

Living Next to Godliness: Residential Property Values and Churches

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Abstract

This article extends the analysis concerning the impact of neighborhood churches on residential property values by investigating nearly 5,000 residential property transactions in Henderson, Nevada, between January 1986 and December 1990. We find that real property values decrease, at a decreasing rate, as distance from a neighborhood church increases. This result is the opposite of that reported by Do, Wilbur, and Short in a previous edition of this journal. We bolster our findings by showing that distance from the site of a future church has little or no impact on residential property values, whereas distance from an existing church is associated with lower property values. Our evidence indicates that neighborhood churches are amenities that enhance the value of neighborhood residential property. Finally, we demonstrate that larger churches (as measured by square foot of lot size) tend to have a greater *positive* impact on residential property values.

In a recent article in this journal, Do, Wilbur, and Short (1994) (hereafter referred to as DWS) reported that a church can constitute a negative externality on residential property values much as does a powerline, hazardous waste dump, landfill, or nuclear waste repository.¹ That a church should, *a priori*, constitute a negative externality is not clear, however. Although DWS suggest that such items as increased traffic or the noise of church bells² may produce a negative effect, churches can also be viewed as amenities, much like shopping centers and quality schools. It is well-known that where there exist desirable neighborhood amenities, the value of which are reflected in property prices.³ In the case of churches, one could hypothesize, for example, that elderly homeowners, religious because of their temporal proximity to meeting Him or Her and loathe to drive, may place a high value on being within walking distance to their house of worship. Other, equally appealing reasons can be offered suggestive of a positive effect on property values.⁴

If a church can be seen, *a priori*, equally as a positive or as a negative externality, then certain questions arise. Why did DWS obtain the results that they did? Would other tests in other localities produce the same result? Can all churches (denominations) be seen as either negative or positive externalities?⁵ Is there a difference in the relationship between church locations and property values if the sale of the home occurs before or after the construction of the church building?

To answer these questions, we replicate the DWS study in another real estate market. Our method is different, however, in that it seeks to answer these questions. In addition, the size of our sample is over ten times that of DWS.⁶ Our results are quite different, as well. We look at churches of several different denominations and find that nearly all, but not all, have a positive effect on property values. There are differences in the price effect of various denominations. We also find, not surprisingly, that there is no price effect of distance between residential property and future church sites, before the construction of a church. That is, we intentionally divide our sample to include sales prior to, and subsequent to, construction of some neighborhood churches. We do this as an added check to ensure that our statistical results are not spurious.

In the next section, we present the model and data for these tests. The third section, which presents the empirical results, is followed by a concluding section.

1. Model and data

1.1. Model

Following DWS, we test several versions of a standard hedonic model:

$$LSP_{it} = f(X_{ijt}, t, DIST_{ik}),$$

where LSP_{it} is the natural logarithm of real selling price of property i at time t , X_{ijt} is a vector of j characteristics of property i at time t , t is a time trend, and $DIST_{ik}$ is the distance of property i from "nuisance" k , in this case, the nearest neighborhood church, measured in feet. Our sets of j characteristics embody the following:

- AGE = the age of the structure in years,
- BATHS = the number of bathrooms,
- BEDS = the number of bedrooms,
- FP = an indicator variable for whether the house has a fireplace,⁷
- LSQFTB = the natural logarithm of the square feet of the building,
- LSQFTL = the natural logarithm of the square feet of the lot,
- POOL = an indicator variable for whether the property has a swimming pool,
- ROOMS = the total number of rooms in the building,
- Z89014 = an indicator for the Green Valley master-planned community (zip code 89014), in contrast to the rest of Henderson, NV (zip code = 89015),
- MONTH⁸ = the time-trend variable, equal to 0 in January 1986, and increasing by 1 per month.

Our tests are designed to answer the questions posed in section 1. Accordingly, we test the model by looking at transaction prices of a sample of houses surrounding all 32 churches in the local market of Henderson, Nevada. We include indicators for the following multiple-church denominations: Baptist: 7 churches; Mormon (LDS): 5 churches; Catholic: 3 churches.

The other 17 churches include Lutheran, Presbyterian, Methodist, Assembly of God, Pentecostal, and congregations of unknown affiliation. Each church is separately identified by an indicator in a third variant of our model.

