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Triskaidekaphobia and North American Residential Real Estate Prices

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A previous study led its authors to conclude that superstition impacts price formation for single-family dwellings in the Vancouver area. Houses there with an address that ends in the "unlucky" number 13 are found to sell at a discount compared to otherwise similar houses. The primary objective of this study is to determine whether the previous results apply in another North American housing market. Hedonic regression is applied to single-family house transactions that occurred in Montgomery County, Ohio, to determine if houses with an address of 13 sold for different prices than houses that comprise the remainder of the sample. The same test is then conducted for houses with an address other than 13. No mispricing associated with the number 13 is discovered, but seven other addresses are found to be significantly related to price. As all but one of the significant house numbers identified in this study are not reputed to be particularly lucky or unlucky, we conclude that the price effects discovered are attributable to coincidence. The results of this first study to investigate the possibility of mispricing due to superstition about the number 13 in a residential property market in the United States are consistent with rational market behavior.

Keywords

Superstition, North America, Housing Prices, International Housing Markets, Hedonic Regression, Triskaidekaphobia

1. Introduction

In Western cultures, the number 13 has a reputation of being unlucky. The genesis of this reputation has been attributed to multiple sources. Two very old references are associated with groups of thirteen individuals. In Norse mythology, twelve benevolent gods were gathered in a hall and the evil thirteenth god, Loki, attacked the group, which resulted in the death of the beloved god Balder. In Christian theology, it is claimed that Judas sat at the thirteenth place at the Last Supper. As a result, the number 13 has maintained a bad reputation in Christian circles. Numerous other sources of the unluckiness of 13 have been offered. Thompson (2002) identifies a number of diverse cultures in which the number 13 has an ominous nature. He finds many similarities of association between the number 13 and the moon, women's magic, omens, etc. in the European, North American, Meso-American, and the pre-Buddhist Tibetan and Mongolian cultures.

While most people are aware of the unlucky reputation of 13, most also consider it mere superstition. For a few, however, the fear of the number 13 is pervasive and there is a name for this fear: triskaidekaphobia. Friday the 13th seems to be a particularly bad day for the superstitious (although in Greece, Spain, and Mexico, the "unlucky" day is not Friday the 13th, but Tuesday the 13th). Poorsoltan (2012) notes several prominent individuals who routinely altered their activities on Friday the 13th, including: Napoleon Bonaparte, Mark Twain, Winston Churchill, Henry Ford and Franklin Roosevelt. On any Friday the 13th, Ford refused to do business, Roosevelt would not depart on a train trip, and Churchill refused to fly. These individuals are not unique in this regard. Superstition associated with the number 13 has been shown to influence behavior and has substantial economic impact. It has been estimated that between $800 and $900 million is lost in business every Friday the 13th because some people will not fly or conduct business as normal on that date (Roach, 2004), and no airline has a flight numbered 13 (McCartney, 2013). In addition, superstition has been shown to affect the stock market. Kolb and Rodriguez (1987) report that mean stock market returns on Friday the 13th are significantly lower than the mean returns on other Fridays.

Of particular interest here is the power of superstition to shape behavior in real estate markets. Carroll (2007) relates the results of a USA Today/Gallup poll which asked Americans how much it would bother them to stay in a room on the 13th floor of a hotel. Eighty-seven percent of the respondents stated they would not be bothered, but (ironically) 13% said it would bother them and 74% of the latter group stated they would ask for a room on a different floor. Perhaps in deference to such concerns, many tall buildings do not have a floor numbered 13. In fact, Anderson (2008) reports that 85% of Otis elevators around the world do not have a 13th floor button.

In a recent study of single-family dwellings in the Vancouver area, Fortin et al. (2013) find that houses with an address that ends in 13 sell for significantly less than comparable properties with an address that ends in something other than 13. The authors conclude that the mispricing occurred because of superstition. The purpose of the present study is to determine if their results apply in a different North American market. The present study applies a hedonic regression model, similar to that used in the previous work, to 3,701 single-family house transactions in Montgomery County, Ohio. The same test is conducted for houses with a house number other than 13. No price effect associated with the number 13 is discovered, but several other numbers are found to be significantly related to transaction price.

The remainder of the paper is organized as follows. In the next section, we will present a review of the limited literature which focuses on transaction prices and house numbers. In the third section, the data and research methodology are described. The fourth and fifth sections contain the results and a summary, respectively.

