Do Homebuyers Value Low Density Housing and Protected Open Lands: Evidence from Colorado Mountain Communities[§]

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Zoning is often pursued by homeowners seeking to protect themselves from the subsequent introduction of a disamenity on neighboring properties that may negatively affect their home values (Fischel 2001). However, in the many communities the feared disamenity, is not industry or commercial land uses, but simply other housing. absence of zoning protections, developers can mimic these safe guards through restrictive covenants Siegan (1970), and homebuyers can seek out locations near land that is protected from development because of government ownership or the existence of conservation easements, Walsh (2003). We examine the home prices and development activity in several communities in the mountains of Colorado in which the feared disamenity may be additional housing developments. We go on to explore the unsuccessful efforts to pass binding growth management legislation in 2001. The analysis incorporates GIS to construct several novel right hand side variables including the *share* of housing protected or developed land within a given buffer distance of homes which are included in a hedonic regression framework. Our initial findings are that homebuyers are willing to pay a premium for houses near but not adjacent to protected or conserved land. We also find that homes with a higher share of protected land around them were worth more when there was an increased likelihood that the state would place constraints on rural development.

[§]PRELIMINARY FINDINGS/DRAFT, DO NOT CITE WITHOUT THE CONSENT OF THE AUTHORS

Introduction

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 but that may not be closely tethered to existing employment centers. However, too much development in the resort type communities may threaten the very amenity that brings people to these areas in the first place. This paper utilizes a rich dataset of housing attributes, an inventory of all built structures, GIS software of parcel and building location, and an originally assembled list of conservation easements and other protected land to identify the effects of housing density and preserved open space on home prices in Eagle County Colorado.

Where the potential dangers posed by development to wildlife habitat, agricultural communities and water quality have been recognized, several approaches are used to preserve land from development. Many state and local governments and not-for-profit organizations purchase rural land or the development rights to rural land.[1] A select number of states, including Oregon and Washington, limit the ability of rural landowners to subdivide or build multifamily housing on their land in an attempt to preserve open space. They also attempt to prevent the extension into rural areas of infrastructure (particularly roads and sewers) that could support urban densities. In other instances, local governments 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.

[1] For example, the Nature Conservancy and the American Farm Land Trust.

While these efforts may be motivated by altruism or the value people derive from the land in its current state, they also create, or preserve, an open space amenity that may be valued by homebuyers.[2] 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 (GIS) parcel records to calculate surrounding densities of development and the *share* of the land protected from development in the proximity of a home. This strategy allows us to identify whether the market perceives and values open space that is shielded from future development.

We go on to examine whether the creation of a conservation easement affects the values of homes on neighboring parcels. Finally, we examine a prospective growth management reform that almost passed in the state legislature in 2001, to assess whether comprehensive planning and zoning are substitutes or compliments for other types of land protection.

We find little evidence of a market penalty for neighborhood density, if the total land coverage is small. However, homes that are surrounded by dense housing at

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

distances beyond .25 miles do trade at a discount. Controlling for existing unit density, we find that there actually appears to be a discount in the market for having a large share of protected open space from 0 to .25 miles, but that there is a sizable premium for having protected land beyond that. The findings with respect to density and protected open land tend to bolster the case for clustered development, (in some cases a PUD) in which housing is built fairly close together, but is also surrounded by open space.

Using a better identified, though less inclusive specification we do find that the creation of a conservation easement raises neighboring house prices. Finally, the proximity to protected open land becomes more valuable with the prospect of growth management.

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. Section V then examines the implementation of conservation easements in a difference in differences framework. Section V also explores the state of Colorado's attempt to impose growth management. 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. Then, 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 challenge, there is limited political support for such action. This is

evidenced by the recent property rights initiative passed (though later declared unconstitutional) in Oregon, that attempted to compensate owner of rural land that were affected by the 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.[3] We examine the legislative process in more detail in section VI.

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."

[3]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).

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 there customers with secure open space. They can seek out parcels for development near already protected lands, set aside some of their developable land as open space (perhaps by clustering housing on one section of the property) and either donate the undeveloped to a land trust or give it the homeowner's association of the ultimate community, or persuade (induce) owners of land near their development to grant a conservation easement.