Like DWS, we measure distance to the closest church (in feet). The address of each property and the address of each church were converted to an X - Y coordinate system, and the closest church to each property thereby identified. Then the computer calculated the distance from each property to that closest neighborhood church. This calculation was made regardless of whether the church was constructed before or after the house was bought; that is, some distances are the span between a residential property and a vacant future site of a church. Distinguishing the relation between property values and distances to actual or future neighborhood churches provides a very strong test of the nuisance versus amenity effect of neighborhood churches. If churches tend to locate where land is inexpensive,⁹ then neighboring houses would also reflect those low land prices, even before the church is built. However, if the church is truly a nuisance, then property near the future church site would not show the diminished value until after the church's construction. Similarly, if churches are amenities, property values would increase as distance from the church decreased *after* the church is built, but not before.

1.2. The data

Our data consist of all property sales in Henderson, Nevada (zip code 89015) and the master planned community of Green Valley (zip code 89014), between January 1986 and December 1990.¹⁰ This was a period of brisk construction activity of both houses and churches.¹¹ Five churches in our sample were built during this period, and four were constructed after this period. Our data allow us to determine both how neighborhood churches affect single-family houses, and whether distance from the church site affects housing prices before and after the church is built. Data were obtained from *Metroscan*, a large computerized database of the files of the Tax Assessor's office of Clark County, Nevada. The database consists of 319,451 properties, including 196,000 single-family homes.¹² We found 4,924 single-family property sales for the period January 1986–December 1990 in Henderson, Nevada. After eliminating observations with missing data, we obtained our statistical sample of 4,858 property sales.¹³ We present descriptive statistics for these data in Table 1.

We also obtained data on 32 churches in Henderson and Green Valley from the same *Metroscan* file. Twenty-two churches were constructed before 1986, four were built between 1986 and 1990, and six were constructed after 1990. Churches of major denominations include seven Baptist churches, five Mormon (LDS) churches, and three Catholic churches. Table 2 shows statistics on each church and the number of property sales closest to each church, both before and after that church was built.

Table 3 presents the results of three regressions run on the entire sample; that is, houses bought before and after neighborhood churches were built. The first regression suppresses the information on religious denominations and individual churches. We find results consistent with the usual hedonic literature. Housing prices decrease with age and number of rooms; housing prices increase significantly with time (about 0.5% a month), square feet of the building (elasticity = 0.6), and square feet of lot size (elasticity = 0.13). Houses with fireplaces sell for about 7% more than houses without fireplaces, and houses with swimming pools sell for about 7% more than houses without swimming pools, *ceteris paribus*.¹⁴ Houses in Green Valley ($Z_{89014} = 1$) sell for about 17% more than houses in old Henderson ($Z_{89014} = 0$).

Table 1. Descriptive statistics.

| | Entire Sample | | Before Church Built | | After Church Built | | t-Statistic |
|----------|---------------|--------------------|---------------------|--------------------|--------------------|--------------------|-------------|
| | Mean | Standard Deviation | Mean | Standard Deviation | Mean | Standard Deviation | |
| PRICE | \$103,215 | \$34,275 | \$111,760 | \$33,425 | \$99,933 | \$34,035 | -10.58 |
| RPRICE | \$84,502 | \$26,971 | \$92,565 | \$25,872 | \$81,406 | \$26,746 | -10.58 |
| AGE | 4.48 | 8.16 | 2.07 | 4.71 | 5.41 | 8.97 | 12.98 |
| BATHS | 2.14 | 0.49 | 2.23 | 0.41 | 2.10 | 0.51 | -10.11 |
| BEDS | 3.30 | 0.86 | 3.40 | 0.72 | 3.26 | 0.77 | -6.20 |
| DISTANCE | 2872 | 2932 | 2768 | 1654 | 2913 | 3293 | 1.67 |
| FIREPLAC | 0.90 | 0.57 | 1.07 | 0.46 | 0.84 | 0.60 | -13.83 |
| FP | 80.30% | 39.78% | 95.10% | 21.59% | 74.62% | 43.53% | -16.56 |
| POOL | 19.47% | 39.60% | 26.48% | 44.14% | 16.78% | 37.37% | -8.31 |
| ROOMS | 6.13 | 1.24 | 6.46 | 1.18 | 6.01 | 1.25 | -12.75 |
| SQFTB | 1741 | 561 | 1856 | 502 | 1697 | 576 | -11.02 |
| SQFTL | 7700 | 4987 | 7377 | 2951 | 7825 | 5570 | 1.62 |
| Z89014 | 63.69% | 48.09% | 93.32% | 24.97% | 52.31% | 49.95% | -29.36 |
| Z89015 | 36.31% | 48.09% | 6.68% | 24.97% | 47.69% | 49.95% | 29.36 |
| MONTH | 38.23 | 16.06 | 34.68 | 15.54 | 39.59 | 16.05 | 9.28 |
| BAPTIST | 16.82% | 37.41% | 16.77% | 37.37% | 16.84% | 37.43% | 0.57 |
| CATHLC | 18.77% | 39.05% | 23.96% | 42.70% | 16.78% | 37.37% | -5.57 |
| LDS | 23.10% | 42.15% | 0.00% | 0.00% | 31.97% | 46.64% | 25.45 |
| CHAGE | 4.41 | 9.11 | -2.55 | 1.36 | 7.08 | 9.40 | 38.09 |
| Number | 4858 | | 1348 | | 3510 | | |

