The Preservation of Open Space on Housing Markets in Mountain Resort Communities: Evidence from Summit County Colorado[§]

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[§]PRELIMINARY FINDINGS/DRAFT, DO NOT CITE WITHOUT THE CONSENT OF THE AUTHORS

Executive Summary

This paper examines the relationship between open space and housing price in a mountain region of Colorado. Recent innovations in information technology have freed a growing number of workers from traditional urban employment centers. This trend, combined with the improving health and activity of retirees, has created substantial demand for housing in areas with special scenic value and access to wilderness. However, too much development may threaten the very amenity that brings people to these areas in the first place. Successful housing development in these communities requires that we identify the premium, if any, homebuyers place on low density housing. In addition, we assess how the legal protection against development is valued by homebuyers in these bucolic settings. This paper utilizes a rich dataset of housing attributes and electronic maps of parcels to identify the effects of housing density and preserved open space on home prices in Summit County Colorado.

In an attempt to preserve wildlife habitat, agricultural communities and water quality, many state and local governments and private not-for-profit organizations such as the Nature Conservancy and the American Farm Land Trust purchase rural land outright or the development rights to rural land. A select number of states, including Oregon and Washington, limit the ability of local governments to up-zone rural land for higher density residential uses. They also attempt to prevent the extension into rural areas of infrastructure (particularly road and sewer) that could support urban densities. In other instances, local governments may require developers to donate land or development rights as a condition of zoning approval. In Colorado, the preservation of open space is

often a component of a Planned Unit Development or (PUD) for construction in rural areas.

While these efforts may be motivated by altruism or the value people derive from the land, they also create, or at least preserve, an open space amenity that is valued by homebuyers.[1] Theoretical work by Walsh (2003) finds that people may bypass other developable land to build near permanently conserved land. Alternatively, developers may choose to set aside land near their project for conservation in order to increase the value of their properties.

Past research has largely focused on the amenity value of open space to traditional urban or suburban communities. Few researchers have assessed the importance of open space on housing in markets centered on outdoor recreation. In addition, past research has often treated open space as an isolated independent amenity, little different from a city park, or for that matter, a retail center. In this paper, we utilize detailed Geographic Information Systems (GIS) to calculate the share of the land protected from development within a given proximity of a home. This feature allows us to identify whether the amount of open space is valued.

We find little evidence of a market penalty for neighborhood density, though quality of views from the property is an important determinant of property price. We do find that homebuyers value land that is protected from development and are willing to pay more for properties close to such protected land. Furthermore, demand for this land has not slackened with passage of the growth management laws in 2001, suggesting that

[1] Estimates of the public value of open space using contingent claim methodologies include: Kline (1998), Breffle (1998) , and Johnston (2002).

the regulation of privately held land is not (at least in Colorado) a substitute for state ownership.

The following section offers a theoretical explanation for why conserved land may be valued. Section II outlines empirical findings from the research literature. Section III presents our research methodology and Section IV presents our results. There is a brief conclusion.

I. Theoretical Foundation and Background

One of the earliest motivations for the introduction of zoning in the beginning of the last century was to protect homebuyers against the dis-amenities generated by industrial or commercial uses of land on neighboring properties Fischel (2001). Not only did incompatible uses of surrounding land cause existing homeowners to suffer noise, smell, congestion and visual blight generated by these industries, but they also posed a serious threat to residential property values. Indeed, the risk that an undesirable firm may commence operations near one's property and lower its values was a considerable discouragement to home purchase. At the turn of the century, as today, home-equity comprised a substantial fraction of total household wealth and homebuyers were very sensitive to any perceived risks to this valuable asset. Thus, it is often the developers themselves that seek out zoning as a way to assure would-be homebuyers that their investment will be secure. In the absence of zoning, developers are often able to achieve similar results through the use of restrictive covenants as is the case in Houston, Texas, Siegan (1970).