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 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 estimator of the 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, 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. Specifically, we count the total number of housing units at four different ranges from each parcel: buildings on adjacent properties, and the number of housing units per acre between 0 and .25 miles from a home, between .25 and .5 miles and between .5 and .75 miles. 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 divide the total number of housing units by the total land area at each buffer range. Note that because distance is measured from the sold property's edge, it is approximately a ring shape, but varies modestly based on the shape of the underling parcel. If there are multiple housing units on a parcel that is only partly intersected by a given range, units are included based on proportion of overlap. i.e. if 4 housing units are on a parcel that is covered by 50 percent of the distance band to a reference property, then only two units will be counted. As there has been considerable development in this area over the last decade, we use the year of construction variable, as tracked by the assessor's office in 2005, to infer the level of development in earlier years. To do this, we assume that all development between 1995 and 2005 occurs on formerly, undeveloped land, that is, that there are no tear-downs. Summary statistics for the density measures are presented in Table 1.

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 (unclear).

Specifically, we identify land that is considered national wilderness (though it remains US Forest service owned land), state wildlife land and land that is owned by a municipal water and sanitation entity. As much of the land in this area is mountainous, these lands are maintained as collection basins to feed reservoirs for cities as far away as Colorado Springs and, given the scarcity of water in the west are unlikely to ever be developed.

We also identify property that is owned outright by any conservation fund that is known to be operating in Eagle County. We use records from the county Clerk and Recorder's Office to identify private land which has been donated or sold as a conservation easement to a land trust. In all, 23 transactions, involving 29 land parcels were identified from 1995 through 2005 covering a total of 1415 acres. In addition, 9 outright parcel sales to conservation entities, totaling 221 acres were also identified. A map showing the location of each easement is presented in Figure 1.

Finally, in a separate specification, we consider land designated as homeowner's association land protected from development. We believe this that these plots are 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. They may also have been created by a Planned Unit Development (PUD) agreement.

Other parcel characteristics included in the analysis are: the size of the property's lot (in acres); and the linear distance to the nearest town (measured as distance to the city or town hall). We also include measures of individual house characteristics, including total living area square footage, the total number of bedrooms, bathrooms and garage

parking spaces and the properties age (what does age mean?) as determined by the local MLS at the time of sale.[4]

Our purpose is to examine how proximity to conservation land influences the market price of owner-occupied housing in Eagle County, Colorado. Market prices for owner-occupied housing in Eagle County exhibit significant spatial variation with 2006 Vail/Beaver Creek condo prices (not used in this analysis) exceeding $2,000 per square foot while condo price in Avon, only 20 miles from Vail, in the $300 per square foot range. The price difference between Vail and Avon can be attributed to a variety of characteristics: distance to the ski lift (Vail is ski-in/ski out while Avon is not), distance to golf courses, distance to downtown recreation amenities (e.g. restaurants), and the availability of land for residential development.

The empirical analysis is conducted using about 2,500 single-family home transactions from the MLS that were successfully assigned to a submarket and could be matched to assessor office maintained parcel and building files. Sales are from the start of 1995 through July 2005. Prices for owner-occupied housing varied substantially over this period, both temporally and spatially. To control for the spatial variation in the price of owner-occupied housing, we segmented the single-family housing markets into submarkets according to 2005 per square foot prices and location. This market segmentation produced four single-family submarkets. The communities identified each of the submarkets are provided in Appendix Table 2.

We then constructed house price indices for each submarket. The price indices are chained hedonic house price indices. The hedonic specification relates the log of transaction price to property characteristics (dwelling size, dwelling age, number of

[4] Missing MLS values were updated using the Assessor's building description file extracted in 2005.

bedrooms, bathrooms, type of garage and sale quarter). Since the hedonic coefficients for these characteristics are unlikely to remain stable over a decade, hedonic coefficients are estimated separately for adjacent year pairs (1995-1996, 1997-1998, etc.) and the resulting price indices are chained together to yield estimates of the changes in the market prices of owner-occupied housing, by submarket, for Eagle County over the 1995-2005 period. Figures 1 illustrate the submarket specific chained price indices for single-family properties.

We examine the influence that proximity to conservation land has on owner-occupied housing prices in two ways: one that relates the time-adjusted transaction price to property characteristics (including surround conservation trust land) and a second specification that relates the observed price to property characteristics including the sale year.

