the sales price of homes and community forests or greenbelts (Treiman & Gartner, 2006), neighborhood churches (Babawale & Adewunmi, 2011), open spaces (Lutzenhiser &

Netusil, 2001), railway accessibility (Debrezion, 2011), and water and green spaces (Cho et al., 2006). Other related valuation studies range in topic from forest amenities (Christie et al., 2007) and farmland amenities (Duke, 2008) to the health impact of recreation amenities (Thomson, Kearns, & Petticrew, 2003).

Park valuation. Crompton (2001, 2005) asserted parks have long been considered assets that increase the property values of urban residential properties located in close proximity to them. The proximal principle suggests the added value from parks and open spaces is a result of the willingness of consumers to pay a higher price for properties located within a proximal distance to various amenities (Crompton, 2001, 2005). As a result, when the appraised value of the home increases, the property taxes increase proportionally. This aggregate capitalization of tax revenue from all proximal properties can then be used by the communities to pay the debt charges associated with initial construction and ongoing maintenance for the parks (Crompton, 2001).

Early park planners quickly validated this intuitive concept of proximal distance in the building of major U.S. parks such as Central Park in New York City and Prospect Park in Brooklyn (Crompton, 2001, 2005). Central Park was constructed with the idea properties located a proximal distance from the park would have increased property values, which would then increase the tax valuation of those properties, bringing in more tax revenue for the city (Crompton, 2001). Over time, the additional tax revenue would more than pay for the initial construction and maintenance of the park. Numerous studies since then have substantiated the claims that the increases in property value stemming from urban park development are more than sufficient to make up for the decrease in taxable property from the tax base for the land dedicated

to the parks (Crompton, 2001). In 2001, Lutzenhiser and Netusil found the parks located within 200 feet of residential property had a significant impact on home values.

Community parks and neighborhood parks vary in both composition and size. Community parks tend to be larger in scale with a larger acreage and are designed for the use of the community as a whole. Community parks may include amenities such as basketball courts, dog parks, green space, picnic facilities, playground equipment, skate parks, and sports fields. In contrast, neighborhood parks or pocket parks tend to be smaller and designed for a particular subset of the community to use. Amenities in neighborhood parks may include covered or uncovered playground equipment, green space, and picnic facilities.

Trail valuation. Recent studies have begun to assess trails, also known as greenways or linear parks, in relation to their impact on residential property values (Morris, 2002; Nicholls & Crompton, 2005; Treiman & Gartner, 2006). *Greenways* have been defined as "extended lengths of trail for recreation and exercise, as well as alternative, non-motorized routes of transportation between home, work, and other community facilities" (Nicholls & Crompton, 2005, p. 88). Fabos (2004) suggested greenways provide extensive recreational opportunities such as walking, hiking, and bicycling in both urban and rural areas. Although greenways have begun to appear as the topic of conferences, books, and doctoral dissertations, few empirical studies assess the portion of property value associated with the existence of trails within a community (Fabos, 2004).

Family-recreation programming. There is a scarcity of research addressing recreation programming for families. The few existing studies focus on the leisure programming of families who have children with disabilities (Kozub, 2001; Prupas, Harvey & Benjamin, 2006),

or programming at family camps (Agate & Covey, 2007; Cottrell & Cottrell, 2003) rather than community-based family-recreation programming.

Family-recreation programming consists of organized recreation programs designed for entire families, regardless of age and ability level (Brock, 1994). Family-recreation programs within master-planned communities are typically offered through the local homeowners' associations and in some communities are designed to be an integral part of the community experience. Examples of possible family programs include summer movies under the stars, father/daughter dances, holiday celebrations, chili cook-offs, and community barbeques (Sharpe, 2008).

There is no previous literature to suggest family-recreation programming is an amenity contributing to residential property values. Since evidence exists that other recreation amenities, such as parks and green spaces, enhance the quality of life for residents and contribute to residential property values (Lutzenhiser & Netusil, 2001; Treiman & Gartner, 2006), it is reasonable to assume family and social interactions achieved through family-recreation programming may contribute as well.

Aquatics valuation. Community aquatics facilities such as swimming pools and water parks have not frequently been studied; however, there have been a few studies assessing private swimming pools in relation to home value. Sirmans, MacDonald, MacPherson, and Zietz (2006) conducted a meta-analysis of studies utilizing the hedonic pricing method in a variety of different parts of the country. They found having a private swimming pool had a "positive effect on house prices in the Southwest" (p. 227). This was explained in part by the distance from other sources of water, such as beaches (Sirmans et al., 2006). In Arizona, tax assessors include private swimming pools in their assessment of the value of a residential property; however, community

swimming pools are not considered for tax purposes (Pima County Assessor's Office, 2008) and have not been studied in relationship to home valuation.

Proximity to other water bodies and oceans has been discussed briefly in the literature. Jim and Chen (2006) studied the influence of water bodies on the value of residential property values in China. Proximity to water bodies was found to increase the value of a home by 13.2%. Fraser and Saunders (1998) found the proximity of an undeveloped residential lot to the ocean was a significant contributor to the sales price, in addition to significant findings relating to the quality of an ocean view.

Summary

Master-planned communities provide a foundational environment in which to explore the relationship between recreation amenity packages and home valuation. The inclusion of a wide variety of recreation amenities in these communities meets the needs of families for both spontaneous and formal recreation opportunities in close proximity to their homes. Although increasing numbers of communities have incorporated these amenities, little empirical evidence exists suggesting a corresponding relationship between the composition of the recreation amenity package and home valuation.

Nonmarket valuation techniques, particularly hedonic pricing methodologies, have been frequently used in determining values associated with amenities that cannot be generally determined in a market economy. Although parks have been frequently studied in association with home valuation, other recreation amenities have not been studied extensively. This research extends the existing literature by combining recreation amenities to better understand which amenities, or combination of amenities, constitute an increase in property valuation. Therefore,

the purpose of this study was to determine the relationship between recreation amenity packages and home valuation using the hedonic pricing method.

The following hypotheses were tested:

H_1: The remaining home value after structural and locational characteristics are accounted for is significantly higher in master-planned communities than in traditional subdivisions.

H_2: Individual recreation amenities located within residential communities has a significant relationship to home valuation.

H_3: A bundle of recreation amenities located within residential communities has a significant relationship to home valuation.

H_4: The distance of recreation amenities from residential properties has a significant negative relationship with home valuation.

Methods

Sample

A sample of 1,183 homes was obtained by a randomly selected stratified sampling of homes located in three Southern Arizona master-planned communities (n = 600) and three comparable traditional subdivisions (n = 583). A power analysis was conducted, and based on the number of variables in the study, 200 homes per community allowed for sufficient power.

The sample of homes in master-planned communities consisted of residential properties similar to those in the comparative sample. Lot sizes were similar between the master-planned communities (M = 5621.92 feet^2, SD = 2258.66) and the traditional subdivisions (M = 5486.21 feet^2, SD = 1166.34). The number of private pools were also similar between master-planned communities and traditional subdivisions; 4.7% (SD = .21) of properties in master-planned

communities and 6.2% (*SD* = .24) of properties in traditional subdivisions included a private pool. The two samples differed slightly in home size with means of 1,980.64 feet^2 (*SD* = 639.43) and 1,760.78 feet^2 (*SD* = 469.46) for master-planned communities and traditional subdivisions, respectively. There were also differences in the age of home and number of rooms between the two community types (see Table 1).

Homes in both sample community types were located a similar distance to the Tucson city center, with master-planned communities located an average of 16.16 miles (*SD* = 3.94) away and homes in the traditional subdivisions located an average of 15.93 miles (*SD* = 7.92) away. There was no difference in the means for distance to schools and distance to retail shopping between the community types (see Table 1).

Master-planned communities contained some or all of the following family-recreation amenities: community parks and trails, neighborhood parks, community swimming pools, and family-recreation programming. The traditional subdivisions contained only neighborhood parks. Within the sample of master-planned communities, the mean distance of properties from community parks was 0.49 miles (*SD* = 0.31), from neighborhood parks was 0.36 miles (*SD* = 0.29), and from community pools was 2.97 miles (*SD* = 3.248). Within the sample of traditional subdivisions the mean distance of properties from community parks was 1.94 miles (*SD* = 0.279), from neighborhood parks was 1.29 miles (*SD* = 1.605), and from community pools was 10.61 miles (*SD* = 6.75).