2. Literature Review

In a research thread closely related to the present topic, several papers report a significant impact on residential real estate transaction price due to number-related superstition in housing markets with substantial Chinese populations. For centuries, feng shui has influenced Chinese thinking, and the Chinese people have relied on feng shui when designing cities, building homes, or burying their dead (Webster, 1997). In the contemporary practice of feng shui, homophonic principles are applied in interpreting numbers. If the pronunciation of a number is similar to the pronunciation of something good, the number is considered to be lucky and if the pronunciation of the number sounds like the pronunciation of something bad, the number is considered to be unlucky. In both Cantonese and Mandarin, the words for “4” and “death” sound similar, so 4 is considered an unlucky number, while the words for “8” and “prosperity” have similar pronunciations and, therefore, 8 is considered to be a lucky number.

Bourassa and Peng (1999), who provide an excellent explanation of the importance of feng shui in the Chinese culture, were the first to empirically investigate the possibility that properties with a lucky (unlucky) address sell at a premium (discount) from otherwise similar properties. The study by Bourassa and Peng includes 4 as an unlucky number and 3, 6, 8 and 9 as lucky numbers. The additional lucky numbers are included because the pronunciation of 3 sounds like the word for “growth” and “alive”, 6 sounds the same as the Cantonese word for “wealth”, and the word for 9 sounds like the word for “to be sustained and long-lived”. They analyze 2,164 detached house transactions that occurred between 1989 and 1996 in two suburbs of

Auckland, New Zealand; the population of these suburbs was 52.4% Chinese. Their results indicate that houses with an address that ended in a lucky number sold, on average, for a 2.4% premium, but houses with an address that ended in 4 did not sell at significantly different prices than other houses. When the lucky numbers were individually considered, however, the authors report (without specifying which lucky numbers were not lucky enough to influence price) that not all the resulting estimates are statistically significant. The insignificant lucky number results are attributed to the small number of observations for each of the numbers even though there were about 200 transactions for each number.

Two studies that investigate housing transactions in Hong Kong are in agreement that superstition significantly affects price there, although the results of the studies are quite different. Chau et al. (2001) analyze 1,019 apartment transactions that occurred between November 1995 and August 1997. They report that units on floors that end with the lucky number 8 (e.g., 8, 18, and 28) sold, on average, for 2.8% more than units on other floors. They also report that the premium varied with the vitality of the housing market; averaging 5% during housing booms, but not significantly different than zero during housing slumps. Their results also indicate that apartments located on floors that ended with the unlucky number 4 (e.g., 4, 14, 24) did not sell at significantly different prices than apartments on other floors. Choy et al. (2007) conduct a similar analysis of 749 transactions that occurred between July 1999 and June 2000. Their results indicate no significant price difference between units on lucky floors and other floors, but units on unlucky floors sold, on average, at significant discounts. The mean discount was equal to 10% of the mean transaction price.

There are numerous additional situations, according to feng shui, which have the potential to influence house prices, but none have been considered in any of the above-described studies. First, feng shui holds that house location is important. Property location on a dead-end street, for example, or near a cemetery, funeral parlor, viaduct, shrine or temple, is considered unlucky. So just how lucky would an 8 in a house number be if the house is located on a dead-end street close to a cemetery? Second, as previously mentioned, the homophonic principles of number interpretation in feng shui dictate that the nature of a number, lucky or not, is generally determined by its last digit. However, as Bourassa and Peng (1999) acknowledge, according to feng shui, different combinations of the other digits in an address can affect the degree of luckiness. Perhaps the house number 8884 is less unlucky than 1234, or floor number 34 is less unlucky than floor number 24. Third, Ang (1997) reports that Chinese consumers consider some letters of the alphabet lucky, while other letters are considered unlucky. So if numerous lucky letters appear in a house address, will their luckiness be enough to offset the bad feng shui associated with an unlucky 4 in the address?

Lin et al. (2012) address the first of the issues, just enumerated, when they analyze over 76,000 housing transactions that occurred between 2002 and 2007 in Taiwan. They focus their investigation on several bad feng shui situations and report that significant price discounts are associated with houses located on a dead end street, or close to a viaduct, cemetery or temple. They also find that the negative impact of bad feng shui in these cases is generally positively related to property value. In addition, they find that dwellings located on the 4th floor of a building sold at an average discount of 4%, and this discount did not significantly vary with property value.