Sales were matched to parcel descriptions using a common schedule number. We remove observations that contain missing values or are in some way problematic, as well as observations that are within 3/4 of a mile of the county boundary.[5]

IV. Findings

We employ the standard semi-log functional form in which the natural log of the marked-to-market (2005) price is regressed on an intercept, a vector of building characteristics, X_{it}, a vector of lot characteristics, L_{it}, a vector of surrounding existing development density at four different distances, N_{it}, share of surrounding land that is

[5] 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.

protected from development at three distance bands, C_{it}, a fixed effect for each of the four submarkets (k) and an error term. The formal specification is provided below.

$$\ln(p_{it}) = \beta_0 + X'_{it}\alpha + L'_i\delta + N'_{it}\gamma + C'_{it}\phi + F_k + \varepsilon_{it} \quad (1)$$

Individual single family homes, indexed by i are sold at time t. Note that building age and distance to the nearest town are also included as quadratics, and lot size is logged.

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. The price of a home falls with its age but at a decreasing rate. Property value rises with the number of bedrooms, bathrooms and parking spaces. Property value also increases with lot size. One peculiar finding is that property values appear to rise with distance from town (though at a decreasing rate). Recall from the standard monocentric model, that we expect quality-adjusted house prices to fall with distance from employment centers, however in this specification properties appear to be most valuable 7 miles outside of town. This is perhaps our first indication that a taste for low density housing in this area may dominate the employment and consumption agglomerative effects found in urban centers.

Having established a baseline model of property prices, we incorporate our measures for surrounding development density. Higher surrounding density on adjacent land does appear to affect house prices, and higher density within a quarter of a mile of sold home is actually associated with higher house values. This may reflect a highly localized amenity, such as road access that is not captured in the model.[6] Beyond a quarter of a mile however, increased density appears to be associated with lower housing

[6] In this draft, no attempt has been made to incorporate spatial weights to address spatial autocorrelation.

values. Increasing surrounding density at a distance of 0.25 miles to 0.5 miles by one standard deviation is associated with a 16 percent decline in single family house price. An increase of one standard deviation at 0.5 to 0.75 miles is associated with a decrease in price of 10 percent. The combination of these findings would also appear to endorse one of the

We next turn to the value of having a home near land that is well protected from future development. That is, controlling for existing development density, how important is it that existing open space is shielded with development. The results are provided in Column 3 of Table 2. Our measure of proximity to protected land is the share of land at three different distance bands that is shielded from development through government ownership, conservation organization ownership or through the granting of a conservation easement. Higher levels of conservation within 0 to .25 miles of a parcel are associated with lower single family house prices. This finding contravenes our expectations as did the seeming density premium at similar distances.

One challenge to this analysis, is that water containment basins, wildlife areas and land worthy of conservation may not be exogenously determined. Wildlife, almost by definition, does not readily coexist with housing. Thus, housing with high levels of exposure to conserved land may also be highly inaccessible, or otherwise less desirable. However, at less immediate proximities, from 0.25 to 0.75 miles, increasing protected land is associated with higher property values. Increasing the share of land subject to government ownership or conservation at a distance band of 0.25 to 0.5 by one standard deviation is associated with an 8.6 percent increase in single family housing prices. At a distance from 0.5 to 0.75, an increase of density of the same magnitude is associated with

an increase of price of 7.1 percent. Another possible explanation for these findings is that much of this protected land consists of easements on working farms and ranches. While it may be attractive to look at these lands from afar, immediate proximity may include exposure to early morning tractor sounds and animal odors and sounds.

One concern is that the chain-weighted price indexes that allow for changing hedonic values of housing and parcel attributes, such as lot size may be capturing the changing levels of land protection. As a robustness check, we also use the simple real price, with year fixed-effects. While this specification yields less precise estimates (the R-square is .77 versus .87 with the indexed prices), the parameter estimates are quantitatively similar. The results with the alternative specification are presented in column 4 of Table 2.

As discussed in the preceding section, the housing markets in Eagle County are highly bifurcated. In submarkets 1 and 2, which incorporate the ski resorts of Vail and Beaver Creek the mean price of a single family home is 3.4 million and 1.4 million respectively. As an additional robustness check, we re-estimate the same model by submarkets. Table 3, provides the results when estimated by each submarket. The results with respect to density measures vary somewhat with market at the 0 to .25 mile range, but beyond this distance, higher density is associated with lower home values. The exception is submarket 4, the most affordable, where the effect of higher density is smaller and not significantly different from 0. Though the parameter estimates are in many cases larger at greater distances, the standard errors also increase such that in many instances, statistical significance is lost. Indeed, only in submarket two, the one for which we have the most single family sales is protected land associated with statistically

significant higher single family house prices, and then only from .5 to .75 miles. Also, the effect of having a high share of protected land in submarket 1 remains negative until half a mile. Finally, there is no protected land in the immediate vicinity of homes sold in submarket 4.