Three sources of property valuation were measured in this study. Tax valuation data for the sample were collected from the county assessor's office for the 2010 tax year (*M* = $156,349.29, *SD* = $41,358.49). In addition, the most recent sales price of properties (*M* = $208,347.71, *SD* = $61,062.20) and zestimates (*M* = $160,720.03, *SD* = $45,078.34) were

collected. Reliability analysis among the three measures of property valuation indicated high internal consistency among the measures (alpha = 0.919). Tax valuation and zestimates (r^2 = 0.909) were more strongly correlated than tax valuation and sales prices (r^2 = 0.627), in part due to the numerous short-sales and foreclosures creating extreme outliers in the Tucson area. The results for both the tax valuation analysis and zestimate analysis were similar. For the purposes of this analysis and for the sake of clarity, zestimate analyses were reported.

Instrumentation

To account for the variance caused by the numerous short-sales and foreclosures in the Tucson area, property valuation data were gathered from Zillow.com, a website using a proprietary algorithm to determine an appropriate market value for a property at any given point in time (Zillow, 2011). The site utilizes a combination of the local tax valuation information, comparative sales listings, and locational factors to determine their estimate, or *zestimate*, for the worth of a given property. Data among Pima County properties were readily available and had been rated with Zillow.com's best zestimate rating, which means enough data was available to obtain a quality estimate (S.E. 7.9%), with 80.3% of estimates within 20% of the sales price and 34.5% of estimates within 5% of the sales price. Zestimates were collected in January 2011 for all homes in the sample in order to ensure they were comparative.

Both structural and locational characteristics have previously been demonstrated to determine a substantial amount of the variance in housing prices (Crompton, 2001; Jim & Chen, 2006). The following structural characteristics were selected for use in this study based upon the frequency in which they were used in previous research: (a) age of home, (b) lot size, (c) number of rooms, (d) square footage of home (Cho et al., 2006; Crompton, 2001), and (e) private pool. Locational characteristics of the area important in determining property value and pertinent to

previous studies were (a) distance to city center, (b) distance to retail shopping, (c) proximity to neighborhood and community parks (Anderson & West, 2006; Jim & Chen, 2006), and (d) proximity to schools (M. Flores, personal communication, May 9, 2009; B. Tiffan, personal communication, May 9, 2009).

Analysis

The data were analyzed using both the statistical software packages R and SPSS. Outliers were examined to ensure that they fit within the sample parameters. Twenty properties from the zestimate analysis were eliminated due to extreme outliers. In the model, the data were positively skewed; however, the data were not skewed beyond the acceptable range. Descriptive statistics were performed on the locational characteristics (distance to city center, distance to school, distance to retail shopping) and structural characteristics (lot size, home size, age of home, number of rooms, number of stories, and private pool) as well as for valuation price. Multiple independent sample *t* tests were run to examine differences between community types, structural characteristics, and locational characteristics. Due to multiple *t* tests, the pseudo Bonferroni adjustment of $p < .01$ was used to guard against inflated experiment-wise error.

Pearson product moment zero-order correlations were calculated to check for multicollinearity and significant relationships among the variables. Multicollinearity led to the removal of all recreation amenity distance variables. Also, the variables master planned, community parks, neighborhood parks, and trails were combined, and the resulting variable was renamed *bundled recreation amenities*. These variables were combined because there was an exact correlation between these variables. Since these variables all conceptually measure the same amenities and were present in all master-planned communities, they can be combined “into

a single measure and . . . the newly created variable [can be used] in the analysis" (O'Brien, 2007, p. 684).

Multiple regression analyses were performed on the dependent variable, home value. Using a stepwise blocked method, the structural and locational characteristics were entered into the first block, and the recreation amenity variables (bundled recreation amenities and family-recreation programming) were entered separately in the second block. A significance level of $\alpha = .05$ was used throughout the analyses. In the significant models, the standardized regression coefficient (Beta) was examined to identify the contribution of each variable.

The individual recreation amenity community swimming pool was dropped step-wise from the model to reduce the variance inflation factor. The final model had a variance inflation factor of less than five for all variables, which provided a reasonable indication the proportion of variance within the model was not related to the other independent variables in the analysis (O'Brien, 2007). The final regression model is as follows:

$$\text{HOME VALUE} = \beta_0 + \beta_1 \text{ DISTANCE TO RETAIL SHOPPING} + \beta_2 \text{ LOT SIZE} + \beta_3 \text{ HOME SIZE} + \beta_4 \text{ AGE OF HOME} + \beta_5 \text{ NUMBER OF STORIES} + \beta_6 \text{ NUMBER OF ROOMS} + \beta_7 \text{ PRIVATE POOL} + \beta_8 \text{ DISTANCE TO SCHOOL} + \beta_9 \text{ DISTANCE TO CITY CENTER} + \beta_{10} \text{ BUNDLED RECREATION AMENITIES or FAMILY RECREATION PROGRAMMING} + \varepsilon$$

in which β_0 is the constant, β_1- β_{10} are coefficients with respect to each valuation attribute, and ε is the error term.

Results

These analyses were performed to test the four hypotheses of the study. Hypothesis 1 sought to determine whether overall home valuation would be higher in master-planned

communities than in traditional subdivisions. Home valuation, as measured by zestimates, was found to be on average $29,835.39 higher in master-planned communities ($t = 12.76$, $p < .001$) than in traditional subdivisions.

In addition, a series of 10 *t* tests were conducted in order to determine which characteristics of home valuation were different between the community types as well as overall valuation differences. For structural characteristics, data-significant differences were found among the mean scores for home size ($t = 6.23$, $p < .001$), age of home ($t = -11.89$, $p < .001$), and number of rooms ($t = 3.71$, $p < .001$; see Table 1). With the exception of the age of home variable, master-planned communities had higher means than traditional subdivisions. There was no significant difference in the mean scores for private swimming pools ($t = -1.30$, $p = .194$); however the mean scores for traditional subdivisions were higher. Analysis of the locational characteristics data between the two community types revealed the mean scores for master-planned communities were higher, and significant differences were found between the mean scores for both distance to school ($t = 6.59$, $p < .001$) and distance to retail shopping ($t = 13.64$, $p < .001$); however, there was no significant difference found between the mean distances from city center ($t = .61$, $p = .544$; see Table 1).

In order to test the subsequent hypotheses, multivariable analyses were computed with block entry method multiple regression equations to examine the relationship between structural or locational characteristics and home valuation beyond the bivariate level. A multiple regression model was created for the dependent variable, zestimate home value. In the model ($n = 1163$); the first block contained only structural (lot size, home size, age of home, number of stories, number of rooms, and private pool) and locational (distance to city center, distance to school, and distance to retail shopping) variables, thus explaining a significant portion of the

variance in residential home value (R_{adj}^2 = 0.837; see Table 2). All variables entered into Block 1 were found to be significant contributors of home value, with the exception of lot size (p = .106) and distance to school (p = .484).

To test Hypothesis 2 regarding the influence of individual recreation amenity variables on the variance in home valuation, individual recreation amenity variables were added to Block 2 of the multiple regression model. Although data were collected for several individual recreation amenities, only family-recreation programming remained in the model due to multicollinearity issues and the nonsignificance of other variables in the zero-order correlations. When family-recreation programming was entered into the second block, there was a statistically significant change in the variance explained by the model (ΔR^2 = .007, p = .000). The addition of family-recreation programming into the model accounted for $11,841.09 (β = .105, p < .001) of home value in communities offering this amenity (see Table 2).

The combination or bundling of recreation amenities was also of interest to the researcher; thus Hypothesis 3 sought to determine whether a relationship exists between a bundle of recreation amenities and home valuation. For this hypothesis, community parks, trails, and neighborhood parks found in master-planned communities were bundled into one variable and entered independently into Block 2 of the multiple regression model. These bundled recreation amenities also accounted for a statistically significant change in the variance from Block 1 (ΔR^2 = .091, p < .001). The bundle of recreation amenities accounted for $30,287.01 (β = .356, p < .001) of home value in communities where this combination of amenities was available (see Table 3).

Hypothesis 4 queried whether the distance of recreation amenities would be significantly related to home valuation. Since none of the distances to recreation amenity variables were

found to be significant in the zero-order correlation, a subsequent multiple regression was not performed, and the hypothesis was not supported.

Discussion

As families today have demonstrated decreasing amounts of both time together and time to spend in recreational pursuits, Hornig's (2005) vision of a place for families to participate in family-recreation near their homes has become a reality in master-planned communities. It is interesting, during a time of economic recession in the United States, master-planned community developers in Southern Arizona continue to build hundreds of new homes and generally have been able to find buyers for these homes. Other factors draw families to these communities beyond the structural characteristics of the homes they are acquiring.

The results of the current study yield insights into the type of recreation amenities which add value to the price of homes in Southern Arizona communities. Findings from the current study support the concept introduced by Alexandrakis and Berry (1994) regarding a price premium associated with homes located within master-planned communities. It is clear recreation amenities contribute to a portion of this premium; in this study, these premiums account for 17.45% of the home value within master-planned communities. For a similar study of master-planned communities in the Dallas, Texas, area, these premiums ranged from 26% to 31% of the home value (Alexandrakis & Berry, 1994).