In the most recent study of this topic, Fortin et al. (2013) improve on their predecessor's methodology in their study of transactions which occurred in thirteen cities in the vicinity of Vancouver, Canada, by verifying that transactions that involve properties with an address that ended in each neutral number (0,1,2,3,5,6,7, and 9) did so at significantly higher (lower) prices compared to houses with an address that ended in an unlucky 4 (lucky 8). In fact, the estimated coefficient for each neutral number is extremely significant, which may be due, at least in part, to their large sample of 116,939 transactions. The relationship between sample size and the significance level of explanatory variables is discussed by, among others, Gelman and Stern (2006). The researchers report that in markets with a substantial Chinese population (at least 18% of the total population), houses with an address that ended in 4 sold at a 2.2% discount and those that ended in 8 sold at a 2.5% premium compared to houses with an address that ended in a neutral number.

Even though the focus of the Fortin et al. (2013) study is on the numbers 4 and 8, at one point in their analysis, they add a binary variable to their model to account for transactions that involve dwellings with an address that ended in 13. They find no price effect for such properties in neighborhoods with a substantial Chinese population, but in areas with fewer Chinese residents, properties with an address that ended in 13 sold for 2.8% less, on average, than other properties. The authors attribute this result to superstition associated with the number 13. Due to some methodological issues, however, the question remains whether this finding is evidence of market inefficiency caused by the presence of a critical mass of superstitious individuals or simply a coincidence. One minor issue is that the researchers did not investigate all appearances of 13 in an address (e.g., 1300 or 130). More problematic is that unlike their analysis of lucky, unlucky, and neutral numbers in markets with substantial Chinese populations, the authors failed to test whether each house number that ended in something other than 13 transacted at significantly different prices. If 13 was the only two digit combination that sold at a discount, a stronger case would exist that superstition had resulted in mispricing. But if, for example, houses with an address that ended in 13, 21 and 77 were each found to transact at significantly lower prices than other addresses, coincidence seems a more likely explanation unless 21 and 77 hold some powerful unlucky reputation in the local market.

3. Data and Methodology

The data for this study were obtained from public records offices in Montgomery County, Ohio. The sample is limited to houses with a house number from 1 through 99. Houses with an address of 100 or higher are not included to avoid the possibility of price impact from numbers other than the last two in the address. The initial data set included information about 4,814 single-family house transactions that occurred in the county between January 1998 and December 2011. Observations with missing or obviously incorrect data are eliminated, which resulted in a final sample of 3,701 transactions; 29 of which have 13 as an address number. Examination of the summary statistics for these transactions, provided in Table 1, will reveal, among other things, that 41% of the houses in the sample have central air conditioning and 23% have a brick exterior. The average house in the study is 71 years old, has 1,517 square feet of living space, and sold for $92,909.

Table 1 Summary of Transaction Characteristics

Variable	Mean	Std Dev	Minimum	Maximum
PRICE (in US dollars)	92,909.09	67,045.51	5,000.00	600,000.00
AGE (structure age in years)	71.76	27.24	1	192
BED (number of bedrooms)	2.85	0.72	1	6
COND (property condition)	6.30	0.89	3	10
LOT (square feet in parcel)	8,335.56	6,531.12	696.96	87,120.00
SQFT (sq. ft. of living space)	1,517.63	562.29	600.00	5,437.00
AIR (central air conditioning)	0.41	0.49	0	1
BRICK (brick exterior)	0.23	0.42	0	1
FULL (full basement)	0.59	0.49	0	1
NONE (no basement)	0.24	0.43	0	1
OWN (owner-occupied	0.80	0.40	0	1
FALL (sold in Sep., Oct., Nov.)	0.25	0.43	0	1
WINTER (sold in Dec., Jan., Feb.)	0.20	0.40	0	1
SPRING (sold in Mar., Apr., May)	0.25	0.43	0	1