It is also unclear, whether homebuyers are more concerned with congestion or visual clutter. As a separate check, we re-run the analysis using hundred of building square footage per acre. The results form this specification are provided in column 1 of tables 4. The signs of the parameter estimates are qualitatively, similar as the surrounding unit specification.

We then attempt to determine whether homebuyers prefer some legal distinctions in the type or nature of shields against development. We repeat the analysis above separating out only land that is designated as watersheds and national wilderness, from land that has an easement or is owned outright by a land trust. Columns 2 and 3 of table 3 provide estimate for government and land trust easement. Homebuyers do not appear to place a similar premium on having a high share of easement land near them. 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 government land is qualitatively different from other type of land. National forest land for example, may be accessed by the public, while, farm land with an easement may not be. However, the relative scarcity of easements, especially for sales in the beginning of the period analysis, leave only

If homebuyers truly do value proximity to open space, developers can provide it within the subdivision and then hand it over to the homeowner's association.

Alternatively, local zoning authorities can require open space set asides as par of a Planned Unit Development (PUD) agreement, which tends to supersede any existing zoning, and appears to be a popular development tool in the area. Column 4 of Table 3, provides the parameter estimates of the share of undeveloped land that is owned by a homeowners association and column 5 provides the parameter estimates when all three types of protected land are combined. Note that homebuyers appear to value this protected land similarly as they do government protected land.

V. The Treatment Effect of Gaining a Conservation Easement

One of the obvious challenges to the tests described in the preceding section is that there are unobserved features of the landscape and man-made amenities that are correlated with our independent variables of interest. For example, if more desirable land for housing is developed first, then land that is ultimately subject to a conservation easement (and the existing homes near it) may be, in unobservable ways, less desirable as well. This may bias downwards our estimates of the importance of land conservation to house prices. To address this concern, we specifically look at home sales in the immediate vicinity of an easement before and after it is granted. This allows us to identify the treatment effect of being near a conservation easement. Adapting the specification in equation (1) to yield a simple a dummy variable for proximity (within half a mile) to an easement results in the following specification:

$$\ln(p_{it}) = \beta_0 + X'_{it}\alpha + L'_i\delta + N'_{it}\gamma + F_k + \lambda_1 d_i^{ease} + \lambda_2 d_i^{ease} \times d_{it}^{postgrant} + Y_t + \varepsilon_{it} \quad (2)$$

Where the dummy variable, d_i^{ease}, identifies all sold homes that eventually obtain an easement within half a mile of them and the dummy variable, $d_{it}^{postgrant}$, identifying sales that occur after the granting/sale of the nearest easement. The specification also includes a vector of year fixed effects to absorb all purely inter-temporal variation in house prices.

The parameter estimates from this initial specification are provided in column 1 of Table 5. Note that, consistent with the concerns discussed above, houses near an ultimate conservation easement trade at a relatively lower price than other homes, as evidenced by the negative parameter estimate on $\hat{\lambda}_1$. However, after the granting of the easement, homes near the land with an easement are worth relatively more than they were before. The parameter estimate on the interaction of $d_i^{ease} \times d_{it}^{postgrant}$, $\hat{\lambda}_2$, is positively and statistically significantly different from zero at the 5 percent level (assuming a two-sided test). In economic terms, this means that being near a newly created easement is associated with a 22 percent increase in home value.