| | |
|----------|--|
| PRICE | Sales price of land and building in current dollars |
| RPRICE | Sales price of land and building in constant dollars (1982-1984 = 100) |
| AGE | Age of structure |
| BATHS | Number of bathrooms |
| BEDS | Number of bedrooms |
| DISTANCE | Distance between property and nearest church, in feet |
| FIREPLAC | Number of fireplaces |
| FP | FP = 1 if building has 1 or more fireplaces; FP = 0, building has no fireplace |
| POOL | Pool indicator (POOL = 1, has pool; POOL = 0, does not have pool) |
| ROOMS | total number of rooms in structure |
| SQFTB | Square feet of building |
| SQFTL | Square feet of lot |
| Z89014 | Indicator for zip code 89014 (Green Valley) |
| MONTH | Number of months after January 1986 that property sale closed |
| BAPTIST | Indicator for Baptist churches |
| CATHLC | Indicator for Catholic churches |
| LDS | Indicator for the Church of Jesus Christ of Latter Day Saints (LDS) |
| CHAGE | Age of nearest church at time of property transfer (AGE < 0 means church had not yet been built) |

Table 2. Churches in the sample.

| Church Number | Year Built | Zip Code | Owner Name | Lot Size Square Feet | Baptist | LDS | Catholic | Other | Number Closest | Before Church Built | After Church Built |
|------------------------|------------|----------|---------------------------------|----------------------|---------|-----|----------|-------|----------------|---------------------|--------------------|
| 1 | 1984 | 89015 | Baptist Community | | • | | | | 201 | 0 | 201 |
| 2 | 1986 | 89014 | Assembly of God Green Valley | | | | • | | 432 | 0 | 432 |
| 3 | 1986 | 89014 | LDS Presiding Bishop | 144,183 | | • | | | 749 | 0 | 749 |
| 4 | 1992 | 89014 | Methodist Green Valley | 180,774 | | | • | | 743 | 743 | 0 |
| 5 | 1990 | 89014 | Baptist Green Valley | 175,111 | • | | | | 374 | 186 | 188 |
| 6 | 1982 | 89015 | Christ Henderson, NV | 20,037 | | | • | | 101 | 0 | 101 |
| 7 | 1954 | 89015 | Giving Life Ministries | | | | • | | 40 | 0 | 40 |
| 8 | 1993 | 89014 | Lutheran Evangelical | 130,680 | | | • | | 6 | 6 | 0 |
| 9 | 1989 | 89014 | Roman Catholic | 368,517 | | • | | | 790 | 323 | 467 |
| 10 | 1969 | 89015 | Church of God California-Nevada | 39,639 | | | • | | 41 | 0 | 41 |
| 11 | 1067 | 89015 | Salvation Army | 62,726 | | | • | | 2 | 0 | 2 |
| 12 | 1970 | 89015 | Pentecostal United | | | | • | | 173 | 0 | 173 |
| 13 | 1963 | 89015 | LDS Presiding Bishop | 194,277 | | • | | | 32 | 0 | 32 |
| 14 | 1979 | 89015 | Baptist First Southern | 84,942 | • | | | | 41 | 0 | 41 |
| 15 | 1959 | 89015 | Presbyterian First NV | 98,445 | | | | • | 104 | 0 | 104 |
| 16 | 1955 | 89015 | LDS Presiding Bishop | 179,031 | | • | | | 31 | 0 | 31 |
| 17 | 1985 | 89015 | LDS Presiding Bishop | 108,464 | | • | | | 73 | 0 | 73 |
| 18 | 1981 | 89015 | Nevada Catholic Welfare Bureau | 122,839 | | | • | | 110 | 0 | 110 |
| 19 | 1956 | 89015 | Christ Henderson | 26,136 | | | • | | 42 | 0 | 42 |
| 20 | 1993 | 89015 | Episcopal St. Timothy's | | | | • | | 11 | 11 | 0 |
| 21 | 1952 | 89015 | Four Square Gospel Intl. | | | | • | | 8 | 0 | 8 |
| 22 | 1969 | 89015 | Four Square Gospel Intl. | | | | • | | 1 | 0 | 1 |
| 23 | 1942 | 89015 | Roman Catholic | 184,258 | | | • | | 12 | 0 | 12 |
| 24 | 1950 | 89015 | Baptist First | | • | | | 15 | 0 | 15 | 0 |
| 25 | 1964 | 89015 | Lutheran Our Saviors Henderson | 63,162 | | | • | | 2 | 0 | 2 |
| 26 | 1966 | 89015 | Baptist Faith | 64,468 | • | | | | 146 | 0 | 146 |
| 27 | 1987 | 89015 | Community Henderson | 216,928 | | | • | | 249 | 39 | 210 |
| 28 | 1985 | 89015 | Methodist Henderson | 157,687 | | | • | | 52 | 0 | 52 |
| 29 | 1982 | 89015 | LDS Presiding Bishop | 169,012 | | • | | | 237 | 0 | 237 |
| 30 | 1991 | 89015 | Baptist Highland Hills | 144,127 | • | | | | 40 | 40 | 0 |
| 31 | 1964 | 89015 | Baptist Indian Springs | 101,494 | • | | | | 0 | 0 | 0 |
| 32 | 1993 | 89014 | Lutheran ELCA | 138,956 | • | | • | | 0 | 0 | 0 |
| Average lot size/Total | | | | 131,079 | 7 | 5 | 3 | 17 | 4858 | 1348 | 3510 |