Bundled Amenities

Previous research has identified either a dollar value or percentage of home value associated with individual recreation amenities (Abbott & Klaiber, 2010; Cho et al,, 2006; Jim & Chen, 2006; Lutzenhiser & Netusil, 2001; Nicholls & Crompton, 2005). Table 4 illustrates how recreation amenities contribute to home valuation in various parts of the world. An initial aim of

this research was to determine which amenities contributed the most value to residential properties in master-planned communities. It became apparent, however, all amenities do not contribute to home value individually; rather, some amenities contribute to property value as a group, or bundle, of amenities. The collinear relationship between community parks, neighborhood parks, and trails suggests, rather than individual amenities providing additional property value, a bundle of amenities is providing the additional property value to homes within master-planned communities. Interestingly, the additional value attributable to bundled recreation amenities ($30,287.01) is almost exactly the same as the difference in value between master-planned communities and traditional subdivisions ($29,835.39). In other words the difference in value between communities may be substantially attributed to the additional recreation amenities.

From the prospective developer's point of view, the bundling of recreation amenities makes sense. Families who are interested in purchasing a home within a master-planned community are likely purchasing a home for the entire experience offered by the community, rather than for the individual amenities located within the community. According to Bulik (2011), half of the top 10 master-planned communities who participated in their study were considering adding park and trail amenities to their budget for 2011. This study's findings reinforce these decisions made by developers to include more amenities by providing a data-based rationale for their investment. By devoting even 10-15% of developable land to parks and trails, developers would be taking advantage of recreation amenity premiums for homes in those communities and still be able to make a healthy profit.

Family-Recreation Programming

Although assigning an individual value to each recreation amenity in the study was not ultimately possible, family-recreation programming did account for $11,841 or 6.82% of residential property value when added individually to the structural and locational characteristics within the regression model. Associating a monetary value with family-recreation programming has exciting implications, as it suggests nonphysical amenities can have economic value beyond the value of recreation amenities physically located in a community. Family-recreation programming is an opportunity for families to recreate together in an organized environment on a regular basis. Sometimes it is not enough to have open access to parks or other open spaces; there are some families who thrive in a structured participation environment.

Couchman (1982) suggested "shared family recreational experiences seem to be strong antidote against the stresses of normal family and personal life" (p. 8). As families struggle to meet the competing demands on their time (Anderson & Doherty, 2006; Doherty & Carlson, 2003; Oaks, 2007), it is essential for families to have an opportunity to participate together in recreation activities without the additional stress of planning those activities. As the family as an entity continues to disintegrate, readily available family-recreation programming that does not add to the increasing stresses of everyday life may serve to stimulate family interaction.

Distance to Recreation Amenities

Distance to parks and swimming pools were not found to be significantly related to home values in this study and were, therefore, not included in the regression model. These results are similar to some previous studies and contradictory to others. Although a recent study (Lutzenhiser & Netusil, 2001) found parks to add value to properties within 200 ft., others did not find proximity to parks significantly related to property values (Bowman, Thompson, &

Colletti, 2009; Nicholls & Crompton, 2005). The range of distances to parks was very small in the current study; all homes in master-planned communities had a park located within a mile, so there may not have been enough variation in the variable to allow for differences in home value to be detected. Although there was no statistically significant relationship between proximity to parks and home values, the monetary value associated with having access to parks and trails within master-planned communities is reflected in the value of the bundled amenities.

Practical Implications

The practical implications of this study apply to both cities and developers. Although an established distance was not found to determine how far parks should be from homes to extract the most value, it is clear the presence of parks and trails within a community may account for up to 17.45% of the property value. City planners and developers should consider these results and recognize the economic benefits associated with these findings.

The tax value of residential properties is influenced by the current market value of home sales in the local area. When homes are perceived to be worth more, the corresponding tax valuation also increases. City planners and developers could approve housing developments that include parks and trails, which then will increase the overall tax revenue generated by the developed homes in those communities. The increase in tax dollars could be used to maintain those parks and trails or to assist in maintaining other parks and recreation facilities in the city. It is important to recognize that, although land donated for the construction of parks and trails diminishes the overall land tax base, the yearly tax revenue increase from nearby residential properties serves to more than compensate for the decreased tax base.

Revitalization projects can also benefit from the findings of this study. As cities age and certain neighborhoods or downtown areas lose residents, some cities have begun revitalization

projects (City of Tucson, 2012; University Park Alliance, 2001). The addition of parks and trails to the residential areas of these revitalization projects may serve to increase the value of homes in those areas and are consequently likely to increase the tax base in those areas. Increases in the tax base may be instrumental in partially funding the revitalization projects. In addition, trails could serve as a network of pathways to connect major features or businesses within the area.

The bundling of amenities has implications for families as well. Master-planned communities are marketed for the entire experience available to homeowners. Individual amenities generally may not be enough to entice homeowners to purchase a home within a certain community; however, a bundle of amenities sets a community apart. Homeowners may look at the available amenities when considering their purchase; often, the bundle of amenities available may trump prior preferences, such as large backyards, proximity to employment, or distance from neighbors, that were initially perceived as important to families. The availability of community and neighborhood parks for families to use for spontaneous or formal recreation can be a major selling feature for master-planned communities.

Future Research

Future research opportunities abound when studying the economic influence of recreation amenities. Though it has been established a bundle of recreation amenities provides additional value to homes in Southern Arizona master-planned communities, additional research is necessary to determine whether a bundle of recreation amenities provides value in other master-planned communities. In addition, there has been an inconsistency between studies as to whether distance to parks and other recreation amenities have been found to be significant. It is important to begin to understand if these are regional issues, community type issues, or if there are other factors influencing the significance of distance to recreation amenities.

Another future area of research relates to the usage of recreation amenities in master-planned communities. Though a premium is associated with the value of homes in master-planned communities, and homeowners pay an additional fee to a homeowner's association to maintain those amenities, research has not been conducted to determine to what extent recreation amenities are utilized by residents.

Understanding the contributions family-recreation programming makes to the economic value of homes in Southern Arizona is a stepping stone to determining the economic benefit of family programming in other areas of the country. In addition to economic benefits, there may also be social benefits associated with family-recreation programming. Further research is necessary to determine to what extent the presence of/attendance at family-recreation programming benefits families. Research could also be conducted to determine the types of programming which are important to families as well as the types of families attending the programs offered within these communities.

Conclusion

City planners and developers continue to have the challenge of creating housing developments to meet the needs of homeowners and community members as well as battle the challenges of a recession economy. The inclusion of a bundle of recreation amenities within a master-planned community was found to be a significant contributor of property value, and serves as a mechanism to attract homebuyers during a time of economic recession.

Ultimately, this study found one of the top five contributors to home values in master-planned communities was the bundle of recreation amenities. In addition, family-recreation programming is a newly developing concept contributing significantly to home values in some Southern Arizona master-planned communities. In these difficult economic times, it is essential

for developers and city planners to incorporate recreation amenities into revitalization projects and future residential developments to increase the tax base and to entice residents into their communities.

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Table 1

Differences between Homes in Master Planned Communities and Traditional Subdivisions

Variable	*M*	*SD*	*t*	*p*
Property valuation				
Zestimate valuation				
Master-planned communities (*n* = 581)	$173,701.20	$44,679.83	12.76	.000*
Traditional subdivisions (*n* = 582)	$143,865.81	$34,435.50		
Structural characteristics				
Lot size				
Master-planned communities (*n* = 581)	5621.92	2258.66	1.90	.06
Traditional subdivisions (*n* = 582)	5486.21	1166.34		
Home size				
Master-planned communities (*n* = 581)	1966.95	641.67	6.73	.000*
Traditional subdivisions (*n* = 582)	1761.64	469.40		
Age of home				
Master-planned communities (*n* = 581)	3.21	1.71	-12.31	.000*
Traditional subdivisions (*n* = 582)	4.24	1.21		
Number of stories				
Master-planned communities (*n* = 581)	1.51	.49	.92	.36
Traditional subdivisions (*n* = 582)	1.47	.50		
Number of rooms				
Master-planned communities (*n* = 581)	7.59	1.52	4.11	.000*
Traditional subdivisions (*n* = 582)	7.3	1.06		
Private pool				
Master-planned communities (*n* = 581)	.04	.21	-1.15	.25
Traditional subdivisions (*n* = 582)	.06	.24		

Note: * $p < .001$

Table 1 continued

Variable	*M*	*SD*	*t*	*p*
Locational characteristics				
Distance to city center				
Master-planned communities (*n* = 581)	16.12	3.94	.48	.63
Traditional subdivisions (*n* = 582)	15.93	7.92		
Distance to school				
Master-planned communities (*n* = 581)	3.73	3.35	6.06	.000*
Traditional subdivisions (*n* = 582)	2.73	1.5		
Distance to retail shopping				
Master-planned communities (*n* = 581)	4.70	2.06	13.84	.000*
Traditional subdivisions (*n* = 582)	2.83	2.58		