While the specification above controls for time invariant unobserved heterogeneity, it does not control for the underlying endogeneity of the easement market. Owners of land in Colorado receive a tax credit (one that became tradeable after the smart growth special session of 2001) based on the value of the development rights they have surrendered. Thus, the supply of easements may very well be higher in areas with more desirable housing. Another concern is that conservation land trusts are more likely to buy land or easements in areas that are threatened with development. Thus, areas that became more attractive for housing between 1995 and 2005 may also have attracted more easements. In a second specification, we allow areas within a half mile of an ultimate easement to have a separate linear trend in house prices. That is, we interact time

(measured in months since the start of 1995) with the dummy indicator for proximity to an eventual easement, d_i^{ease}. Thus if house prices near an eventual easement are growing faster over time, then this interaction should absorb the effect. Thus the treatment effect of easement proximity is identified solely by any non-liear shift in house prices around the granting of the easement. While the inclusion of the easement specific trend does lowers the parameter estimate of $\hat{\lambda}_2$ slightly and leaves it significant only at the 6 percent level, the positive treatment effect of the easement remains, as is evident in the parameter estimates presented in column 2 of Table 5.

A final concern may be that some easements may occur near the beginning or end of our period of analysis, leaving insufficient sales pre or post easement to establish much of an effect. To address this possibility, we repeat the analysis, but exclude all sales whose nearest easement was granted in the first two or and last two years. Restricting the sample in this way lowers our sample size by almost 500 observations but does but actually increases our estimate of the treatment effect of easement proximity. The results are presented in column 3 of Table 5.

VI. Comprehensive Planning, Open Space and Land Values

In January 2000, Colorado's governor, Bill Owens, called for the implementation of growth management in Colorado as part of his "Smart Growth Initiative". Specifically, he hoped to mandate that large and/or fast-growing communities engage in comprehensive planning, and that the resulting plans had to have the force of law. Comprehensive planning is a political means of attempting to incorporate land use and density decisions with existing and planned transportation and other infrastructure

capacity. These plans also distinguish areas intended for development from areas that are to be kept rural or agricultural. More specifically, a rural or agricultural designation implies that land in this area may not be subdivided into small lots, and that city infrastructure such as water, sewer, and road capacity will not be extended to these areas.

In September 2001, Governor Owens called a special session of the state legislature to address his Smart Growth Initiative. Several pieces of his agenda passed, including increased state tax credits for conservation easements, and compelling local governments to engage in comprehensive planning. However, the legislature failed to give the resulting comprehensive plans the force of law, making them only advisory documents. If the housing market believed that there was, in the days leading up to the special session, a chance that the legislature would impose growth development restrictions, this may have been reflected in existing house prices. Specifically, if open space is a valued amenity and the state was likely to preserve that amenity by shielding existing homes from subsequent development, this prospect should have raised house prices. Indeed, returning to Figure 1, it does appear that there is a local maximum in house prices after the announcement of the initiative for three of the markets.

To test the effect of the anticipated law, we first control for the overall effect of time using a three segment spline to allow the effect of time on housing prices to vary in different periods of time. The first segment captures the pre-reform period from beginning of our sample in January 1995 to the announcement of the initiative in January 2000. A second segment captures the period of time when reform was imminent –from the beginning of January to the culmination of the special session in September 2001. The final segment covers the post-session period when it became clear that the initiative

would not be enforces, up to July 2005. We then interact the spline with our measure of surrounding protected land to see whether the prospect (or threat) of growth management disproportionately affected homes that already had some secure open space around them. Again we adapt the existing specification, by including the linear spline terms, S^t, with our previous measure of share of land protected from development.

$$\begin{aligned}\ln(p_{it}) = {} & \beta_0 + X'_{it}\alpha + L'_i\delta + N'_{it}\gamma + F_k \\ & + \theta_1 S_t^{pre} + \theta_2 S_t^{during} + \theta_3 S_t^{post} \\ & + \rho_1 S_t^{pre} \times Conse_{it} + \rho_2 S_t^{during} \times Conse_{it} + \rho_3 S_t^{post} \times Conse_{it} + \varepsilon_{it}\end{aligned} \tag{3}$$

Examining just the parameter estimates on the spline terms (column 1 of Table 5) does reveal that while the indexed prices do not increase with time before and after the period of contemplated reform, they rise when the legislation was active. This is consistent with homebuyers in the area being aware of the potential law changes.

Having controlled for the direct effects of time, we then interact the spline terms with our measures of protected land (government owned and easement land) to see whether proximity in open land is indeed a substitute for comprehensive planning. If homebuyers view restrictive development zoning as alternative mechanism for securing their low density amenity, then the prospect of growth management may have made proximity to existing protected lands less desirable. When we examine the parameter estimates on the interacted term we find that single family homes with a large fraction of surrounding protected land (at distance bands of .25 to .5 miles and .5 to .75 miles) do not change in value with the passage of time pre-announcement, but actually rise in value over time during the reform period. They are relatively unaffected in the post-reform period. These findings, provided in columns 2 and 3 of Table 5 suggest that proximity to protected land and growth management are complements, not substitutes. This might be

the case if the amount of protected land in an area increased the prospect of receiving a low-density designation in the comprehensive planning process and thus further secured the home's low density amenity.