However, for people building a home in the mountains today, the feared dis-amenity may be that someone else will build their home in the mountains next to them. In other words, the ability to look at or to have ready (and sole?) access to open space appears to be a large incentive for buying a home in rural areas. The paradox with such development is that if a sufficient number of people choose to consume the open space by moving to a rural community, the area ceases to be rural and the essential amenity is lost. The central challenge then to developers of housing centered on outdoor recreation and open space is how to provide their product without killing the proverbial golden goose, and how to assure potential buyers that their rural retreat won't end up looking like the subdivision they just left.

Traditional zoning does not lend itself as well to the task of limiting residential development as it does to precluding incompatible uses. The most obvious challenge is that the state must pick winners and losers by allowing some landowners to subdivide their land while stripping other owners of development rights. Even if such laws can survive legal scrutiny, there is limited political support for such action. This is evidenced by the recent property rights initiative past in Oregon, regarding that state's landmark growth management act. In Colorado in 2001, despite the support of a republican governor in calling a special assembly, the state legislature was unable to include an open space provision into the local master planning provision, nor was it able to give the resulting master plans (comprehensive plans) the force of law.[2]

[2]Consideration for open space, House Bill SB01S2-1008 was" postponed indefinitely." The force of law provision, House Bill SB01S2-1019, died in conference. In addition, legislation allowing local governments to collect impact fees for new development passed but was narrowly tailored to meet direct costs associated with a development and not the more expansive language advocated by the growth management community, (Senate Bill SB01S2-015, Amended).

In addition, most western states retain a homestead provision which guarantees the right to build a personal home on ones land. Counties in Colorado can and do place some restrictions on the subdivision of rural land, but there are limits to the efficacy of these restrictions. Specifically, an owner of rural land can avoid any zoning oversight by dividing the land into parcels 35 acres or larger. Should owners of land wish to subdivide the land into smaller units, they can often persuade cash poor county or town zoning boards to grant zoning variances or enter into a PUD which typically allows a much higher development density but also requires landowners to keep some parts of the land as open space or to provide other public amenities. Should a Colorado landowner be unable to obtain the desired zoning variance from the county, he may persuade a nearby town to annex his property, thus becoming the regulating entity and granting the landowner the desired variances. This process is sometimes referred to as "flagpole annexations."

Given the underlying motivation for much of the migration to outdoor activity regions and the limited regulatory reach of the state, developers must find other ways to provide their customers with secure open space. In Summit County, much of the land consists of national forest which is unlikely to be subjected to building in the future. Another strategy is for developers to simply purchase or retain some of their existing parcel as open space and then turn this land over to the homeowner's association to be developed or preserved, as desired. By giving control of surrounding land to those most affected by its ultimate development, homebuilders may assure their customers that the rural character of the land can be maintained. In this paper we estimate the value

homebuyers in Summit County place on having surrounding land protected from development.

II. Literature Review

Open space generates both highly localized amenities and also benefits that accrue to the wider community. Residents living near open space enjoy observing wildlife, having scenic views, and perhaps direct access to undeveloped land for hiking or hunting. Preserving agricultural and forest land allows the community at large to enjoy reduced traffic congestion, improved flood control, and the maintenance of ground water quality. Several empirical papers have attempted to estimate the importance of such preserved land on house prices. Examining first-time sales of building lots in a suburban subdivision, Thorsnes (2002) identified a premium of 19-35% for lots that bordered conserved land. Looking at otherwise identical condominiums within a development, Tyrvain (2000) found that units closer but not adjacent to an urban forest traded at a premium.

Geoghehan (2003) finds that homes near conserved land appreciated faster between 1993 and 1996 than other homes and the rate of appreciation was faster for homes nearest to the conserved land. Indeed, in two of the three counties studied, the rate of appreciation was sufficient enough to pay for the development rights.

One of the earliest works in this field focused on the creation of Boulder's greenbelt in 1975. Correll (1978) found that property prices rose with proximity to the greenbelt and that the appreciation was sufficient to justify the purchase of the land.

Furthermore, there is some evidence that homebuyers value proximity to land with a conservation easement or other legal guard against development more than they value open space without such protections. Geoghehan (2002) finds that open space with a conservation easement on it increases house prices three times as much as otherwise similar open space. Even within conservation easements there appears to be some variation, with homebuyers preferring government-owned easements to private ones Irwin (2002).

