

The Effects of Subdivision Design on Housing Values: The Case of Alleyways

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Abstract

Subdivision design likely impacts residential housing values. This study examines the sale prices of houses located in subdivisions utilizing rear-entry alleyways in the Greater Dallas-Fort Worth-Denton metroplex. Regression analysis on a sample of 1,672 home sales, some of which are located on alleyways, reveals statistically significant impacts. Consequently, developers, appraisers, New Urbanists and other real estate participants should consider subdivision design when estimating value for residential dwellings.

Introduction

In the late 1990s, the Greater Dallas-Fort Worth-Denton metroplex area news media dedicated significant coverage to criminal activities perpetrated in the alleyways behind homeowners' dwellings.¹ In two instances, homeowners were abducted at gunpoint, driven to isolated areas, assaulted, raped, and robbed. Another situation transpired whereby criminals lurked in the alley until the homeowners arrived after dark. On returning home, the family members were nearly robbed and abducted, but one of the children activated the alarm and the intruders fled. Do circumstances such as these result in houses with rear alleyways being less attractive to homeowners than properties with traditional front-entry driveways?

If so, are housing values affected? Other factors may also contribute to such houses being less desirable. The alleyway itself and the rear-entry driveway greatly reduce the size of a residential dwelling's backyard. Developers prefer this design, however, because housing density per acre can be increased; in other words, houses can be closer together. An interesting dichotomy exists today because while the findings of this research suggest that there are diseconomies associated with the rear-entry alleyway design, one element in the New Urbanism contemporary neighborhood design is, in fact, the alleyway that emphasizes compactness and a return to traditional neighborhood values. Therefore, a contribution of this research is that it identifies a potential problem with a key design element.²

Many homeowners find alleyways to be quite inconvenient, unsightly, poorly maintained and cluttered with garbage and debris, so they parallel-park on the

street. This causes congestion and significantly reduces the width of the street that can be used by through-traffic, thereby reducing the aesthetic appeal of the neighborhood. These vehicles parked on the curb also reduce drivers' visibility, thereby increasing the likelihood of a pedestrian being injured by a passing automobile if he or she were to dart out from between the parked cars.

Local real estate market participants (*e.g.*, brokers, appraisers, policy makers, tax assessors, buyers, sellers, developers) should be concerned that the alleyway subdivision design may be an amenity that adversely affects housing values. Homeowners need to know which factors may cause the value of their houses to decline. Further, buyers may overpay if their sale prices are based on recent sales of houses not located on alleyways. Developers and builders need to know the magnitude of the discount, so that it can be capitalized into the final selling prices of lots and houses. If properties on alleyways are found to sell for less than comparable houses with front-entry driveways, then developers and builders need this information so that their inventory can be priced accordingly. Perhaps most interested in this information are residential appraisers, who are compensated for their expertise to estimate housing values. They may be held liable to buyers and lenders for overstating a house's fair market value. Thus, appraisers should adjust comparables for subdivision design (*e.g.*, alleyways, culverts vs. curb-and-gutter, sidewalks) when the comps and the subject property differ in said design.

The primary purpose of this study, therefore, is to measure empirically whether the sale price of single-family dwellings (SFD) with rear-entry alleyways sell for less than those with traditional front-entry driveways, all else held equal. A secondary goal is to get New Urbanists to reconsider the alleyway parking design. This is the first study to investigate the potential impact of rear-entry alleyways on housing values.

New Urbanism vs. the Rear-Entry Alleyway

New Urbanism is defined as a planning approach that seeks to reintegrate the components of modern life—housing, workplace, shopping and recreation—into compact pedestrian-friendly mixed-use neighborhoods linked by transit and set in a larger regional open space framework (Eppli and Tu, 1999). New Urbanist developments generally include narrow interconnected streets, a clear neighborhood center, various housing types, compactness and an emphasis on quality civic spaces (Tu and Eppli, 1999). Proponents suggest that it helps overcome urban sprawl, encourages less reliance on automobiles and promotes a sense of community. Given these offerings, they find that houses located in New Urbanist subdivisions generally sell for a significant premium, averaging 11%. On the other hand, they conclude that developers do not make more money developing New Urbanist communities. This implies, therefore, that these subdivisions are simply more expensive to develop.

Because of its popularity, Bohl (2000) suggests that New Urbanism is the most influential movement in architecture and planning in America since the Modernist

movement. In fact, he concludes that it can be applied to revitalizing and improving living conditions and opportunities for inner-city residents. This is an interesting finding because, to date, New Urbanism has been applied primarily to upscale developments.