Perhaps the most secure method of protecting oneself against unwanted development is simply to own more land outright. When homebuyers calculate their taste for access to undeveloped land, publicly protected land may also be a substitute for private land. If this is the case, homes on large lots should be worth relatively less in the presence of restrictive zoning. What we find, presented in Table 5-column 4 is largely consistent with this hypothesis. While the relative value of large lots does not change over time in the pre-reform period, they do become relatively less valuable in advance of the special session. Of course larger lot home may also have had more potential for subdivision and the relative decline in price simply reflects the threaten development rights embedded in the land. Consistent with the hypothesis, large lots begin to modestly increases in relative value after the threat of comprehensive planning passes.

VII. Conclusion

In the resort and rural communities of Eagle County, Colorado, densely built housing does not appear to suffer a market penalty if the overall land coverage is small. However, being surrounded by high density housing by more than a quarter mile does result in a market penalty. These findings support our hypothesis that homebuyers value the proximity of protected land, while also preferring access to some amenities of density, consistent with a preference for a clustered type of development pattern. The market appears to value proximity to protected land. Among the various forms of

protection, conservation easements are particularly valued. Homebuyers and developers seem to assess growth management as a complement to other types of protected land.

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Table 2: Single family house price hedonic
Surrounding density and protected lands

	(1)	(2)	(3)	(4)
Variable	Baseline specification	Proximate density bands	Share protected lands	Share protected land with non-indexed prices
Age	-0.005**	-0.005**	-0.005**	-0.009**
	(0.001)	(0.001)	(0.001)	(0.002)
Age quadratic	0.000**	0.000**	0.000*	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Living area (square feet)	0.000**	0.000**	0.000**	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Parcel size (log)	0.133**	0.131**	0.133**	0.116**
	(0.008)	(0.008)	(0.008)	(0.010)
Number of bedrooms	0.025**	0.030**	0.030**	0.018
	(0.009)	(0.009)	(0.009)	(0.012)
Number of baths	0.171**	0.167**	0.158**	0.155**
	(0.007)	(0.007)	(0.007)	(0.009)
Number of garage spaces	0.042**	0.049**	0.048**	0.006
	(0.009)	(0.009)	(0.009)	(0.012)
Distance to town	0.043**	0.007	0.002	0.065**
	(0.010)	(0.011)	(0.011)	(0.014)
Distance to town quadratic	-0.003**	-0.001	-0.001	-0.006**
	(0.001)	(0.001)	(0.001)	(0.001)
Number of adjacent units		0.000	0.001	0.000
		(0.001)	(0.001)	(0.001)
Proximate density (housing units per acre)				
0 to 0.25 miles		0.040**	0.058**	0.053**
		(0.010)	(0.010)	(0.014)
0.25 to 0.50 miles		-0.121**	-0.126**	-0.089**
		(0.016)	(0.016)	(0.022)
0.50 to 0.75 miles		-0.073**	-0.121**	-0.053
		(0.023)	(0.024)	(0.032)
Share protected land				
0 to 0.25 miles			-0.831**	-0.750**
			(0.100)	(0.125)
0.25 to 0.50 miles			0.585*	0.464
			(0.235)	(0.310)
0.50 to 0.75 miles			0.486	1.203**
			(0.287)	(0.375)
Controls				
Sub-market fixed effects	Yes	Yes	Yes	Yes
Year of sale fixed effects	No	No	No	Yes
Constant	13.389**	13.570**	13.804**	13.233**
	(0.051)	(0.058)	(0.065)	(0.093)
Observations	2572	2572	2572	2641
R-squared	0.86	0.86	0.87	0.77