III. Research Methodology

A cross-sectional hedonic regression is the central econometric technique of this paper. When a traded product contains multiple attributes, a hedonic regression is used to estimate the value added to the final product by individual features. This method is widely employed in real estate and urban economics to determine the contribution of different parcel or building characteristics to a property's ultimate price. Typically, such regressions include measures of features such as building and lot size, building quality, accessibility of the property's location and local amenities. In the current work, in addition to these determinants of property value, we also include measures of density in the surrounding area and of the share of land that is guarded against development in the future.

To assess the importance homebuyers place on protection against subsequent development, one must first assess the impact of existing development density on home prices. We calculate the total number of structures within a certain distance of a parcel's property line utilizing GIS software. We count the total number of buildings at four

different ranges from each parcel: buildings on adjacent properties, and total number of buildings within 1/10th of a mile, half a mile, and one mile from the reference home's property line. To create this measure, we first use records from the assessor's office to identify every parcel within range of the reference property and then count the total number of housing units on parcels within the different ranges. These measures of surrounding density are then included as possible determinants of property value in the hedonic regression. Summary statistics for these density measures are presented in Figures 1 through 4.

In addition to these existing measures of density that are readily observable to the homebuyer, we want to determine whether homebuyers perceive and/or value open space that is in some way protected from development. To do this, we identify several types of property that are likely to be difficult if not impossible to develop utilizing abstract codes and legal descriptions maintained by the Summit County assessor's office. Specifically, we identify land that belongs to the City of Denver's Water Utility and consists of Denver's watershed, making it highly unlikely that the will ever be developed. We also identify land owned by local governments that is used for drinking water, as drainage fields and as fire breaks. We deem these properties to be strictly protected from development.

We also treat national forest land, which comprises much of the county, to be protected from development. National forest land is occasionally sold and also traded to secure more ecologically significant or fragile tracts. However, these transactions appear to be infrequent and subject to considerable public scrutiny. A review of the 12,000

matched property sales did not contain any sales by the National Forest Service, the Bureau of Land Management, and the Department of the Interior between 1995 and 2004.

Finally, we consider land designated as non-profit homeowner's association land as protected from development. We believe this land to be conserved open space created as part of the subdivision by the developer and turned over to the homeowner's association at the end of construction. It may also arise from a PUD agreement.

There are two central challenges to the analysis of density and of protection from density on the demand for homes. The first challenge is that there are probably other reasons why some areas are more densely developed then others. Were one simply to look at density and property prices across the entire country, one would find that housing in expensive but dense New York and San Francisco was very desirable and that housing in low density but affordable Maine was not and conclude that homebuyers preferred density. Obviously, such naïve analysis fails to consider the economic opportunities and cultural amenities that cause people to choose their location in the first place. Social scientists refer to this confounder as unobserved heterogeneity. We confront this problem in our analysis of Summit County. There is such heterogeneity even within our area of interest: land near downhill ski resorts is densely developed and highly valued. Rural farmland is less valued.

A second, related challenge is to isolate *demand* for conserved open space from the effects of *supply*. While protected open space may be an attractive feature of the remaining developable land there is also a supply-side effect of the conservation: by reducing the amount of land available for development, conservation makes the supply of land less elastic. As the supply of land becomes scarcer, homebuilders are less able to

respond to increases in demand by providing more housing. Instead, positive demand shocks lead to greater house price appreciation. Thus, areas with a lot of protected land may appear desirable when in fact they just lack sufficient building sites.

The first challenge, unobserved heterogeneity, could bias our analysis towards not finding a market premium for open space, if there is in fact a premium. The second challenge, confusing a supply effect for a demand effect may bias our estimate of the market premium upward. We guard against both concerns by using a statistical technique referred to as a "fixed-effect" or "within-variation". By using each economic area as its *own* reference, this technique allows us to isolates all variation *between* the different geographic areas. Depending on the size of the region used in the fixed-effect, we can confine our analysis parcels within a particular city or even neighborhood. This allows us to remove from our analysis any variation in prices that may be driven by changing economic circumstances or market-wide supply effects and focus instead on variation in proximity to open space within each market. The use of fixed-effects may also control for the supply-side effects of withholding land from development.