Note: * $p < .001$

Table 2

Summary of Blocked Regression Equations: Family-Recreation Programming

Variables	*B*	*SE B*	β	*p*
Zillow.com (n = 1153)				
Block 1 R^2 = .838 (*p* = .000)				
Lot size	0.580	0.359	0.024	.106
Home size	73.711	1.726	0.989	.000*
Age of home	-4147.304	392.002	-0.153	.000*
Number of stories	-17281.568	1313.341	-0.202	.000*
Number of rooms	-2790.747	657.722	-0.086	.000*
Private pool	8641.069	2348.156	0.046	.000*
Distance to city center	-2597.927	121.675	-0.382	.000*
Distance to school	208.303	297.437	0.013	.484
Distance to retail shopping	-5035.663	375.675	-0.297	.000*
Block 2 ΔR^2 = .007 (*p* = .000)				
Lot size	.293	.353	.012	.407*
Home size	74.125	1.691	.995	.000*
Age of home	-4939.542	399.509	-.182	.000*
Number of stories	-15785.642	1302.762	-.184	.000*
Number of rooms	3355.651	648.771	-.104	.000*
Private pool	8945.040	2299.293	.047	.000*
Distance to city center	-3178.806	144.271	-.467	.000*
Distance to school	1275.055	327.315	.079	.000*
Distance to retail shopping	-6172.528	400.806	-.364	.000*
Family-recreation programming	11841.085	1659.072	.105	.000*

*Note: * p < .001*

Table 3

Summary of Blocked Regression Equations: Bundled Recreation Amenities

Variables	*B*	*SE B*	β	*p*
Zillow.com (n = 1153)				
Block 1 R^2 = .838 (*p* = .000)				
Lot size	0.580	0.359	0.024	.106
Home size	73.711	1.726	0.989	.000*
Age of home	-4147.304	392.002	-0.153	.000*
Number of stories	-17281.568	1313.341	-0.202	.000*
Number of rooms	-2790.747	657.722	-0.086	.000*
Private pool	8641.069	2348.156	0.046	.000*
Distance to city center	-2597.927	121.675	-0.382	.000*
Distance to school	208.303	297.437	0.013	.484
Distance to retail shopping	-5035.663	375.675	-0.297	.000*
Block 2 ΔR^2 = .091 (*p* = .000)				
Lot size	1.387	.239	.059	.000*
Home size	63.835	1.172	.857	.000*
Age of home	-3105.746	261.066	-.114	.000*
Number of stories	-13690.967	874.937	-.160	.000*
Number of rooms	-1547.030	436.863	-.048	.000*
Private pool	10144.737	1555.864	.054	.000*
Distance to city center	-3518.003	84.078	-.517	.000*
Distance to school	1076.436	198.308	.067	.000*
Distance to retail shopping	-8640.723	265.945	-.510	.000*
Age of home				
Bundled recreation amenities	30287.010	788.356	.356	.000*

*Note: * p < .001*

Table 4

Value of Amenities in Recent Literature

Amenity	Author	Location	$ Value	% Value
Parks				
General	Cho (2006)	Knoxville, TN	$172.00	
Large*	Abbott & Klaiber (2010)	Phoenix, AZ	$1,138.00	
Local*	Abbott & Klaiber (2010)	Phoenix, AZ	$513.00**	
Natural	Lutzenhiser & Netusil (2001)	Portland, OR	$6,269.17	
Specialty	Lutzenhiser & Netusil (2001)	Portland, OR	$2,421.64	
Urban	Lutzenhiser & Netusil (2001)	Portland, OR	-$2,171.93	
View of parks	Jim & Chen (2006)	Ghangzhou, China		7.10%
Greenbelts	Nicholls & Crompton (2005)	Austin, TX	$28,715	
*	Cho (2006)	Knoxville, TN	$368.00	
Golf courses	Lutzenhiser & Netusil (2001)	Portland, OR	-$46,567.59	
Water bodies	Jim & Chen (2006)	Ghangzhou, China		13.27%
*	Cho (2006)	Knoxville, TN	$491.00	
Bundled recreation amenities		Tucson, AZ	$30,287.01	17.45%
Family-recreation programming		Tucson, AZ	$11,841.09	6.82%

Notes: * = distance variable, measured at one mile from property, value listed is price increase if moving 1000 feet closer to amenity

** = nonadjacent properties; adjacent properties = $112.00

Appendix

Prospectus

Chapter 1

Introduction

Parks and open spaces have long been considered valuable community assets. The value associated with parks and open spaces is associated with far more than the beauty and environmental benefits associated with such amenities. Recent studies have attempted to estimate a monetary value associated with parks and open spaces through examining sales prices of homes in close proximity to these amenities (Anderson & West, 2006; Crompton, 2001, 2005; Nicholls & Crompton, 2005). Parks and other related recreation amenities near homes may provide not only an increased value for these homes, but also opportunities for families to recreate together near their homes.

Family recreation may include spontaneous recreation at a park, pool, or trail as well as more formal program participation. Regardless of the type of recreation, Hornig (2005) stated "one of the key elements required for family development is simply time spent together" (p. 47). He determined it is not only important how families interact, but it is also important for families to have a place in which to interact (Hornig, 2005).

Community recreation amenities inviting family-recreation participation are not limited to parks and open spaces. The increasing frequency of the inclusion of trails, swimming facilities, and family-recreation programming in master-planned communities (T. Murphy, personal communication, February 20, 2009) suggests these may be important to families and communities. The value of these amenities has not yet been ascertained; however, methodologies that have been used in estimating the value of parks and open spaces may also be able to estimate the value of recreation amenities as well.

Nonmarket valuation has frequently been used as a method for evaluating the value of resources not generally traded in the marketplace because the values of these resources are difficult to determine (Aabo & Audunson, 2002; Crompton, 2001; Duke, 2008). In lieu of a market price for recreation amenities, an appropriate surrogate for measuring amenity value is the related value of homes located in close proximity to recreation amenities (Alexandrakis & Berry, 1994). Revealed preference techniques such as hedonic pricing methods determine value based on inferences derived from actual expenditure patterns (Ruijgrok, 2006) and have frequently been utilized in conjunction with property valuation analysis (Crompton, 2001; Jim & Chen, 2006; King & Mazzotta, 2000c).

Master-planned communities are ideal for estimating the value associated with a variety of recreation amenities due to the inclusive nature of such communities. Master-planned communities are real estate developments in which amenities are bundled and integrated directly into communities to afford residents the access to as many services as possible (McGuirk & Dowling, 2009; T. Murphy, personal communication, February 20, 2009). These communities have become increasingly popular in portions of Australia and Great Britain (Costley, 2006; McGuirk & Dowling, 2009; Rosenblatt, Cheshire, & Lawrence, 2009; Siembieda & Sturmer, 2009), in addition to the numerous developments within the United States. The southwestern region of the United States has also been a predominant location for the development of these communities due to the availability of large tracts of land necessary for constructing these communities (Alexandrakis & Berry, 1994).

Master-planned communities are among the fastest growing communities in the country (Costley, 2006). Though master-planned communities have been frequently utilized for active adult communities; recently they have become popular for family communities as well (Diamond

Ventures, n.d.). Since the relative proximity of these developments tends to be further from city centers, many of the communities have incorporated additional amenities into the developments such as schools, retail shopping, or recreation amenities. Furthermore, many master-planned communities have established a family friendly environment through the inclusion of amenities appropriate for family-recreation use.

Statement of the Problem

Research regarding the value of recreation amenities is limited. Though master-planned communities emphasize the inclusiveness of their recreation amenities, it is unclear to what extent the inclusion of recreation amenities contributes to the value of homes in those communities. The problem of this study is to determine the relationship between proximity of recreation amenities and home valuation using the hedonic pricing method.

Justification for the Study

The close proximity of recreation amenities in master-planned communities to each home is ideal for family use. Shaw and Dawson (2001) suggested when families recreate together, they are engaging in an activity that promotes positive interactions amongst all family members. A recent study found not only does family recreation allow families to bond, problem solve, and strengthen relationships (Agate, Zabriskie, Agate, & Poff, 2009), but it is also one of the key elements in family development (Hornig, 2005). Since family recreation can be either spontaneous or formal and can happen within the home or community, there are a plethora of opportunities for families to find recreational activities that meet their needs.