Hedonic regression is used to investigate the possibility that superstition has a significant influence on the price of single-family houses in the study area. This widely used technique, which enables the researcher to unbundle transaction prices into the contribution of various property and market characteristics, has been employed in all of the studies included in the literature review. The functional form specified in Equation (1) is the same used by Chau et al. (2001), Lin et al. (2012) and Fortin et al. (2013) where linear independent variables are regressed against the natural logarithm of the

dependent variable. Equation (1) is estimated by using the SAS (2004) PROC REG procedure. In Equation (1):

$$\begin{aligned} \ln\text{PRICE} = {} & \alpha + \beta_1\text{TRIX} + \beta_2\text{AGE} + \beta_3\text{BATH} + \beta_4\text{COND} + \beta_5\text{LOT} \\ & + \beta_6\text{SQFT} + \beta_7\text{AIR} + \beta_8\text{BRICK} + \beta_9\text{FULL} \\ & + \beta_{10}\text{NONE} + \beta_{11}\text{OWN} + \beta_{12}\text{SPRING} + \beta_{13}\text{FALL} \\ & + \beta_{14}\text{WINTER} + \sum_{I=15}^{30}\beta_i\text{AREA} + \sum_{I=31}^{44}\beta_i\text{YEAR} + \epsilon \end{aligned} \tag{1}$$

where:
lnPRICE = the natural logarithm of the transaction price,
α = the intercept,
β = the estimated coefficients,
TRIX = a binary variable equal to 1 if the street address of the property is a particular number (initially 13), equal to zero otherwise,
AGE = the structure age in years,
BATH = the number of bathrooms in the house,
COND = the auditor's estimate of the property's condition,
LOT = the number of square feet in the parcel,
SQFT = the number of square feet of living space in the house,
AIR = a binary variable equal to 1 if the house has central air conditioning, equal to zero otherwise,
BRICK = a binary variable equal to 1 if the house has a brick exterior, equal to zero otherwise,
FULL = a binary variable equal to 1 if the house has a full basement, equal to zero otherwise,
NONE = a binary variable equal to 1 if the house has no basement, equal to zero otherwise,
OWN = a binary variable equal to one if the buyers of the property is an owner/occupant, equal to zero otherwise,
SPRING = a binary variable equal to 1 if the property is sold either in March, April or May, equal to zero otherwise,
FALL = a binary variable equal to 1 the property is sold in September, October or November, equal to zero otherwise,
WINTER = a binary variable equal to 1 if the property is sold in December, January or February, equal to zero otherwise,
AREA = a series of binary variables equal to 1 if the property is located in a particular area of the county, equal to zero otherwise,
YEAR = a series of binary variables equal to 1 if the transaction occurs in a particular year, equal to zero otherwise, and
ϵ = the error term.

The anticipated sign of the estimate is negative for AGE and positive for BATH, COND, LOT, SQFT, AIR, BRICK and OWN. The sign of the estimate for FULL and NONE, which is unclear a priori, will reveal the

contribution of these variables compared to a property with a partial basement. A basement in the study area has value because it offers some safety during severe storms, but basement flooding and other water related issues can be problematic. As previous studies have reported differences in transaction prices between houses sold in the summer and other seasons, SPRING, FALL and WINTER are included to capture any seasonality in the data. The AREA and YEAR variables are included to control for differences in the property location and market conditions. The holdout category for AREA and YEAR is the city of Dayton and 1998, respectively. The variable COND is derived from the property condition rating assigned by the auditor's office. The auditor rates property condition from "excellent" to "poor". To operationalize these ratings, they have been converted to a numerical value with average condition assigned a value of 6. As indicated in Table 1, assigned values range from 10 to 3 (in half-point increments) for the best to worst rated properties in the database.

The independent variables described above are important because they control for differences in transaction prices attributable to those characteristics, but the variable of primary interest is TRIX. If buyers are put off by an "unlucky" house number such as 13, reduced demand may result in lower transaction prices for these properties. It is also possible, however, that significant differences in transaction prices associated with a particular property address may occur due to coincidence.

4. Results

Examination of the estimation results of Equation (1), summarized in Table 2, will reveal the following facts. The highly significant F value indicates that the data fit the model well, and the adjusted R^2 indicates that slightly over 81% of the variation in the dependent variable is explained by the independent variables. The sign of all the significant property characteristic variables is in the anticipated direction, and all but two of the property characteristic variables are significant. No significant price difference is discovered between houses with either a full basement or no basement and those with a partial basement. The results also indicate that owner/occupants paid more, on average, than buyers who do not reside in the property. Some seasonality is detected in the transaction prices. Houses that sold in the fall and winter did so at significantly lower prices, ceteris paribus, compared to properties that sold during the summer. Compared to houses located in Dayton (the county seat and the holdout category for the AREA variables), houses in all other areas of the county sold at significant premiums. Examination of the estimated coefficients for the YEAR variables will demonstrate that during most of the study period, prices roller-coasted above the average 1998 price, but in the last two years of the study, the average transaction price was not statistically different than it was in 1998.