Confidence in these controls hinges in-part on what one believes to be the true geographic boundaries of a housing market. As we increase the number of region fixed-effects, consequently shrinking the geographic area of each region, we are more likely to capture housing sub-markets, removing the unobserved heterogeneity and supply effects from our analysis. On the other hand, the consequence of such rigor is that it limits our ability to gauge the value whole communities may place on proximate open space. The entire town of Dillon probably enjoys considerable benefits from the surrounding

national forest, but it is difficult to isolate this effect on house prices from all the other factors that cause Dillon to exist in the first place.

In part, we address this issue by using the share of protected land not only within one range but at varying distances from the property. This also yields some understanding of the degree to which the value of open space decreases with distances. In addition, we ensure the robustness of our results by varying the geographic size of the fixed effects. At its broadest, and least robust to the concerns discussed, we use in our analysis the six economic areas defined by the Summit county assessor's office: Silverthorne North Rural, Frisco, Copper Mountain Area, Silverthorne/Dillon, Breckenridge-Blue River, and Keystone Area.

At least historically, the single most important amenity in the county is access to downhill skiing. We calculate the distance in miles of each property to the nearest chair-lift. As this is a principle source of recreation in the area we include a very flexible specification that may capture the changing price premiums from shifts in transportation modality (i.e. walking/skiing to a lift versus driving).

Other parcel characteristics included in the analysis are: the size of the property's lot (in acres); and different estimates of view quality. We also include measures of individual building characteristics. First we distinguish between the several types of property: single-family detached, single-family duplexes, condominiums and mobile homes. We allow multi-storey condominiums to be valued differently. Other property attributes include total living area square footage, the grade of construction (below average, average and above average), and the total number of bathrooms.

To control for purely inter-temporal variation in housing demand resulting from changing economic and labor market quality, falling interest rates, etc., we include dummy variables for each year of sale. In addition, the inclusion of quarterly dummy variables captures any change in price resulting from the ski season or other seasonal affects on the real estate market.

The analysis is conducted on 11,500 property sales that occurred over the last ten years. Sales were matched to parcel descriptions using a common schedule number if available, otherwise the property address. We remove observations that contain missing values or are in some way problematic, as well as observations that are within 1 mile of the county boundary[3].

IV. Findings

This paper set out to determine the value placed by homebuyers on having open land close to their house. Such open land could be sparsely developed, or it could contain land that is legally protected from development. In this section, we describe our findings with respect to both types of preferences.

We start off by examining some of the standard determinants of sales price. Our results (shown in Column 1 of Table 1), are largely in line with our expectations for the market place. Let us review some of these findings: Mobile homes trade at a substantial discount to other types of homes. The price of a home falls with its age. Homes with a high quality of construction are worth an addition 56 dollars per square foot over homes of average or poor quality. A good view raises the price by 9 dollars per square foot, and

[3] We are unable to create consistent measures of surrounding development density or protected land area for parcels near the county line because we cannot observe the status of land development in neighboring counties.

an excellent view raises the price by 35 dollars a square foot.[4] The price of a property falls with its distance from a ski resort but at a decreasing rate. This relationship, based on our estimates, is illustrated in Figure 5. Property value also increases with lot size. Oddly, additional bathrooms are associated with lower values. This may be capturing other unobserved aspects of the property such as propensity for use as full time residential versus vacation use. For the whole county, prices have risen steadily in the last decade, with the largest jump occurring between 1997 and 1999. Also, properties sold in the third and fourth quarters sold for more than properties in the first two quarters of the year, perhaps reflecting the importance of the skiing season.