Criticisms of New Urbanism abound. Some suggest that it attempts to change human behavior through design, arguing that such stringent guidelines usurp the nature of a community. Others believe that it actually creates *more* traffic problems, it lacks a desirable mix of land use to create community and has been applied only to upscale projects. Moreover, opponents find that consumers are not given enough housing choices and that overall densities are too low to support public transportation.

A cornerstone of New Urbanism is the rear-entry alleyway, which is designed to remove vehicles from the view of pedestrians. Eppli and Tu (1999) find that all four developments they study—Kentlands in Gaithersburg, MD, Harbor Town in Memphis, TN, Laguna West in Elk Grove, CA and Southern Village in Chapel Hill, NC—utilize the alleyway, as well as small lots and short setbacks.³ Nevertheless, the results of this paper throw into question this type of design. Eppli and Tu (1999) conclude that most New Urbanist communities have fallen short of original expectations because of a lack of market research to determine the most appropriate lot size, product mix, price level, amenities and density. Perhaps this study will entice New Urbanism subdivision designers to consider the many drawbacks of rear-entry alleyways more seriously.

Alleyway Impact Model

As noted earlier, there are drawbacks to the alleyway subdivision design. They may cause housing value diminution not associated with dwellings that have front-entry driveways. Therefore, an empirical model measuring alleyway impact on housing value has been developed.

A standard regression model is used to examine the relationships between home price, the alleyway subdivision design and normal house amenities. Similar models have been used to estimate housing values since the early 1960s by real estate researchers. Bailey, Muth and Nourse (1963) pioneered the methodology, and numerous academicians have improved it to the point that the regression results are highly reliable, precise and efficient.

Dowall and Landis (1982), Mark and Goldberg (1986), Speyrer (1989), Pollakowski and Wachter (1990), Beaton (1991) and Shilling, Sirmans and Guidry (1991) used such regression models to estimate and/or quantify the impact of public land-use controls (*e.g.*, zoning) on residential housing values. Kohlhepp and Ingene (1979) investigated empirically the effect of municipal services and local taxes on housing values. All of these researchers found land-use controls have statistically significant impacts on housing values. Some controls increased values (*e.g.*, density restrictions in expanding urban areas, reducing negative

influences) while others adversely affected residential values (e.g., zoning variances, restrictions not allowing properties to be operated in their highest and best uses, overallocating land designated for one use over another).

This methodology has been applied to numerous additional influences affecting property values, as well. Jud and Watts (1981) estimated a model of housing prices that measured the extent to which public schools exert an influence on residential locations decisions and the demand for area housing, while Dusansky, Ingber and Karatjas (1981) measured the impact of property taxation on housing values and rents. Guy, Hysom and Ruth (1985) studied the effect of subsidized housing on values of adjacent housing. Izraeli (1987) examined the effect of environmental attributes on housing values in 237 standard metropolitan statistical areas (SMSA). Kohlhase (1991) analyzed the impact of toxic waste sites on housing values, while Parsons and Wu (1991) studied coastal land-use controls. Do, Wilbur and Short (1994) offered an empirical examination of the externalities of neighborhood churches on housing values.

The regression equation is written as:

$$\begin{aligned}
 SP_i = & \beta_0 + \beta_1 ALLEY_i + \beta_2 LIVAREA_i + \beta_3 AGE_i \\
 & + \beta_4 QTRSOLD_i + \beta_5 NETAREA_i + \beta_6 BEDS_i \\
 & + \beta_7 BATHS_i + \beta_8 LOTSIZE_i + \beta_9 LOCATION_i + \varepsilon_i, \quad (1)
 \end{aligned}$$

Where:

- SP = The sale price of the i^{th} house;
- $ALLEY$ = Binary (1, 0) variable with a value of 1 for a house situated on an alleyway, 0 otherwise;
- $LIVAREA$ = The square feet of living area;
- AGE = The age of the house when sold;
- $QTRSOLD$ = A time-trend variable for the quarter of the sample period in which the house sold;
- $NETAREA$ = The square feet of net area (e.g., garage, porch, patio);
- $BEDS$ = The number of bedrooms;
- $BATHS$ = The number of bathrooms;
- $LOTSIZE$ = The square feet of the lot;
- $LOCATION$ = The area of the city where the property is located;
- β = Parameters to be estimated, including a constant term; and
- ε = A random error term.