Focusing on our variable of interest, recall that TRIX is assigned the value of 1 if the property address is 13, zero otherwise. The highly insignificant regression coefficient makes it clear that, ceteris paribus, no significant difference in transaction price exists between houses with an address of 13 and other houses in the sample. In other words, superstition associated with the number 13 plays no systematic part in the price formation process. In a separate estimation of Equation (1), by examining over 80,000 transactions, the prices for all properties where 13 appears anywhere in the house number (e.g., 1300, 130, 2130) are compared to prices for other properties. The results of that effort, not detailed here, especially those that concern the variable of interest, are similar to those reported here.

Table 2 Ordinary Least Squares Regression Results

Variable	Parameter Estimate	Standard Error	t value	Pr > |t|
Intercept	8.68764	0.09501	91.44	<.0001
TRIX	0.00785	0.08784	0.09	0.9288
AGE1	- 0.00095072	0.00040769	-2.33	0.0198
BATH	0.06123	0.01984	3.09	0.0020
COND	0.23599	0.01301	18.14	<.0001
LOT	0.00000306	0.00000152	2.02	0.0439
SQFT	0.00020093	0.00002021	9.94	<.0001
AIR	0.14672	0.01850	7.93	<.0001
BRICK	0.09928	0.02102	4.72	<.0001
FULL	0.02684	0.02220	1.21	0.2268
NONE	- 0.01084	0.03032	-0.36	0.7206
OWN	0.14475	0.01990	7.27	<.0001
SPRING	- 0.01684	0.02075	-0.81	0.4173
FALL	- 0.05784	0.02065	-2.80	0.0051
WINTER	- 0.03638	0.02236	-1.63	0.1038
AREA2	0.50980	0.06095	8.36	<.0001
AREA3	0.56045	0.05515	10.16	<.0001
AREA4	0.49757	0.05630	8.84	<.0001
AREA5	0.61097	0.04393	13.91	<.0001
AREA6	0.23399	0.03825	6.12	<.0001
AREA7	0.31864	0.08837	3.61	0.0003
AREA8	0.34504	0.07795	4.43	<.0001
AREA9	0.08721	0.03627	2.40	0.0162
AREA10	0.27822	0.08457	3.29	0.0010
AREA11	0.53821	0.04228	12.73	<.0001
AREA12	0.37130	0.07112	5.22	<.0001
AREA13	0.45772	0.04495	10.18	<.0001
AREA14	0.44353	0.08772	5.06	<.0001
AREA15	0.52453	0.03615	14.51	<.0001
AREA16	0.69489	0.03489	19.92	<.0001

(Continued…)

(Table 2 Continued)

YEAR99	0.20359	0.03425	5.94	<.0001
YEAR00	0.25039	0.03489	7.18	<.0001
YEAR01	0.27431	0.03478	7.89	<.0001
YEAR02	0.12550	0.03333	3.76	0.0002
YEAR03	0.15991	0.03325	4.81	<.0001
YEAR04	0.06101	0.03302	1.85	0.0647
YEAR05	0.38551	0.03736	10.32	<.0001
YEAR06	0.38335	0.03857	9.94	<.0001
YEAR07	0.37951	0.04240	8.95	<.0001
YEAR08	0.16572	0.04554	3.64	0.0003
YEAR09	0.12896	0.04757	2.71	0.0067
YEAR10	-0.00735	0.04694	-0.16	0.8757
YEAR11	0.06871	0.11586	0.59	0.5532
Observations	3,701	Pr > F	<.0001	
F Value	139.41	Adj R2	0.8111	

To investigate whether the results of Equation (1) would be different if the variable TRIX takes a positive value when the property address is one of the other addresses in the sample, Equation (1) is estimated 98 additional times. In 91 cases, no significant difference is discovered, but examination of the results of this process, summarized in Table 3, will reveal that houses with seven different addresses sold, on average, for significantly different prices than other properties.