Having established a baseline model of property prices, we incorporate our measures for surrounding development density. Surprisingly, higher surrounding density does not appear to lower property values. Indeed, higher housing density, measured as number of units within half a mile of a parcel's boundary, is associated with a higher sales price. This may reflect unobserved features of the market place, as discussed in the previous section. It may also reflect the fact that given the large swaths of protected land accessible to all county residents, there is little value added from living on an even more isolated property. Another possibility is that the benefits of low-density homes are less important than having a greater number of retail and employment services, which can be sustained near higher density housing.[5]

Given the value of nice views, which we uncovered in the findings discussed above, we also calculate the total amount of surrounding development, measured as total

[4] All property values are in 2004 dollars.
[5] We have also tested for a threshold effect for density: for example, it may be that homeowners want just enough density to sustain a Starbucks and no more. These tests for non-linearity, performed by defining density as a four level scale, did not to support this proposition.

above-ground living area and garage size. This specification could identify whether homebuyers are concerned more with congestion or with visual clutter. However, we find that if anything property values are more likely to be positively affected by total surrounding bulk. That is, buyers paid more for properties in areas with more and/or larger properties around them. This may reflect the unobserved neighborhood quality associated home size: nicer neighborhoods have larger homes. In an attempt to overcome this confounding effect, we utilize a much smaller geographic fixed effect using 43 assessor defined neighborhoods. This more conservative estimation still finds little evidence of a density penalty, and perhaps even a small premium.

We next turn to the value of having a home near land that is well protected from future development. The results are shown in Table 2. Our measure of proximity to protected land is the share of one's property line that borders a national forest, watershed, or homeowner's association. Though this measure is positively associated with a higher property price, the relationship is not statistically significant. However, when we examine land within one tenth of a mile from the property line, we do find a market premium for protected land. An increase in the share of land protected from development is associated with 2.7 dollar increase in the price per-square-foot of housing. Examining the share of land within half a mile of a properties edge we find that a ten percent increase in protected land is associated with 2.2 dollar increase in the property price per-square-foot. However, the relationship disappears with distance: the share of property protected from development within one mile of a parcel's edge is much more modestly associated with home value and not is significantly different from zero.

We then attempt to determine whether homebuyers prefer some legal distinctions in the protected property over others. We repeat the analysis above separating out national forest land. With this narrower definition of protection, we find the effect of shielded land to be much stronger.[6] Increasing by 10 percent the share of national forest within one-tenth of a mile of a property raises that property's values by 5.4 dollars per square foot. Homebuyers do not appear to place a similar premium on having a high share of homeowner-associated protected land close by. These findings are consistent with those of (Geoghehan, 2002), who finds that publicly held easements are more valuable to homebuyers than are other types of easements. Of course it may simply be the case that national forest land is qualitatively different from other type of land.

As a further check, we use fixed effects to narrow in on geographic area, now moving to neighborhood-level fixed effects. This eliminates some of the possible confounding that may be affecting our results. This specification raises our estimate of the effect of protecting open space on house prices. When controlling for the neighborhood in which the property is located, a ten percent increase in the share of protected land (whether as national forest or otherwise) raise the price per-square-foot by 3.3 dollars.

Finally, we attempt to assess whether the market views proximity to protected parcels as a substitute for zoning. Specifically, we examine whether property owners valued protected land less after 2001, when the state succeeded in passing some growth management legislation, than they had before. We did not find that protected land was any less valuable after the passage of the growth management package. A possible

[6] The complete findings are available in Table 3.

explanation is that the legislation may have been too diluted to offer a credible guarantee to homeowners.

V. Conclusion

In the resort and rural communities of Summit County, Colorado, densely built housing does not appear to suffer a market penalty. This may reflect the overall low density of the county or the underlying econometric challenges of the question. While low density is not valued per se, there does appear to be a substantial premium associated with having land near one's home that is protected from development. While developers may attempt to create this amenity by providing common land to homeowners' associations, we find evidence that this type of protected land is not as highly valued by homebuyers as is land possessed by some more trusted entity.

Breffle, B., E. Morey, and T. Lodder, 1998, "Using Contingent Valuation to Estimate Neighborhood's Willingness-to-Pay to Preserve Undeveloped Urban Land", *Urban Studies* 35, 715-27.

Correll, M.R., J.H. Lillydahl, and L.D. Singell, 1978, "The Effect of Greenbelts on Residential Property Values: Some Findings on the Political Economy of Open Space", *Land Economics* 54, 207-17.

Downs, Anthony, 2002, Have Housing Prices Risen Faster in Portland Than Elsewhere?, *Housing Policy Debate* 13, 7-31.