Table 3. Regression results; dependent variable = log of real selling price; entire sample.

| Variable | Coefficient | t-Statistic | Coefficient | t-Statistic | Coefficient | t-Statistic |
|-------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Log of constant | 5.5560 | 70.74 | 5.6009 | 71.36 | 5.7506 | 68.77 |
| AGE | -0.0060 | -19.83 | -0.0061 | -20.25 | -0.0060 | -14.55 |
| BATHS | 0.0200 | 3.12 | 0.0192 | 2.99 | 0.0217 | 3.37 |
| BEDS | -0.0022 | -0.54 | -0.0029 | -0.70 | 0.0009 | 0.22 |
| MONTH | 0.0021 | 17.79 | 0.0021 | 17.90 | 0.0021 | 17.57 |
| DISTANCE | -1.12E-05 | -9.13 | -1.22E-05 | -9.67 | -1.32E-05 | -9.09 |
| DISTSQ | 1.86E-10 | 7.91 | 2.02E-10 | 8.43 | 2.21E-10 | 8.48 |
| FP | 0.0682 | 11.66 | 0.0694 | 11.91 | 0.0600 | 9.99 |
| LSQFTB | 0.6013 | 42.08 | 0.5979 | 41.93 | 0.5787 | 39.63 |
| LSQFTL | 0.1298 | 20.87 | 0.1285 | 20.70 | 0.1228 | 18.67 |
| POOL | 0.0651 | 12.91 | 0.0649 | 12.93 | 0.0646 | 13.03 |
| ROOMS | -0.0159 | -4.74 | -0.0159 | -4.76 | -0.0149 | -4.47 |
| Z89014 | 0.1579 | 31.11 | 0.1610 | 31.01 | 0.1908 | 18.74 |
| Baptist | | | -0.0142 | -2.52 | | |
| Catholic | | | -0.0270 | -4.99 | | |
| LDS | | | 0.0125 | 2.53 | | |
| Church | | | | | | F = 9.1118 |
| R ² | | 0.8294 | | 0.8312 | | 0.8368 |
| Adjusted R ² | | 0.8290 | | 0.8307 | | 0.8356 |
| Multiple F | | 1962.81 | | 1589.55 | | 686.64 |
| Durbin-Watson | | 1.87 | | 1.88 | | 1.91 |
| Number | | 4858 | | 4858 | | 4858 |

We are most interested in the coefficients on distance and distance squared. We find that property values decrease with distance from the neighborhood church at a decreasing rate (as shown by the significant positive coefficient on distance squared). Taking the partial derivative of the log of real price with respect to distance and setting the result equal to zero allows us to solve for the distance at which proximity to churches has no impact on property values:

$$\begin{aligned} \frac{\partial \ln(SP)}{\partial D} &= -1.1 \times 10^{-5} + 2(1.9 \times 10^{-10})D = 0 \rightarrow D^* \\ &= \frac{1.1 \times 10^{-5}}{2(1.9 \times 10^{-10})} = 28,947 \text{ feet} = 5.48 \text{ miles.}^{15} \end{aligned}$$

Our results are strongly at odds with those of DWS, who found that property values increased with distance from the neighborhood church, up to a distance of 850 feet. Apparently, reactions of housing prices to neighborhood churches in Chula Vista, California, and Henderson, Nevada, are not the same.