Table 3 House Numbers Significantly Related to Price

Address Number	Number of Observations	Estimate	t-value	P > |t|
7	37	0.16035	2.07	0.0388
25	89	-0.09528	-1.88	0.0604
27	51	0.17302	2.64	0.0084
34	47	0.11436	1.67	0.0944
40	88	-0.10115	-1.98	0.0482
54	42	-0.13283	-1.81	0.0710
59	32	-0.08277	-2.11	0.0348

One of the addresses for which a positive association with selling price is discovered is 7. Houses with this address sold for 16% more than other properties in the sample. The number 7 is considered lucky by some individuals in many cultures; its lucky reputation stems from a variety of sources. It may have to do with the fact that in ancient times, there were 7 visible planets in the night sky. Some Christians consider the number 7 lucky

because in Christian theology, it is the number of days that it took for the completion of creation. To gain some understanding of the contemporary thoughts of people in the study area with regard to the luckiness of each of the numbers in Table 3 as well as the number 13, we conducted an unscientific survey. Of the one hundred respondents, forty-nine classify 13 as an unlucky number, thirty-nine identify 7 as a lucky number, and none of the other numbers are considered lucky or unlucky by more than a few respondents. Many of those who classify 13 as unlucky mention that their response is based on the reputation of the number rather than their personal beliefs, and many who expressed the opinion that 7 is lucky offer a gambling reference to support their response (e.g., triple 7s on a slot machine result in a handsome payout).

So, in the present study, if the only estimate of Equation (1) has TRIX equal to 1 when the property address is 7, the significant positive estimate for TRIX and the lucky reputation of the number 7 might tempt one to conclude that the results are due to superstitious buyers who bid up the price of such properties to capture the luckiness of the address. A stronger case could be made for this assertion if Equation (1) is estimated multiple times to investigate other addresses and the only time the variable of interest obtained significance occurs when the property address is 7. In the present study, the latter approach is employed, and because no plausible reason exists for market participants in the study area to have systematically considered the number 27 or 34 to be especially lucky and, therefore, command price premiums, nor any reason why 25, 40, 54 or 59 should have been considered to be unlucky thus causing buyers to reduce their bids, we conclude that the significant results for each of the identified addresses, including 7, are best attributed to coincidence.

5. Summary

While several studies indicate that number-related superstition results in mispricing of residential properties in markets with a substantial Chinese population, it is not until recently that a similar hypothesis has been tested that concerns superstition about the number 13 in a Western market. The authors of a recent study analyze residential property transactions in the Vancouver area and report that houses in their sample with an address that ended in 13 sold for 2.8% less than other properties, and they conclude that this mispricing occurs because of superstition.

The present study investigates whether the same results would apply in a different North American community. In analyzing single-family house transactions in Montgomery County, Ohio, we find no significant difference in prices between houses with an address of 13 and other houses with an address that range from 1 through 99. A significant price difference, however,

is discovered between houses with seven different house numbers and other properties. These differences are attributed to coincidence because all but one of these numbers has no reputation of being particularly lucky or unlucky. In the absence of a population comprised predominantly of triskaidekaphobics, it seems unlikely that sellers of houses with an address that ended in 13 could not systematically continue their buyer search until locating a buyer who is unaffected by the unlucky reputation of the property address, and who, therefore, would be willing to pay fair market price. The results of the present study combined with methodological problems with the previous study and the suspicion that the Vancouver area does not include a substantial number of individuals who are triskaidekaphobics suggest the possibility that the results of the previous study are also best explained by coincidence rather than non-rational market behavior.

Another way superstition associated with the number 13 could influence residential real estate market behavior would be if single-family house developers/builders avoid the use of 13 as an address (similar to high-rise buildings that do not have a floor numbered 13) either because of personal reservations or in an attempt to not alienate potential purchasers with an aversion to buying property that has an "unlucky" number. Numbering convention in the United States calls for odd numbers to be used for parcels on one side of a street (typically, for parcels on the south and east sides) and even numbers on the other. Hence, the number 11, 13 or 15 could serve equally well as the address for a house on the odd-numbered side of the street in the appropriate vicinity. It is interesting to note that our sample consists of 71, 29, and 103 transactions that involve houses with the address of 11, 13 or 15, respectively. This suggests the possibility that developers/builders in the study area have avoided the use of 13 as an address, but no formal analysis of the possibility has been conducted here. Examination of this issue might provide an interesting extension of the research thread.

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