Though opportunities may abound for families to participate in recreational activities, many families are constrained by available time in which to recreate together. There is an abundance of literature that suggests that both parents and children are overscheduled and that

families are underconnected (Anderson & Doherty, 2006; Doherty & Carlson, 2003; Oaks, 2007), leaving very little time for recreating together as a family. With restricted availability of family time, it is important for families to have access to both spontaneous and formal recreation opportunities close to their homes. Many master-planned communities in Southern Arizona have embraced the idea that not only is family recreation an important part of family life, but it is also important for families to have a place to recreate in close proximity to their homes (Hornig, 2005; T. Murphy, personal communication, February 20, 2009).

Nonmarket valuation is appropriate for measuring the value of recreation amenities as they are difficult to measure in a market economy. Economic theory suggests individuals will act in ways which are not only rational, but will also maximize their utility (Herrnstein, 1997). Consumers will choose to participate in recreational activities or recreate together in places that offer the best possible combination of activities and services, which achieves a balance of their needs (Aabo & Audunson, 2002).

Nonmarket goods can be measured through either the stated or revealed preferences of consumers (Aabo & Audunson, 2002; Crompton, 2001; Duke, 2008). Stated preference techniques such as contingent valuation are appropriate for determining willingness-to-pay for some nonmarket goods. Though this technique can determine value based on stated preferences derived from a questionnaire, there is a tendency for consumers to misstate their true preferences in favor of a strategic response or a personal agenda (Hider, 2008). This has led to considerable controversy surrounding this technique.

Revealed preference techniques such as hedonic pricing methods determine value based on inferences derived from actual expenditure patterns (Ruijgrok, 2006). Hedonic pricing methods have been frequently applied to ascertaining the value of local amenities in relationship

to the market value of residential property (King & Mazzotta, 2000c). This technique allows for structural and locational characteristics such as square footage, property size, and proximity to nearby schools to be controlled, allowing the remaining value to be attributed to the surrounding recreation amenities.

Recent studies have utilized nonmarket valuation techniques in their endeavors to determine the economic contribution of park and open space amenities, structural characteristics, and locational characteristics to the market value of residential property (Anderson & West, 2006; Crompton, 2001; Handy, Boarnet, Ewing, & Killingsworth, 2002; Jim & Chen, 2006). Studies on park and open space amenities have tended to focus primarily on the size of parks (Cho, Bowker, & Park, 2006), proximity to homes (Crompton, 2005), and availability of parks for resident usage (Jim & Chen, 2006).

Alexandrakis and Berry (1994) determined there are premiums residents are willing to pay in order to have access to amenities located within master-planned communities. There is a scarcity of research, however, related to the composition of amenity packages which are part of master-planned communities. Additional research is necessary; therefore, to understand which recreation amenities contribute to home values. Further research is, therefore, necessary to establish the value of recreation amenities within master-planned communities in order to help both existing communities and future developers make informed decisions.

Hypotheses

The following hypotheses will be tested:

H_1: The remaining home value after structural and locational characteristics are accounted for is significantly higher in master-planned communities than in traditional subdivisions.

H_2: Individual recreation amenities located within residential communities has a significant relationship to home valuation.

H_3: A bundle of recreation amenities located within residential communities has a significant relationship to home valuation.

H_4: The distance of recreation amenities from residential properties has a significant negative relationship with home valuation.

Delimitations

This study will be delimited to the following:

1. Three master-planned communities, one in Sahuarita, Arizona, and two in Tucson, Arizona; each community offers a range of recreation amenities.

2. Three control communities, one in Sahuarita, Arizona, and two in Tucson, Arizona, with similar structural and locational characteristics as the selected master-planned communities. Five structural characteristics will be measured: (a) age of home, (b) lot size, (c) number of rooms, (d) square footage of home, and (e) private pools. Distances to three locational amenities will be measured: (a) Tucson city center, (b) elementary schools, (c) retail shopping.

3. Stratified random sampling of residential properties within the six communities for an equal representation of homes from each of the six communities.

4. The use of public records relating to structural characteristics of selected homes, obtained from the Pima County Assessor's office.

5. Distances to locational and recreation amenities will be determined by plotting locations using the Google Maps software program.

6. Distances to three recreation amenities will be measured: (a) community parks, (b) neighborhood parks, and (c) swimming pools.

7. Hedonic pricing methodology will be used to determine the contribution of each type of recreation amenity to the value of homes.

8. Current property valuation data will be collected from the Pima county assessors' office tax valuation database, rather than current market value data due to the large quantity of short sales and foreclosures in the greater Tucson area.

9. A data collection period of 3 months during 2011.

Limitations

This study is limited by the following:

1. The randomly selected properties will allow for generalizability to the population of homes within the selected master-planned communities and control communities in Sahuarita and Tucson, Arizona; however, there will not be generalizability beyond the selected communities.

2. The tax valuation of homes will allow for comparisons to be drawn between communities during a time of economic recession. Market values are not being used, as in other studies, due to the frequency of nontypical home sales in the area.

Assumptions

This study is based upon the following assumptions:

1. Revealed preferences of homeowners for recreation amenities will be revealed through the purchase of a home in a community that has the combination of amenities that best meets the needs and interests of homeowners.

2. The hedonic pricing method will provide a valid and reliable measure of amenity valuation (Lutzenhiser & Netusil, 2001).

Definition of Terms

The following terms are defined to clarify their use in the study:

1. Community park. A park intended to serve an entire community, often includes basketball courts, dog parks, green space, picnic facilities, skate parks, and sports fields.

2. Family-recreation programming. Organized recreation programs that are designed for entire families, regardless of age and ability level, to participate in together (Brock, 1994).

3. Future option value. The value that residents place on being able to use a nonmarket good in the future, regardless of current usage patterns (Hider, 2008).

4. Hedonic pricing method. A nonmarket valuation technique in which "variations in housing prices reflect the value of local environmental attributes" (King & Mazzotta, 2000c, para. 1).

5. Master-planned communities. Planned subdivisions in which amenities are planned directly into communities prior to the start of any construction, sometimes including recreation, retail shopping and schools. Master-planned communities can span an extensive land area (Alexandrakis & Berry, 1994; T. Murphy, personal communication, February 20, 2009).

6. Neighborhood park. A park designed to serve a particular subset of the community, often includes covered or uncovered playground equipment, picnic facilities, open space, or green space.

7. Nonmarket valuation. “Nonmarket valuation measures amenity value using revealed preference and stated preference techniques” (Duke, 2008, p. 12).

8. Non-use value. Independent of the value derived from using a good or service, there is often value associated with the existence of the good or service that relates to the well-being of the general public (Aabo & Audunson, 2002).

9. Recreation amenities. Recreation facilities and programs located within a master-planned community in order to enhance the quality of life for residents, such as swimming pools, community and neighborhood parks, fitness centers, family-recreation programming, and greenways/trails.

10. Retail shopping. Proximal distance to retail shopping will be measured from the nearest major grocery store.

11. Revealed preference techniques. Studies that use existing transaction data on a measurable market good to infer the value of a related amenity.

12. Stated preference techniques. Studies that use formal surveys to estimate willingness-to-pay for services.

13. Subdivision. A portion of land divided into individual housing plats, generally spans a smaller area of land than a master-planned community and may include a small park or recreation area

14. Use value. Value that is derived from the direct usage of a nonmarket good (Aabo & Audunson, 2002).

Chapter 2

Review of Literature

The problem of this study is to determine the relationship between proximity of recreation amenities and home valuation using the hedonic pricing method. The literature related to family recreation, master-planned communities, economic theory, nonmarket valuation, and amenity valuation will be presented in this chapter.

Family-Recreation Activities

For many families, family recreation is considered to be an important part of family life. Shaw and Dawson (2001) found family recreation to be both purposive in nature and an integral part of healthy family life. In their time diary study, Shaw and Dawson found that family leisure was deliberately planned and facilitated in order to achieve particular family goals. Some parents even felt a sense of urgency to plan to spend time with their children in family activities (Shaw & Dawson, 2001).

Family-recreation activities allow families the opportunity "to bond with each other, problem solve, and strengthen their relationships" (Agate et al., 2009, p. 206). In an overview of 60 years of leisure and recreation research, Hawks (1991) found "that most recreation is engaged in with other family members" (p. 424). Likewise, Shaw (1992) found that recreational activities or free time consisted of 38% of all family time. Family recreation may consist of a variety of different types of recreation, including spontaneous recreation at a park, pool, or trail in addition to more formal program participation. Hornig (2005) emphasized that it is not necessarily the type of recreation that makes the difference for families, but rather that they are simply spending time together.

A challenge that is facing many families today is a perceived lack of time to participate in family activities. As a larger portion of our society is comprised of dual-earner families and single-parent families, there has been an increase in is "overscheduled children and underconnected families" (Doherty & Carlson, 2003). Many families are constrained not only by available time in which to recreate together, but also by the additional constraint of excessive travel time to participate in recreational activities (Wiersma & Fifer, 2008).