Adding indicator variables for denominations proves interesting. Each of the dummy variables for Baptist, Catholic, and Mormon (LDS) churches was statistically significant. Compared to properties near (actual or future) churches of "other" denominations, properties near Baptist churches sell for 1.4% less, houses near Catholic churches sell for 2.66% less, and LDS churches sell for 1.3% more. Adding dummy variables for each of the 30

churches with neighborhood sales provides a significant, but small, improvement in the explanatory power of the equation. None of the other coefficients are materially affected by the inclusion of church or denominational indicator variables. Most importantly, property values decrease at a decreasing rate with distance from the neighborhood church, up to a distance of 5.5 miles.¹⁶

Table 3 begs the question of whether the distance from the neighborhood church reflects the amenity value of the church, per se, or if that distance merely measures the effects of preexisting characteristics of church neighborhoods that predate the church building. In Table 4, we limit our sample to 1,348 sales that occurred before the church building was erected. In contrast to Table 3 (and Table 5), property values are not significantly related to the distance or the squared distance from the neighborhood church.¹⁷ Adding dummy variables for Baptist and Catholic denominations (no LDS churches in the sample were constructed after 1986) does not affect the results, except to imply that Catholic churches tend to be built in neighborhoods with slightly lower property values. This implies that the negative relation between property values and Catholic churches predates the building of the church, which does not seem to be the case for Baptist churches.¹⁸

Table 5 clinches the argument that neighborhood churches represent amenities that, by themselves, enhance property values. The first regression shows that, for properties bought *after* the neighborhood church was built, property values decrease with distance and increase with the square of distance. Adding the indicator variable for church denomination implies that Baptist and Catholic churches tend to locate in neighborhoods with slightly lower average property values; the location of LDS churches appears to be independent

Table 4. Regression results; dependent variable = log of real selling price; homes purchased before church built.

| Variable | Coefficient | t-Statistic | Coefficient | t-Statistic | Coefficient | t-Statistic |
|-----------------|-------------|-------------|-------------|-------------|-------------|--------------|
| Log of constant | 3.8845 | 26.89 | 3.8863 | 27.05 | 3.8584 | 26.57 |
| AGE | -0.0040 | -5.15 | -0.0042 | -5.37 | -0.0042 | -5.43 |
| BATHS | -0.0576 | -5.38 | -0.0544 | -5.08 | -0.0553 | -5.17 |
| BEDS | -0.0010 | -0.16 | -0.0054 | -0.87 | -0.0065 | -1.03 |
| MONTH | 0.0024 | 12.35 | 0.0020 | 9.36 | 0.0020 | 9.41 |
| DISTANCE | -4.27E-06 | -1.47 | -4.84E-06 | -1.51 | -4.22E-06 | -1.30 |
| DISTSQ | -8.01E-11 | -0.35 | -3.86E-11 | -0.16 | -6.75E-11 | -0.29 |
| FP | -0.0064 | -0.42 | -0.0092 | -0.61 | -0.0094 | -0.62 |
| LSQFTB | 0.8868 | 36.24 | 0.8877 | 36.46 | 0.8933 | 36.25 |
| LSQFTL | 0.1137 | 10.04 | 0.1147 | 10.18 | 0.1139 | 10.08 |
| POOL | 0.0395 | 5.86 | 0.0390 | 5.80 | 0.0384 | 5.72 |
| ROOMS | -0.0309 | -6.68 | -0.0306 | -6.66 | -0.0305 | -6.62 |
| Z89014 | 0.1438 | 9.95 | 0.1565 | 10.63 | 0.0941 | 2.05 |
| Baptist | | | 0.0040 | 0.45 | | |
| Catholic | | | -0.0294 | -3.71 | | |
| LDS | | | | | | |
| Church | | | | | | $F = 6.1422$ |
| R^2 | | 0.8249 | | 0.8369 | | 0.8371 |
| Adjusted R^2 | | 0.8334 | | 0.8351 | | 0.8353 |
| Multiple F | | 13.80 | | 488.42 | | 456.38 |
| Durbin-Watson | | 1.64 | | 1.66 | | 1.67 |
| Number | | 1348 | | 1348 | | 1348 |

Table 5. Regression results; dependent variable = log of real selling price; homes purchased after church built.