Fischel, William A., 1997, Comment on Carl Abbott's "The Portland Region: Where City and Suburbs Talk to Each Other--And Often Agree ", *Housing Policy Debate* 8, 65-73.

Fischel, William A., 2001. *The homevoter hypothesis: How home values influence local government taxation, school finance, and land-use policies* (Harvard University Press, Cambridge and London).

Geoghehan, J., 2002, "The Value of Open Spaces in Residential Land Use, *Land Use Policy* 19, 91-8.

Geoghehan, J., L. Lynch and S. Bucholtz, 2003, "Capitalization of Open Spaces into Housing Values and the Residential Property Tax Revenue Impacts of Agricultural Easement Programs." *Agricultural and Resource Economics Review* 32, 33-46.

Irwin, E., N. Bockstael, 2002, "The Effects of Open Space on Residential Property Values", *Land Economics* 78, 465-80.

Johnston, R., Swallow, and D. Bauer., 2002, "Spatial Factors and Stated Preference Values for Public Goods: Considerations for Rural Land Development", *Land Economics* 78, 481-500.

Kline, J and Wichelns, 1998, "Measuring Heterogeneous Preferences for Preserving Farmland and Open Space." *Ecological Economics* 26, 211-24.

Siegan, Bernard H., 1970, Non-zoning in Houston, *Journal of Law and Economics* 13, 71-147.

Thorsnes, P, 2002, The Value of Suburban Forest Preserve: Estimates from Sales of Vacant Residential Building Lots", *Land Economics* 78.

Tyrvain, L., A. Miettinen, 2000, "Property Prices and Urban Forest Amenities", *Journal of Environmental Economics and Management* 39, 205-23.

Walsh, R., 2003, Analyzing Open Space Policies in a Locational General Equilibrium Model with Endogenous Landscape Amenities", University of Colorado mimeo.

Table 1: Determinants of Price per Square Foot - Initial specification and Surrounding Density

	(1) Baseline	(2) Unit Density	(3) Square footage of surrounding homes	(4) Neighbourhood Fixed-Effects
Type of building (omitted= single family detached)				
Duplex	-1.325	-11.757	-11.757	-11.757
	(0.44)	(3.20)**	(3.20)**	(3.20)**
Townhome	1.424	-12.609	-12.609	-12.609
	(0.41)	(2.98)**	(2.98)**	(2.98)**
Condo	-10.986	-38.717	-38.717	-38.717
	(0.39)	(1.12)	(1.12)	(1.12)
Mobile home	-153.543	-140.524	-140.524	-140.524
	(24.93)**	(33.73)**	(33.73)**	(33.73)**
Multi-story	29.249	29.091	29.091	29.091
	(1.01)	(0.84)	(0.84)	(0.84)
Structure age	-2.108	-2.016	-2.016	-2.016
	(6.72)**	(7.91)**	(7.91)**	(7.91)**
Number baths	-11.363	-10.673	-10.673	-10.673
	(4.56)**	(6.56)**	(6.56)**	(6.56)**
Grade (omitted=average)				
Above average	56.825	53.414	53.414	53.414
	(8.07)**	(8.49)**	(8.49)**	(8.49)**
Below average	11.032	23.709	23.709	23.709
	(1.02)	(3.05)**	(3.05)**	(3.05)**
View (omitted=average)				
Poor or fair	-6.915	-7.636	-7.636	-7.636
	(1.17)	(1.23)	(1.23)	(1.23)
Good	8.729	14.703	14.703	14.703
	(3.33)**	(6.08)**	(6.08)**	(6.08)**
Excellent	35.939	39.416	39.416	39.416
	(6.90)**	(7.76)**	(7.76)**	(7.76)**
Waterfront	10.160	4.399	4.399	4.399
	(1.02)	(0.50)	(0.50)	(0.50)
Acres (logged)	5.454	7.970	7.970	7.970
	(4.08)**	(5.24)**	(5.24)**	(5.24)**
Distance to skiing	-14.982	-4.942	-4.942	-4.942
	(7.46)**	(2.72)**	(2.72)**	(2.72)**
Distance to skiing squared	0.576	0.121	0.121	0.121
	(5.82)**	(1.52)	(1.52)	(1.52)
Surrounding units by proximity				
Adjacent units		0.075	0.075	0.075
		(0.69)	(0.69)	(0.69)
Within 1/10 mile		0.044	0.044	0.044
		(1.29)	(1.29)	(1.29)
Within 2/3 mile		0.021	0.021	0.021
		(4.03)**	(4.03)**	(4.03)**
Within 1 mile		-0.001	-0.001	-0.001
		(0.41)	(0.41)	(0.41)
Year of sale fixed effect	YES	YES	YES	YES
Quarter of sale fixed effect	YES	YES	YES	YES
Economic area fixed effect	YES	YES	YES	NO
Neighbourhood fixed effect	NO	NO	NO	YES
Constant	239.074	213.049	213.049	213.049
	(9.49)**	(10.55)**	(10.55)**	(10.55)**
Observations	11551	11551	11551	11551
R-squared	0.53	0.60	0.60	0.60