Empirical research primarily focuses on the schedule, time, and travel constraints associated with children's extracurricular activities (Doherty & Carlson, 2003; Lareau & Weininger, 2008; Wiersma & Fifer, 2008). It is interesting to note, studies have found that though these constraints affect families, most families have been found to be willing to participate in extracurricular activities despite the constraints because of the perceived positive outcomes for their children (Conroy & Coats, 2007; Kremer-Sadlik & Kim, 2007; Wiersma & Fifer, 2008). Family recreation may be perceived to have the same positive outcomes if family recreation is readily available for participation. By offering family recreation in close proximity to homes, the constraints associated with travelling to a venue may be reduced in addition to increasing the opportunity for spontaneous family recreation.

Master-Planned Communities

A recent trend in residential housing development has shown an increase in master-planned communities, more so than traditional subdivisions. Most master-planned communities require large tracts of land in order to develop these comprehensive communities; thus, due to land availability, the Southwestern United States has become a popular location for these communities (Alexandrakis & Berry, 1994). In addition to the rising number of these developments in the United States, Australia, and Great Britain have also seen influxes of

master-planned communities (Costley, 2006; Rosenblatt et al., 2009; Siembieda & Sturmer, 2009).

Master-planned communities are planned subdivisions in which amenities are included directly into the development (T. Murphy, personal communication, February 20, 2009). Often these amenities include retail shopping, small businesses, and schools. In addition, many communities have also established a place for families to recreate through the inclusion of extensive amenities appropriate for family-recreation use. Some of these amenities may include playgrounds, skate parks, ball fields, water parks, or trails (T. Murphy, personal communication, February 20, 2009).

In contrast to the larger master-planned communities springing up around the globe, traditional subdivisions tend to be smaller and provide few or no amenities. Though they are still planned in the sense that the entire neighborhood is typically built at the same time, they usually cover smaller land segments and only occasionally include amenities. If any amenities are included at all, they are usually limited to a small neighborhood park. Though master-planned communities have included a plethora of amenities in hopes of attracting families to reside and recreate there, it is unclear to what extent the addition of extensive recreation amenities provides value to the residential properties they surround.

Economic Theory and Nonmarket Valuation

Nonmarket valuation has been widely used in a variety of fields and is generally accepted as a valid method for estimating total economic value ("Non-market valuation," n.d.). The strength of nonmarket valuation lies in its straightforward analysis and its ability to estimate the comparative value of a wide variety of goods and services ("Non-market valuation," n.d.). Many tangible goods and services have values that are readily attributable and are easily measured

within a market economy. Nonmarket goods are less tangible and, therefore, their worth is more difficult to assess. Nonmarket valuation allows the economic worth of these goods to be assessed through revealed or stated preferences of consumers (Aabo & Audunson, 2002; Crompton, 2001; Duke, 2008).

In order for value to be determined for nonpublicly traded goods, basic economic theory assumes involved persons will act in a rational manner (Aabo & Audunson, 2002). Just as the invisible hand guides the process of exchange in a market economy, Herrnstein (1997) suggested each party in a transaction maximizes their utility as they each move toward the best possible combination of goods, services, and money for themselves and ultimately the society around them.

Similar to the early ideas of utilitarianism, these transactions for nonmarket goods are completed for the purpose of increasing the pleasure of the individual (Dare, Welton, & Coe, 1987). Aabo and Audunson (2002) concluded the following:

> An individual's economic behavior can be based on a compromise between self-interest, claims of morality, social norms, and the pursuit of various other objectives. It indicates that the individual's utility, which he tries to maximize, can be understood as the overall end result which reflects a balance among a variety of considerations. (p. 10)

Therefore, regardless of whether individuals participate consistently in available opportunities, they are weighing the opportunity cost of the availability of goods and will act in a rational manner according to their individual preferences. In order to ascertain the value associated with these goods and services, nonmarket valuation techniques are used.

Nonmarket Valuation Techniques

Two techniques are commonly used to determine the economic value of nonmarket goods: stated preference and revealed preference techniques. Stated preference studies rely on formal surveys to directly estimate amenity values by asking individuals their willingness to pay for a nonmarket good (Aabo & Audunson, 2002; Duke, 2008). Revealed preference studies use techniques that analyze transaction data to infer amenity values through observed behavior (Aabo & Audunson, 2002; Crompton, 2001; Duke, 2008).

Stated Preference Techniques. Stated preference techniques utilize a cost-benefit analysis assigning value to services not generally traded in a market economy (Chen & Jim, 2008; Crompton, 2001; Duke, 2008). Stated preference techniques have been frequently used to determine the value of forests and parks, based on stated values derived from user surveys and questionnaires (Ahmad, 2009; Amirnejad, Khalilian, Assareh, & Ahmadian, 2006; Christie, Hanley & Hynes, 2007).

Stated preference techniques are able to, in principle, capture the total value for both users and nonusers of a public good (Aabo & Audunson, 2002; Duke, 2008). This method has an advantage over revealed preferences methods, which are only able to assess value for actual users of a good or service. Though many commodities such as parks, green spaces, and recreation opportunities have substantial value to a community as a whole, they may still have a nonuse or future option value to residents (Chen & Jim, 2008). In other words, residents may value having a park nearby their home, regardless of whether they go to the park on a regular basis (Hider, 2008). Thus, the ability to evaluate value from both users and nonusers allows for valuation that is "independent of observed market choices" (Duke, 2008, p. 12) and, therefore, is frequently used in valuation analysis.

Stated preferences are measured through the presentation of hypothetical situations to evaluate willingness-to-pay for specific goods and services (Chen & Jim, 2008). Hypothetical situations are often presented in either political or economical scenarios asking survey participants to "state their willingness to pay, contingent on a specific hypothetical scenario and description" (King & Mazzotta, 2000b, para. 2) for the service. Hypothetical situations that are more realistic and appropriate to the situation tend to elicit more honest responses from survey participants (Hider, 2008). Most stated preference surveys are conducted through in-person interviews (Hider, 2008) per recommendations from the National Oceanic and Atmospheric Administration; due to the escalated costs of interviewing, however, printed surveys have also been completed on the participants' own time after an in-person introduction has occurred (Hider, 2008).

Though stated preference methods have been used extensively to measure the total economic value for library services (Aabo & Audunson, 2002; Hider, 2008), forest amenities (Amirnejad et al., 2006; Christie et al., 2007), and farmland (Duke, 2008), it is often considered to be controversial by economists and policy makers (King & Mazzotta, 2000b; Hider, 2008). The controversy stems from the tendency for respondents to overstate their willingness-to-pay, sometimes called strategic response, as well as the limitations in generalizability of data (Hider, 2008). Strategic response occurs when respondents state their preferences in such a way that they are intentionally biasing the results, usually to further a specific cause (Hider, 2008). Economists and policy makers rarely use the results, even though the method is capable of determining a value of nonmarket goods that incorporates use and nonuse values, (Hider, 2008).

Revealed Preferences Techniques. The most common approach to measuring revealed preferences is the hedonic pricing method. The hedonic pricing method "is a powerful and appropriate research tool to assess the value of environmental benefits and resources, to estimate the worth of urban welfare and to explore factors accounting for household allocation" (Jim & Chen, 2006, p. 425). In other words, the hedonic pricing method determines willingness to pay for goods and services by inferring the value based on revealed preferences and actual expenditure patterns (Ruijgrok, 2006).

Hedonic pricing method has been most commonly applied to situations where the value of local amenities is reflected in the market value of residential property (King & Mazzotta, 2000c). The value of a home is made up of a number of different components. Both structural and locational attributes are the most frequently studied characteristics in conjunction with residential property values (Crompton, 2001; Jim & Chen, 2006). Once these nonenvironmental factors are controlled for, then differences in price can be attributed to differences in available amenities (King & Mazzotta, 2000b). Structural characteristics are the properties of an existing structure that provide additional value to the land (Crompton, 2001). The following are pertinent in assessing the value of the property: lot size, age of home, number of rooms, and square footage (Cho et al., 2006; Crompton, 2001).

Locational characteristics are considered an important factor in hedonic analyses as they are contributing factors toward determining property value. Jim and Chen (2006) substantiated the recommendations of Correll et al. (1978) by including distance to city center and distance to a major retail shopping center as two locational characteristics that generally influence property values. Schools also influence the price of nearby properties (Alexandrakis & Berry, 1994; Crompton, 2005; Nicholls & Crompton, 2005). Other locational variables may include: size of

park and open space amenities (Anderson & West, 2006); proximity to parks, green space and water bodies (Correll et al., 1978; Jim & Chen, 2006); and views of amenities (Jim & Chen, 2006). Some studies have also considered population density (Anderson & West, 2006) and exposure to noise and traffic (Jim & Chen, 2006).