| Variable | Coefficient | <i>t</i> -Statistic | Coefficient | <i>t</i> -Statistic | Coefficient | <i>t</i> -Statistic |
|--------------------------------|-------------|---------------------|-------------|---------------------|-------------|---------------------|
| Log of constant | 5.9850 | 64.68 | 6.0400 | 65.26 | 6.2038 | 63.50 |
| AGE | -0.0061 | -18.01 | -0.0061 | -18.31 | -0.0060 | -16.28 |
| BATHS | 0.0382 | 5.00 | 0.0380 | 4.98 | 0.0440 | 5.68 |
| BEDS | -0.0062 | -1.22 | -0.0051 | -1.00 | -0.0044 | -0.86 |
| MONTH | 0.0021 | 13.72 | 0.0023 | 14.68 | 0.0022 | 13.95 |
| DISTANCE | -1.20E-05 | -8.25 | -1.33E-05 | -8.90 | -1.36E-05 | -7.83 |
| DISTSQ | 2.02E-10 | 7.50 | 2.20E-10 | 8.10 | 2.28E-10 | 7.61 |
| FP | 0.0854 | 13.00 | 0.0873 | 13.26 | 0.0810 | 12.09 |
| LSQFTB | 0.5265 | 30.87 | 0.5230 | 30.73 | 0.4974 | 28.63 |
| LSQFTL | 0.1359 | 18.71 | 0.1332 | 18.27 | 0.1316 | 17.11 |
| POOL | 0.0729 | 11.13 | 0.0720 | 11.04 | 0.0709 | 10.94 |
| ROOMS | -0.0106 | -2.46 | -0.0118 | -2.74 | -0.0093 | -2.15 |
| Z89014 | 0.1660 | 27.34 | 0.1655 | 25.94 | 0.1802 | 17.14 |
| Baptist | | | -0.0213 | -3.02 | | |
| Catholic | | | -0.0297 | -4.04 | | |
| LDS | | | 0.0101 | 1.67 | | |
| Church | | | | | | <i>F</i> = 9.22 |
| <i>R</i> ² | | 0.8272 | | 0.8292 | | 0.8321 |
| Adjusted <i>R</i> ² | | 0.8266 | | 0.8285 | | 0.8310 |
| Multiple <i>F</i> | | 1395.13 | | 1130.88 | | 751.12 |
| Durbin-Watson | | 1.90 | | 1.91 | | 1.93 |
| Number | | 3510 | | 3510 | | 3510 |

of property values. The set of dummy variables for the 30 churches with neighborhood property sales increases the adjusted R^2 slightly, albeit significantly, but otherwise leaves the results unmodified.

Table 6 represents our analog of DWS's tables 3 and 4, showing the relation between property values and distance from neighborhood churches. DWS showed a gain of approximately \$4,000 (2.2% of value) due to movement 850 feet away from churches. We demonstrate a loss of nearly \$4,500 (5.5% of value) as a result of being one mile, instead of 100

Table 6. Property values and distance from neighborhood church.

| Distance (feet) | Distance (miles) | Property Value | Rate of Change per 1000 feet | Proportion of Sales |
|-----------------|------------------|----------------|---------------------------------|---------------------|
| 100 | 0.02 | \$83,025 | -1.1960% | 0.14% |
| 850 | 0.16 | \$82,293 | -1.1657% | 8.47% |
| 1,320 | 0.25 | \$81,847 | -1.1467% | 22.42% |
| 1,760 | 0.33 | \$81,438 | -1.1289% | 22.42% |
| 2,640 | 0.50 | \$80,646 | -1.0933% | 57.35% |
| 2,910 | 0.55 | \$80,409 | -1.0824% | 57.35% |
| 3,520 | 0.67 | \$79,886 | -1.0578% | 57.35% |
| 3,960 | 0.75 | \$79,518 | -1.0400% | 76.07% |
| 5,280 | 1.00 | \$78,462 | -0.9867% | 88.55% |
| 7,920 | 1.50 | \$76,552 | -0.8800% | 88.55% |

feet, from a church. In our sample, 97.5% of property purchases were with 1.5 miles of existing churches. Assuming normality, 95% of DWS's sample is within 1,300 feet (or one-quarter of a mile).