The null hypothesis is that the sale prices of houses with alleyways will not be significantly different than those with front-entry driveways. It is expected, however, that β_1 , the coefficient on $ALLEY$ in Equation (1), will be statistically significant and negative. In other words, if a house is located on an alleyway, this

will adversely affect its sale price, all else held equal. Following Asabere and Huffman (1996) and others, the analysis is reported in two functional forms: the linear form and the natural logarithm (LN) form, using the natural log of the sale price along with LNs for the continuous property variables for each property. The linear form allows an interpretation of the coefficients in dollars. Using the natural log form allows an estimation of a nonlinear effect for property variables, a situation generally conceded to hold for many property characteristics. Also, using the LN of the sale price against the alleyway variable allows an estimation of a potential percentage change in sale price associated with *ALLEY*.

Data and Results

The data consist of 1,672 sales of single-family dwellings throughout the City of Denton, Texas over the 22-quarter period July 1989 through December 1995. One hundred thirty-two of these houses are located on alleyways. This city of 100,000 residents is part of the Greater Dallas-Fort Worth-Denton metroplex. The data were collected from the Metroplex Regional Association of Realtors' multiple listing service (MLS). The sample includes homes sold during the 22-quarter period that were recorded in the MLS Quarterly Comparable Sales Books. Sales are excluded from the sample, however, if any of the input variables in Equation (1) are omitted from the MLS Comp Books. Also, to ensure that the analysis examines the pricing of typical housing, rather than acreage, properties are deleted if their lot sizes exceed 50,000 square feet (*i.e.*, 1.1 acres).

In addition to sale price, the data collected from the MLS provided information on standard property attributes such as square feet of living area, age of the home, the square feet of net area, number of bedrooms, number of bathrooms, the lot size in square feet and location.⁴ As a proxy for improving market conditions, a time-trend variable stipulates the quarter in which a property sold. All of these control variables are included in the analysis to estimate the impact of *ALLEY* on sale price. While the Comp Books do not specify whether a house is located on an alleyway, the City of Denton, TX Planning and Right-of-Way Department and the Denton County, TX Appraisal District graciously identified those houses in the sample that are.

It is expected that the coefficients for living area, the quarter sold, net area, the number of baths and lot size will have a positive impact on the sale price of a home, while the coefficients for the age of the home and the number of bedrooms will have a negative impact.

Exhibit 1 reports descriptive statistics for all variables. The average house sells for about \$86,500, has 1720 square feet of living area, 512 square feet of net area and is 13.5 years old. It has approximately three bedrooms, two bathrooms and a 12,400 square foot lot. Overall, 8% of the sample properties are located on rear-entry alleyways.

The results of the empirical regression analysis are reported in Exhibit 2. Approximately 80% of the total variance in the regression equation models is

Exhibit 1 | Descriptive Statistics

Variable	Mean	Std. Dev.	Max.	Min.
SALE PRICE	86,503.00	41,097.00	349,500.00	10,000.00
ALLEY	0.08	0.27	1.00	0.00
LIVAREA	1,720.28	586.90	7,348.00	576.00
AGE	13.49	10.25	93.00	1.00
QTRSOLD	13.29	5.72	22.00	1.00
NETAREA	511.66	257.21	3,052.00	0.00
BEDS	3.21	0.61	7.00	1.00
BATHS	2.07	0.58	6.50	1.00
LOTSIZE	12,416.31	9,802.17	98,446.00	4,010.00
LOCATION	67.06	16.09	99.00	1.00

Exhibit 2 | Regression Results

Model 1			Model 2		
Variable	Coefficient	t-Stat	Variable	Coefficient	t-Stat
ALLEY	-5,574.86	-3.27*	ALLEY	-0.054	-2.81*
LIVAREA	46.71	36.54*	LN LIVAREA	0.806	30.48*
AGE	-658.78	-13.96*	LN AGE	-0.079	-14.45*
QTRSOLD	500.47	6.28*	LN QTRSOLD	0.047	5.00*
NETAREA	20.30	10.24*	LN NETAREA	0.031	6.27*
BEDS	-526.76	-0.54	LN BEDS	0.017	0.48
BATHS	9,663.82	7.22*	LN BATHS	0.281	9.95*
LOTSIZE	0.20	3.89*	LN LOTSIZE	0.106	8.01*
LOCATION	66.09	2.27**	LOCATION	0.018	0.96
Intercept	-26,829.16	-1.46	Intercept	3.913	18.71*
R ²	0.80		0.78		

Notes: In Model 1, the Dependent Variable = Sale Price; in Model 2, the Dependent Variable = LN(Sale Price).

* Significant at the 1% level, two-tailed test.

** Significant at the 5% level, two-tailed test.

explained by the linear influence of the independent variables, as measured by the coefficient of determination, R^2 . Other regression diagnostics suggest no evidence of collinearity among the explanatory variables, so the regression results are generally reliable.