Robust t statistics in parentheses; * significant at 5%; ** significant at 1%

Table 2: Determinants of Price per Square Foot - Including Land Protected From Development

	(1)	(2)	(3)	(4)
	Protected adjacent	**Protected one tenth**	**Protected half mile**	**Protected mile**
Type of building (omitted= single family detached)				
Duplex	-11.501	-12.248	-12.986	-12.012
	(3.13)**	(3.43)**	(3.72)**	(3.36)**
Townhome	-12.720	-13.409	-13.524	-12.808
	(3.00)**	(3.24)**	(3.26)**	(3.08)**
Condo	-38.617	-38.689	-41.000	-39.065
	(1.12)	(1.14)	(1.20)	(1.14)
Mobile home	-140.528	-145.759	-145.896	-141.480
	(33.68)**	(32.18)**	(28.77)**	(28.96)**
Multi-story	28.712	27.020	28.564	28.971
	(0.83)	(0.79)	(0.83)	(0.84)
Structure age	-2.013	-1.991	-2.003	-2.017
	(7.89)**	(7.74)**	(7.86)**	(7.91)**
Number baths	-10.712	-11.046	-10.806	-10.703
	(6.59)**	(6.92)**	(6.68)**	(6.61)**
Grade (omitted=average)				
Above average	52.948	53.655	53.622	53.437
	(8.31)**	(8.55)**	(8.54)**	(8.49)**
Below average	23.801	23.041	24.331	23.971
	(3.05)**	(2.93)**	(3.18)**	(3.09)**
View (omitted=average)				
Poor or fair	-7.501	-7.093	-8.468	-7.802
	(1.20)	(1.14)	(1.40)	(1.28)
Good	14.532	14.648	14.577	14.762
	(5.98)**	(6.06)**	(6.08)**	(6.12)**
Excellent	39.006	38.593	39.027	39.452
	(7.57)**	(7.78)**	(7.93)**	(7.76)**
Waterfront	4.285	3.398	4.355	4.424
	(0.48)	(0.38)	(0.49)	(0.50)
Acres (logged)	8.165	8.283	7.716	7.923
	(5.36)**	(5.53)**	(5.20)**	(5.23)**
Distance to skiing	-5.009	-4.872	-5.662	-5.139
	(2.76)**	(2.72)**	(2.97)**	(2.58)**
Distance to skiing squared	0.124	0.108	0.130	0.125
	(1.57)	(1.39)	(1.64)	(1.51)
Surrounding units by proximity				
Adjacent units	0.078	0.080	0.067	0.073
	(0.72)	(0.74)	(0.61)	(0.67)
Within 1/10 mile	0.044	0.043	0.040	0.044
	(1.28)	(1.26)	(1.19)	(1.28)
Within 1/2 mile	0.021	0.021	0.021	0.021
	(4.05)**	(3.97)**	(4.07)**	(4.05)**
Within 1 mile	-0.001	-0.000	0.000	-0.001
	(0.42)	(0.10)	(0.11)	(0.33)
Share protected	16.417	27.105	22.699	3.783
	(1.17)	(2.53)*	(2.25)*	(0.44)
Year of sale fixed effect	YES	YES	YES	YES
Quarter of sale fixed effect	YES	YES	YES	YES
Economic area fixed effect	YES	YES	YES	YES
Neighbourhood fixed effect	NO	NO	NO	NO
Constant	212.122	211.015	213.053	213.313
	(10.51)**	(10.61)**	(10.72)**	(10.58)**
Observations	11551	11551	11551	11551
R-squared	0.60	0.60	0.60	0.60