There is one additional equation to fit in an attempt to reconcile our results with those of DWS. Although their article did not discuss the size or other characteristics of neighborhood churches, it is conceivable that small churches are less intimidating to neighborhood residents than large churches are. If noise and traffic are the major disruptions caused by churches, then we would expect that bigger churches would create correspondingly greater externalities. In Table 7, we add three terms to gauge the relation among the property values, the size of the church, and distance from the church. If DWS are correct that churches are nuisances, then larger churches ought to be greater nuisances than smaller churches. If churches are amenities, larger churches should enhance property values more than smaller churches do, unless diminishing returns are experienced. *CLOT* measures the size of the nearest neighborhood church lot in square feet (see Table 2).¹⁹ A positive coefficient on *CLOT* supports the hypothesis that churches are amenities, while a negative coefficient supports the hypothesis that churches are nuisances. *DCLLOT* is the interaction term between the size of the church lot and the distance from the church, while *D²CLOT* is the interaction term between the square of distance and church lot size. Table 7 shows that *CLOT* has a positive coefficient that is statistically significant at the 0.05 level. Being near the smallest church (lot size = 20,000) would increase property values by only 0.33%. Being near the largest church (square feet = 368,517) would increase property values by 6.27%.

Table 7. Property values, church lot size, and distance to nearest church.

| Variable | Coefficient | t-Statistic | Coefficient | t-Statistic |
|-------------------------|-------------|-------------|-------------|-------------|
| Log intercept | 6.1019 | 60.26 | 6.2296 | 59.13 |
| AGE | -0.0058 | -14.66 | -0.0057 | -14.43 |
| BATHS | 0.0571 | 6.72 | 0.0583 | 6.92 |
| BEDS | -0.0078 | -1.41 | -0.0058 | -1.07 |
| MONTH | 0.0021 | 12.25 | 0.0021 | 12.54 |
| DISTANCE | -2.34E-05 | -9.40 | -2.74E-05 | -3.55 |
| DISTSQ | 1.38E-09 | 6.78 | 4.20E-09 | 4.73 |
| FP | 0.0682 | 9.20 | 0.0684 | 9.30 |
| LSQFTB | 0.5267 | 28.43 | 0.5050 | 27.07 |
| LSQFTL | 0.1223 | 14.73 | 0.1224 | 14.74 |
| POOL | 0.0769 | 10.93 | 0.0760 | 10.89 |
| ROOMS | -0.0087 | -1.88 | -0.0080 | -1.74 |
| Z89014 | 0.1496 | 21.96 | 0.1642 | 22.25 |
| CLOT | | | 1.65E-07 | 2.43 |
| DLCLOT | | | -5.95E-11 | -2.10 |
| D ² LCLLOT | | | -5.71E-15 | -2.24 |
| R ² | | 0.8210 | | 0.8244 |
| Adjusted R ² | | 0.8202 | | 0.8234 |
| F-statistic | | 1003.87 | | 821.25 |
| Durbin-Watson stat | | 1.8575 | | 1.8616 |
| Observations | | 2640 | | 2640 |

Both the coefficients on *DCLOT* and *D²CLOT* are negative and statistically significant at the 0.05 level. This implies that the effect of church size on housing values declines rapidly with distance from the church. All effects due to church size disappear at 2,309 feet (0.43 miles).²⁰ These results support the conclusion that neighborhood churches are amenities.

2. Conclusion

Our findings sharply contrast with those of Do, Wilbur, and Short (1994). Whereas they purport to show that neighborhood churches are nuisances that reduce property values over relatively short distance, we find that neighborhood churches are amenities that enhance property values over much larger distances (at least one-half mile, in contrast to DWS's limitation of 850 feet). We suspect that the small size of their sample, plus the restriction of their sample to properties at a very short distance from churches, may have distorted DWS's findings.²¹ It is possible, however, that both studies accurately reflect the relationship between neighborhood churches and property values in their respective communities. Chula Vista, California, is apparently so crammed with churches that citizens can only escape its theocratic environment by selling their homes at a discount. This gives new meaning to the term "moral hazard." Henderson, Nevada, by contrast, is close to Las Vegas (sin city). Henderson residents welcome churches built on vacant lots that might otherwise have been the site of a neighborhood casino. Obviously, there is further research that must be conducted before this issue is finally resolved. How are housing value gradients across cities related to the concentration of churches within cities? We suspect that interesting contrasts can be made between Vatican City, Salt Lake City, and Mecca.

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Notes

1. The literature which offers empirical support for the negative effect on property prices of such obviously undesirable property uses as listed here is voluminous and not referenced out of a concern for brevity.
2. Which the authors find, by the way, quite comforting.
3. Again, for brevity, the reader is not bored with a lengthy list of references which report that proximity to quality schools is an amenity for which house buyers are willing to pay.
4. In the rapidly growing Las Vegas valley, it is a common practice for real estate developers to donate land to religious groups who build churches prior to the developers' construction of houses. It is doubtful that the developers believe that the churches will reduce the prices which they can charge for residential property.
5. Would churches offering relatively sedate or fewer services be preferred to their counterparts with rowdy and frequent services, for example?
6. The DWS sample contained 469 properties sold between January 1991 and September 1992 in Chula Vista, California. The average distance between in their sample is 634.37 feet, with a standard deviation of 360.42 feet, implying that 95% of the properties in their sample are within 1,355 feet of a church. This works out to 15 churches per square mile. Our data consists of 32 churches covering an area of approximately 100 square miles.