The coefficients of all control variables in Model 1 are of the hypothesized signs and nearly all are statistically significant at the 1% level. Virtually identical results obtain for Model 2, the natural log model.⁵ As expected, the alleyway variable, *ALLEY*, is significantly negative at the 1% level in both models, suggesting home values of those located on alleyways are affected adversely.

The standard regression results suggest that houses located on rear-entry alleyways, on average, should be discounted \$5,575 or, according to Model 2, a percentage discount of about 5.3% ($e^{-0.0544} - 1$), relative to similar dwellings not located on alleyways. This finding is consistent with the notion that houses located on alleyways should sell at a discount because of the problems associated with this subdivision design.

Conclusion

This study investigates whether houses located on rear-entry alleyways should sell for less than otherwise identical properties with traditional front-entry driveways. The regression results suggest that the alleyway subdivision design discounts sale prices about 5%, all else held equal. Why? Because alleyways can attract criminal activities and greatly reduce the size of the homeowner's backyard. As well, they are often poorly maintained, unsightly, cluttered with debris and inconvenient, so many residents park their vehicles on the street, thereby creating traffic congestion.

While the findings of this research suggest that there are diseconomies associated with the rear-entry alleyway design, one element in the New Urbanism contemporary neighborhood design is, in fact, the alleyway that emphasizes compactness and a return to traditional neighborhood values. New Urbanists believe that it helps overcome urban sprawl and encourages less reliance on automobiles, while critics counter that New Urbanism attempts to alter human behavior through design, it creates more traffic problems than it solves, its densities are too low to support public transportation and it does not offer consumers enough housing choices. These findings hopefully will influence New Urbanism subdivision designers to reconsider alleyways in favor of traditional suburban parking.

The results of this study may be, in part, a function of this sample, but the implications are clear for appraisers, developers, New Urbanists and other real estate participants. Subdivision design contributes to overall value. Additional subdivision design research is recommended, both to confirm the findings of this investigation and to determine whether other elements of design (*e.g.*, sidewalks, culverts vs. curb-and gutter drainage) affect value, as well.

Endnotes

- ¹ Residential real-entry alleyways, found in both urban and suburban neighborhoods, are assessable by automobiles, garbage trucks, construction equipment, etc. Often, they are not dedicated to the municipality by the developer, so they are poorly maintained. As well, virtually every homeowner has a six-foot, wooden privacy fence and the alleyways have no street lights, so mischief can occur with regularity, yet go unnoticed.
- ² *The Wall Street Journal* (August 13, 1997: T1) published a feature article on this research. Entitled, *Back-Street Brawl: Do Alleyways Hurt Texas House Prices?*, the author, developers, police departments and research economists at Texas A&M's Real Estate Center discussed the advantages and disadvantages of the rear-entry alleyway subdivision design. Not surprising, no party was in complete agreement with the others. Even the Fort Worth Police Department and the Dallas Police Department disagreed. The former concurred that crime is a significant problem in alleyways, while the latter stated that it had "... never heard of alley crime being much of a concern." Ironically, it was significant criminal activity in Dallas alleyways that prompted this research. Jack Harris of the Texas A&M Real Estate Center believed that everyone was right. "We've had times in the housing market when what some people were willing to pay extra money for, others weren't." He also stated that it can be a regional phenomenon, meaning that if Houston buyers desire the alleyway design, Dallas buyers may not. Whatever the outcome, homebuyers who are purchasing houses with rear-entry alleyways for the first time in the new neighborhoods of Houston and elsewhere will likely grow to regret their decision, based on many of the negative features mentioned.
- ³ Laguna West also has front-entry garages that are connected with long driveways.
- ⁴ The location variable is incorporated into the model as follows: The city is approximately nine miles by eleven miles (*i.e.*, ninety-nine square miles), so each property is codified to one of these ninety-nine sections of land. (A "section" equals 640 acres or one square mile.) These disaggregated data are more useful than codifying by MLS area or zip code because Denton is included in only three MLS areas and has only five zip codes. Moreover, it better accounts for spatial autocorrelation.
- ⁵ A common explanatory variable used in hedonic housing models is Days on the Market (DOM), which measures how many days the property was on the market, as of the final listing contract. Because it does not accurately reflect the total number of days a property was on the market if it were listed more than once, however, it is deleted from this model. Nevertheless, when DOM is included in Equation 1, it is statistically insignificant and the results are identical to the second decimal, both in sign and magnitude.

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The author wishes to acknowledge the editor, two anonymous referees, the City of Denton, TX Planning and Right-of-Way Department and the Denton County, TX Appraisal District for valuable input.

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