Robust t statistics in parentheses; * significant at 5%; ** significant at 1%

Table 3: Share of land protected, including neighbourhood fixed effects

	(1) Protected - national forests only	(2) Protected- Abstract codes only	(3) Neighborhood fixed effects	(4) After 2001 interaction
Type of building (omitted= single family detached)				
Duplex	-12.887	-11.818	-7.483	-12.993
	(3.76)**	(3.24)**	(3.07)**	(3.73)**
Townhome	-13.301	-12.188	-0.863	-13.533
	(3.26)**	(2.86)**	(0.21)	(3.26)**
Condo	-39.148	-38.938	-12.530	-41.271
	(1.15)	(1.12)	(0.60)	(1.20)
Mobile home	-153.922	-141.797	-141.281	-146.086
	(28.39)**	(32.17)**	(26.61)**	(29.56)**
Multi-story	27.130	30.105	8.201	28.826
	(0.79)	(0.86)	(0.40)	(0.84)
Structure age	-1.964	-2.016	-1.846	-2.004
	(7.78)**	(7.97)**	(9.71)**	(7.90)**
Number baths	-11.160	-10.551	-11.372	-10.823
	(6.96)**	(6.55)**	(7.20)**	(6.71)**
Grade (omitted=average)				
Above average	54.982	53.905	42.647	53.674
	(8.90)**	(8.59)**	(6.36)**	(8.44)**
Below average	22.732	23.880	28.351	24.338
	(2.96)**	(3.12)**	(4.54)**	(3.18)**
View (omitted=average)				
Poor or fair	-6.501	-7.620	-5.383	-8.506
	(1.07)	(1.24)	(1.06)	(1.41)
Good	14.909	14.847	10.941	14.578
	(6.24)**	(6.16)**	(4.99)**	(6.08)**
Excellent	38.802	39.894	24.283	39.000
	(7.87)**	(7.84)**	(5.41)**	(7.94)**
Waterfront	2.918	4.648	3.271	4.347
	(0.32)	(0.53)	(0.34)	(0.49)
Acres (logged)	7.602	7.515	11.419	7.713
	(5.22)**	(5.02)**	(6.46)**	(5.20)**
Distance to skiing	-5.455	-5.239	-11.608	-5.676
	(3.08)**	(2.80)**	(1.99)*	(2.99)**
Distance to skiing squared	0.102	0.124	1.146	0.130
	(1.36)	(1.57)	(2.42)*	(1.65)
Surrounding units by proximity				
Adjacent units	0.084	0.074	0.063	0.067
	(0.78)	(0.68)	(0.60)	(0.61)
Within 1/10 mile	0.043	0.045	0.040	0.040
	(1.27)	(1.31)	(1.36)	(1.19)
Within 1/2 mile	0.021	0.021	0.015	0.021
	(4.13)**	(4.12)**	(3.25)**	(4.04)**
Within 1 mile	-0.000	-0.001	-0.005	0.000
	(0.11)	(0.55)	(1.80)	(0.12)
Share protected within 1/10mile	54.876	-24.944	33.619	23.660
	(3.83)**	(1.42)	(3.20)**	(2.32)*
Share of land protected x dummy after 2001				-2.724
				(0.23)
Year of sale fixed effect	YES	YES	YES	YES
Quarter of sale fixed effect	YES	YES	YES	YES
Economic area fixed effect	YES	YES	NO	YES
Neighborhood fixed effect	NO	NO	YES	NO
Constant	217.515	216.951	198.664	212.988
	(11.29)**	(10.37)**	(7.57)**	(10.68)**
Observations	11551	11551	11551	11551
R-squared	0.61	0.60	0.68	0.60

Robust t statistics in parentheses; * significant at 5%; ** significant at 1%