7. Our data set includes the number of fireplaces per house, but this cardinal variable was more highly correlated with building size than is this indicator variable.
8. The time trend MONTH is intended to reflect the effects of general inflation and housing price inflation, which the Henderson, Nevada market may parallel. However, addition of the percent change in the CPI, the rate of change in the CPI for housing, and the prevailing mortgage interest rate proved statistically insignificant.
9. Say, next to cemeteries, parsonages, or sinner.
10. The Las Vegas suburb of Green Valley was annexed by the city of Henderson in the early 1980s.
11. Trying to investigate all 196,000 housing sales for the effect of local churches would have been a daunting task. Homes outside the Las Vegas valley could be hundreds of miles from a "neighborhood" church. Observations outside Henderson and Green Valley would have created distortions due to an Air Force base, the Las Vegas Strip, the 14th busiest airport in the country, land fills, and other nuisances. Accordingly, we restrict our sample to a suburb of Las Vegas, for many of the same reasons as DWS restricted their sample to a suburb of San Diego.
12. Both new and preowned homes were included in the sample. We include property sales before churches were actually constructed to control for spurious correlation between unspecified hazards (of which the authors could find none) and church sales.
13. Sixty-two sales were land sales only. Another four sales had missing data on building size and number of rooms.
14. To compute the precise effect, subtract one from the anti-log of the coefficient on the dummy variable:

$$\frac{\Delta P}{P} = e^{0.07} - 1 = 1.0725 - 1 = 0.0825 = 7.25\%$$

15. The 5.5 miles is a point estimate of zero effect derived from the coefficients on the distance and distance squared variables. It is likely that the major effect diminishes much before this point estimate. We reestimated the equations by including only houses within a given number of feet and discovered that the major impact occurs within 2,910 feet (0.55 miles) of the neighborhood church, which included 62.5% of our sample.
16. Since distance and squared distance increase together, the mutual insignificance of distance and squared distance could reflect multicollinearity between those two variables. This problem is avoided by relating the log of real housing price to the log of distance, so the coefficient can be interpreted as an elasticity. In the sample of 1348 observations before the church was constructed, the elasticity of property values with respect to distance (from the future church site) is $-.0096$, or about 1% loss in value for each doubling of distance. This coefficient was barely significant with a t -statistic of -2.04 . In the set of observations after the church was constructed, the elasticity is -0.025 with a t -statistic of 7.67 . This small negative effect of distance prior to the church being constructed might be an expectations effect.
17. Given that LDS and Catholic families tend to be larger than Baptist families, this result does not appear to reflect a neighborhood aversion to noisy children on Sunday mornings.
18. Because church lots are typically purchased prior to the construction of the church building, the size of the church building was known for only two churches, while lot size is known for 23 churches. The size of the church lot is a good proxy for the number of parking spaces (reflecting traffic) and the expansion potential of the church activities.
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20. Letting D stand for distance and S for church size, Table 7 implies:

$$\frac{\partial LRP}{\partial S} = 1.65 \times 10^{-7} - 5.95 \times 10^{-11} D - 5.71 \times 10^{-15} D^2.$$

we have $.65 - 5.95 \times 10^{-4} D - 5.71 \times 10^{-8} D^2 = 0$, which implies

$$D^* = \frac{5.95 \times 10^{-4} - \sqrt{(5.95 \times 10^{-4})^2 - 4(1.65)(5.71 \times 10^{-8})}}{2(5.71 \times 10^{-8})} = 2,309.$$

21. When we limited our sample to the 762 properties within 1300 feet of neighborhood churches, sold after the church was completed, we found that neither the coefficient on distance nor the coefficient on distance squared was statistically significant, with a joint F -statistic of 1.30, which implies a probability of .27 that both coefficients are zero. Dropping the distance squared variables (because of possible multicollinearity with distance) yielded a coefficient on distance equal to $-2.24E-05$, which is significant at the 9.5% level, one-tail test.

Reference

Do, A. Quang, Robert W. Wilbur, and James L. Short. (1994). "An Empirical Examination of the Externalities of Neighborhood Churches on Housing Values," *The Journal of Real Estate Finance and Economics* 9(2), 127–136.