The ability of the hedonic pricing method to control for structural and locational characteristics allows for the revealed amenity preferences of home buyers to be investigated. Though the contingent valuation method can be beneficial in determining current usage and nonusage patterns, hedonic pricing methods are instrumental in isolating amenities that are valued by home buyers at the time of purchase. The future option value of the availability of amenities is thus capitalized into the purchase price of a home, reflecting their revealed preferences (C. Bowles, personal communication, May 8, 2009; Chen & Jim, 2008). Hedonic pricing methods have a distinct advantage over contingent valuation methods since revealed preferences of consumers are measured, data tends to be more accurate and is not influenced by misstatements of hypothetical preferences.

Hedonic pricing and master-planned communities. Alexandrakis and Berry (1994) studied the degree of impact master-planned communities had on home values. Using the hedonic pricing method, 73,716 of the homes sold between 1980 and 1991 were assessed. This extensive range of time allowed for economic cycle differences to be assessed in times of both economic upturn and downswing during an entire economic cycle. The study found that not only were prices in master-planned communities significantly higher than home prices in other locations, but those price increases were due to a premium attributed to amenity packages that were included within the communities (Alexandrakis & Berry, 1994).

Current economic conditions mimic those experienced in the 1980s during the recession downswing of the cycle. As the United States has entered a nationwide recession, housing prices have declined. Alexandrakis and Berry (1994) found that "since competitive pressures are more potent on the downswing as the economy slides toward recession…[housing] premiums probably come close to approximating the value of the amenity package that these master-planned communities provide" (p. 22). This suggests that a downswing in the economy is an appropriate time to assess the value of particular amenities while they are more likely to be subject to competitive pricing pressures.

Amenity Valuation and Proximity to Residential Property

The hedonic pricing method has frequently been used to assess the value of a variety of recreational amenities in close proximity to residential properties (Chen & Jim, 2008; Cho et al., 2006; Lutzenhiser & Netusil, 2001; Treiman & Gartner, 2006). Through controlling for structural and locational characteristics, the value that residents place on specific amenities can be estimated by examining how the amenities contribute to the overall price of the home (King & Mazzotta, 2000c).

Amenity valuation has been shown contribute to the literature based on the quantity of studies emerging from a number of scholarly journals. Recent studies have assessed the relationships between the sales price of homes near open spaces (Lutzenhiser & Netusil, 2001), community forests or greenbelts (Treiman & Gartner, 2006), and water and green spaces (Cho et al., 2006). Other related valuation studies range in topic from forest amenities (Christie et al., 2007), to farmland amenities (Duke, 2008), and to the health impact of recreation amenities (Thomson, Kearns, & Petticrew, 2003).

Proximal Principle. Crompton (2001, 2005) asserted that parks have long been considered to increase the property values of urban residential properties within close proximity. The proximal principle suggests that the added value from parks and open spaces is a result of people's willingness to pay a higher amount of money for properties located within a proximal distance to various amenities (Crompton, 2001, 2005). As a result, when the appraised value of the home increases, the property taxes increase proportionally. This aggregate capitalization of tax revenue from all proximal properties can then be used by the communities to pay the debt charges associated with initial construction and ongoing maintenance for the parks (Crompton, 2001).

Early park planners quickly validated this intuitive concept of proximal distance in the building of major U.S. parks such as Central Park in New York City and Prospect Park in Brooklyn (Crompton, 2001, 2005). Numerous studies since then have substantiated the claims that the increases in property value stemming from urban park development are more than sufficient to make up for the decrease in taxable property from the tax base for the land dedicated to the parks (Crompton, 2001).

Though studies have substantiated the claim that parks within a certain proximal distance have an influence on residential property valuation, it is unknown if other amenities such as family-recreation programming, greenway trails and swimming pools also contribute to home valuation after nonenvironmental attributes have been accounted for.

Park Valuation. Hendon, Kitchen, and Pringle (1967) studied the influence of different park designs on the value of surrounding residential property. Hendon et al. found that playground parks, those where the main feature was a playground, contributed to the value of properties that were further than 500 feet from the park but still within the sphere of the park's

influence. Contrastingly, the community playfield parks were more influential within 500 feet and less influential the farther a property was located from the park. It was concluded that community playfield parks increased property values in part due to the size of the parks, whereas the playgrounds generally decreased the value (Hendon et al., 1967). This was accounted for due to the decreased quality of many playground parks, whereas the authors hypothesized that increased maintenance or redesigning the park would likely alter the adverse effect (Hendon et al., 1967). A more recent study found that parks located within 200 feet of residential property were significantly related to home values (Lutzenhiser & Netusil, 2001).

Greenway/Trail Valuation. Recent studies have begun to assess greenways or linear parks in relation to their impact on residential property values (Morris, 2002; Nicholls & Crompton, 2005; Treiman & Gartner, 2006). Greenways have been defined as "extended lengths of trail for recreation and exercise, as well as alternative, nonmotorized routes of transportation between home, work, and other community facilities" (Nicholls & Crompton, 2005, p. 88). Fabos (2004) suggested that greenways provide extensive recreational opportunities such as walking, hiking, and bicycling in both urban and rural areas. Though greenways have begun to appear as the topic of conferences, books, and doctoral dissertations, there is a lack of empirical studies assessing the segment of property value associated with greenway usage (Fabos, 2004).

Family-Recreation Programming. Family-recreation programming is a little studied aspect of family leisure studies. The few existing studies focus on the connection between content of leisure programming for children with disabilities and meeting family needs (Kozub, 2001; Prupas, Harvey & Benjamin, 2006), and programming at family camps (Agate & Covey, 2007; Cottrell & Cottrell, 2003) rather than community based family-recreation programming.

Family-recreation programming consists of organized recreation programs that are designed for entire families, regardless of age and ability level, to participate in together (Brock, 1994). Family programming consists of more than just offering activities for individuals of all ages and groups at the same location (Nelson, Cappel, & Adkins, 1995). Nelson et al. (1995) argued that even if the entire family is participating simultaneously in activities at the same location, if family members are participating independently they are not engaging in family recreation.

Smith (1997) suggested, "Recreation allows family members to share common interests, increase cohesion, and have fun" (p. 21). When families recreate together bonds are forged; trends indicate family leisure has been "seen to be a vehicle that encouraged positive interaction between family members, both between siblings and between parents and children" (Shaw & Dawson, 2001, p. 223). Yet, despite these positive relationships between family leisure involvement, community recreation research has not focused on family-recreation programming.

Family-recreation programs in master-planned communities are typically offered through the local community organization or homeowners association, and in some communities are designed to be an integral part of the community experience. Possible family programs may include: summer movies under the stars, father/daughter dances, holiday celebrations, chili cook-offs, and community barbeques (Sharpe, 2008). Family programs are often offered monthly, with additional activities dispersed throughout the year (Sharpe, 2008), and are free for all residents.

There is no previous literature to suggest that family-recreation programming is an amenity that would contribute to residential property values. However, since it is known that other recreation amenities such as parks and green spaces enhance the quality of life for residents

and contribute to residential property values (Lutzenhiser & Netusil, 2001; Treiman & Gartner, 2006), it is reasonable to assume that family and social interactions achieved through family-recreation programming may contribute as well.

Aquatics Valuation. Community aquatics facilities such as swimming pools and water parks have not frequently been studied; however, there have been a few studies that assessed private swimming pools in relation to home value. In Arizona, tax assessors include private swimming pools in their assessment of the value of a residential property; however, community swimming pools are not considered for tax purposes (Pima County Assessor's Office [PCAO], 2008) and have not been studied in relationship to home valuation.

Sirmans, MacDonald, Macpherson, and Zietz (2006) conducted a meta-analysis of studies utilizing the hedonic pricing method in a variety of different parts of the country. They found that having a private swimming pool had "a greater positive effect on house price in the Southwest" (p. 227). This was explained in part by the suggestion that the southwest is located further from other sources of water, such as beaches (Sirmans et al., 2006).

Proximity to other water bodies and oceans has been touched lightly upon in the literature. Jim and Chen (2006) studied the influence of water bodies on the value of residential property values in China. It was found that proximity to water bodies increased the value of a home by 13.2%. Fraser and Saunders (1998) found that the proximity of an undeveloped residential lot from the ocean was a significant contributor to the sales price, in addition to significant findings relating to the quality of an ocean view.

Summary

Hornig (2005) stated that "one of the key elements required for family development is simply time spent together" (p. 47). Though perhaps it can be argued that there are many ways

that families can recreate within the home, it also should be considered that families may want access to recreation opportunities outside the home as well. Providing families with places to recreate within their own community reduces the constraints of time and travel, while allowing for both spontaneous and formal family recreation.

Master-planned communities have supported this idea by including a plethora of recreation amenities in their communities in hopes of enticing residents to their communities. Though these amenities have been incorporated into the communities within proximal distances of residences, there is a lack of empirical evidence suggesting a corresponding relationship between the close proximity and home valuation.

Nonmarket valuation techniques, particularly hedonic pricing methodology, have been frequently used in determining values associated with amenities that cannot be generally determined in a market economy. Though parks have been frequently studied in association with home valuation, other recreation amenities that have been included recently in many communities have not been studied. Therefore, the problem of this study is to determine the relationship between proximity to recreation amenities and home valuation using the hedonic pricing method.

Chapter 3

Methods

The problem of this study is to determine the relationship between proximity of recreation amenities and home valuation using the hedonic pricing method. This chapter is organized as follows: (a) study sample, (b) instrumentation, (c) data collection, and (d) data analysis.

Study Sample

The study sample will consist of a total of 1200 homes. A stratified random sample of 600 homes (n = 200 homes per community) will be selected from homes located in three master-planned communities in the greater Tucson, Arizona, area: Rancho Sahuarita in Sahuarita, Arizona; Sierra Morado in Tucson, Arizona; and Sycamore Park in Tucson, Arizona. In addition, 600 homes (n = 200 homes per community) will also be selected from a stratified random sample of homes within two control subdivisions (nonmaster-planned communities) in the greater Tucson, Arizona, area: Desert Stone and Rancho Paraiso in Tucson, Arizona; and Santo Tomas Villas in Sahuarita, Arizona. A power analysis was conducted and it was concluded that based on the number of variables in the study, 200 homes per community was sufficient.

The communities in this study will consist entirely of stucco homes, with lots ranging in size from .10 acre to .5 acre, on average. All homes in the sample will be selected from homes constructed between 2002 and the present. Homes in the study have 6 to 10 rooms, with square footage ranging from 1000 square feet to 3000 square feet. Within each community there will be a variety of home sizes selected in order to represent a wider variety of family sizes and socioeconomic backgrounds.

All communities in the study will be located between 15 and 25 miles from the Tucson city center and may be located in varying distances from retail shopping and local schools. In addition, the sample communities will be grouped on the southeastern and southern sides of Tucson.

Each of these communities of interest features the same basic set of recreation amenities: community parks, neighborhood parks, and walking trails. In addition, some master-planned communities offer additional amenities such as: community swimming pools and water parks, and family-recreation programming. These amenity differences will be controlled for through the similarities in structural and location characteristics between the communities. This will allow the hedonic pricing analysis to determine if there are differences between the communities, then it can estimate what portion of that difference may reasonably be attributed to the different recreation amenities.

There are some similarities and differences between the master-planned communities and the traditional subdivisions in this sample. First, though the homes in both types of communities are similar in structural characteristics and age, traditional subdivisions span a smaller geographical area and are developed independently of retail shopping, schools, and most recreation amenities. Master-planned communities, on the other hand, frequently have retail shopping, schools, and other amenities incorporated into the concept of the development, prior to groundbreaking (T. Murphy, personal communication, February 20, 2009). Second, the communities of interest all feature at least three types of recreation amenities within the community. In contrast, subdivisions may include a small community park; however, that is generally the extent of any recreation amenities. Instead of incorporating additional amenities

into the community, these subdivisions rely on local city and county recreation facilities, as well as private facilities, to meet the recreational needs of residents.

Instrumentation

Stated and revealed preference methods have both frequently been used to provide an economic valuation of nonmarket goods or services (Duke, 2008). Though it is clear that both methods of nonmarket valuation would yield appropriate results to aid in determining the economic value of recreation amenities, this study will utilize the hedonic pricing method. The hedonic pricing method allows for the revealed preferences of residents to be analyzed, which allays the concern many economists have for frequent overstatements of value from stated preference methods (Duke, 2008). Although stated preference methods are able to ascertain the nonuse values of amenities in addition to use values, it is important to first determine which amenities contribute to the value of homes within the various communities.

Structural characteristics and locational elements have previously been demonstrated to determine a substantial amount of the variance in housing prices (Correll et al., 1978; Crompton, 2001; Jim & Chen, 2006). The following structural characteristics have been selected for use in this study based upon the frequency in which they were used in previous research: (a) age of home, (b) lot size, (c) number of rooms, (d) square footage of home (Cho et al., 2006; Correll et al., 1978; Crompton, 2001), and (e) private pool. Locational characteristics of the area important to determining property value and pertinent to this study are (a) distance to city center, (b) distance to retail shopping, (c) proximity to neighborhood and community parks (Anderson & West, 2006; Correll et al., 1978; Jim & Chen, 2006), and (d) proximity to schools (M. Flores, personal communication, May 9, 2009; B. Tiffan, personal communication, May 9, 2009).

Distances to park and open space amenities have been previously hypothesized to have an impact on property values (Anderson & West, 2006); thus distances to each amenity will be measured using Google Maps software. Pertinent amenities include (a) community swimming pools; (b) community parks, (c) neighborhood parks, and (d) trails. Similar to current findings on park and open space amenities, the proximal distance of these other amenities to homes may also contribute to the value of surrounding residential property. In additional, family-recreation programming will be measured as to whether it is included as an amenity within a community or not.

Data Collection

Property data will be collected directly from PCAO, which maintains an online information database regarding each property located within the county. Homes are grouped in the database by subdivision; however, many of the master-planned communities are entered into the information database under a set of subdivisions. For the purposes of this study, all homes in the combination of subdivisions comprising a master-planned community will have equal opportunity to be selected for inclusion in this study.

Sample properties will be randomly selected using a stratified sampling technique to select the initial house number in each sample community/subdivision. Since the geographical size of master-planned communities varies greatly from the size of traditional subdivisions, a stratified sample of properties will be selected by finding the total number of houses in the group, then dividing by the desired sample size of 200 to determine the interval width for selecting individual properties within the community,

Structural and locational data points will be collected from public tax valuation documents and Google Maps software (Anderson & West, 2006; Lai, Chau, Ho, & Lin, 2006).

Data collected from the assessors' offices will include square footage of home, lot size, age of home, number of rooms, price of original sale (as all homes are less than 10 years old), and total full cash tax valuation amounts for 2010.

In Arizona, the tax valuation of a home is considered to be an appropriate measure of the market value (PCAO, 2008). The market approach is the most widely used approach in Arizona for determining residential property values for tax valuation purposes (PCAO, 2008). A combination of geographic stratification, property characteristics and sales data is used to determine the market value of homes within a given geographical area (PCAO, 2008). Multiple regression is then used by the assessors to "analyze the sales and characteristic data to develop appropriate adjustments for amenities found to be meaningful in the marketplace, such as square footage, pools, garages, etc." (PCAO, 2008, para. 7). This approach yields tax valuation data that is consistent and objective throughout the county, separate from the economic fluxuations of the real estate market.

The availability of pertinent locational characteristics will be determined from site visits and location information provided by the communities. Distances to amenities, city center, community parks, neighborhood parks, retail shopping, and schools will be determined with Google Maps software. A database will be compiled that will reflect the structural characteristics, locational characteristics, proximity, and available amenities for each property in the sample. In addition, site visits will determine whether or not family-recreation programming is offered in each community.

Data Analysis

The statistical package SPSS will be used to analyze the data. Data will be first cleaned for incorrectly entered or missing data points. Next, univariate analyses will be conducted to

examine for outliers, skewness as well as determine means, medians, standard deviations and possible needed transformations. Then, a bivariate analysis will be conducted by utilizing Pearson zero-order correlations to examine for multicollinearity as well as to identify possible controlling factors that could be included in subsequent multiple regression equations.

Hypothesis 1, which states the remaining home value after structural and locational characteristics are accounted for is significantly higher in master-planned communities than in traditional subdivisions, will be tested through a multivariate blocked entry multiple regression analysis. Block 1 will consist of structural and locational characteristics.

Next, Hypothesis 2, which states individual recreation amenities located within residential communities have a significant relationship to home valuation and Hypothesis 3, which states a bundle of recreation amenities located within residential communities have a significant relationship to home valuation, will both be tested through a continuation of the multivariate blocked entry multiple regression analysis. In order to determine what portion of unique variance is contributed by the variables of interest, the recreation amenities community parks, neighborhood parks, swimming pools, trails and family-recreation programming will be entered in Block 2 of the regression analysis. The multiple regression coefficients will be examined at a .05 alpha level. The relative contribution of each variable in significant models will be determined with standardized regression coefficients (Beta).

Finally, Hypothesis 4, which states the distance of recreation amenities from residential properties has a significant negative relationship with home valuation will be tested by inputting the distance variables in Block 3 of the multivariate blocked entry multiple regression analysis. The coefficients will be examined at a .05 alpha level; the relative contribution of each variable in significant models will be determined with standardized regression coefficients (Beta).

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