Note: Standard errors in parentheses; * significant at 5%; ** significant at 1%

Table 3: Single family house price hedonic
By sub-market

Variable	(1) Submarket 1	(2) Submarket 2	(3) Submarket 3	(4) Submarket 4
Age	-0.006*	-0.014**	-0.003*	-0.000
	(0.003)	(0.004)	(0.001)	(0.002)
Age quadratic	0.000	0.000**	0.000*	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Living area (square feet)	0.000**	0.000**	0.000*	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Parcel size (log)	0.070**	0.074**	0.151**	0.051**
	(0.025)	(0.013)	(0.010)	(0.009)
Number of bedrooms	0.016	0.074**	0.008	0.006
	(0.024)	(0.015)	(0.010)	(0.013)
Number of baths	0.038	0.112**	0.135**	0.059**
	(0.021)	(0.009)	(0.011)	(0.014)
Number of garage spaces	0.069**	0.036*	0.062**	0.086**
	(0.023)	(0.014)	(0.012)	(0.010)
Distance to town	-0.566**	0.151**	0.169**	0.012
	(0.049)	(0.036)	(0.014)	(0.018)
Distance to town quadratic	0.043**	-0.011**	-0.015**	-0.001
	(0.006)	(0.002)	(0.001)	(0.002)
Number of adjacent units	0.002	-0.002	-0.000	-0.001
	(0.003)	(0.002)	(0.001)	(0.001)
Proximate density (housing units per acre)				
0 to 0.25 miles	0.108**	-0.067*	0.058**	-0.047**
	(0.022)	(0.030)	(0.012)	(0.011)
0.25 to 0.50 miles	-0.133**	-0.351**	-0.063**	-0.042
	(0.044)	(0.037)	(0.017)	(0.024)
0.50 to 0.75 miles	-0.318**	-0.236**	-0.026	-0.074
	(0.058)	(0.048)	(0.023)	(0.042)
Share protected land				
0 to 0.25 miles	-0.749**	-0.456*	-0.257	--
	(0.147)	(0.200)	(0.350)	
0.25 to 0.50 miles	-1.059**	0.954	1.611	--
	(0.361)	(0.588)	(1.034)	
0.50 to 0.75 miles	0.588	2.596**	-2.248	--
	(0.360)	(0.882)	(1.295)	
Constant	15.759**	12.722**	12.511**	12.193**
	(0.183)	(0.156)	(0.050)	(0.060)
Observations	408	1019	643	502
R-squared	0.82	0.68	0.76	0.69

Note: Standard errors in parentheses; * significant at 5%; ** significant at 1%

Table 4: Alternate measures of surrounding development and protected lands

Variable	(1) Building bulk	(2) Just government land	(3) Just easement land	(4) Homeowners association land	(5) All types of protection
Parcel characteristics					
Age	-0.004**	-0.005**	-0.005**	-0.006**	-0.005**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age quadratic	0.000*	0.000**	0.000**	0.000**	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Living area (square feet)	0.000**	0.000**	0.000**	0.000**	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Parcel size (log)	0.136**	0.133**	0.132**	0.132**	0.136**
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Number of bedrooms	0.027**	0.030**	0.031**	0.034**	0.031**
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Number of bathrooms	0.160**	0.158**	0.167**	0.164**	0.155**
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Number of garage spaces	0.046**	0.048**	0.049**	0.049**	0.047**
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Distance to town	0.021*	0.003	0.010	-0.009	-0.012
	(0.010)	(0.011)	(0.011)	(0.011)	(0.011)
Distance to town quadratic	-0.003**	-0.002	-0.001	0.001	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Number of adjacent units	0.001	0.001	0.000	0.000	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Proximate density (surrounding square footage (in hundreds of square feet/ or units, per acre)					
0 to 0.25 miles	0.004**	0.056**	0.039**	0.031**	0.052**
	(0.000)	(0.010)	(0.010)	(0.010)	(0.010)
0.25 to 0.50 miles	-0. 006**	-0.123**	-0.117**	-0.117**	-0.125**
	(0.000)	(0.017)	(0.016)	(0.016)	(0.016)
0.50 to 0.75 miles	-0.005**	-0.120**	-0.066**	-0.060*	-0.109**
	(0.000)	(0.024)	(0.023)	(0.023)	(0.023)
Surrounding protected land					
0 to 0.25 miles	-0.842**	-0.835**	-0.211	-0.922**	-0.731**
	(0.101)	(0.102)	(0.541)	(0.134)	(0.072)
0.25 to 0.50 miles	0.606**	0.600*	0.613	0.825**	0.739**
	(0.232)	(0.243)	(1.349)	(0.232)	(0.166)
0.50 to 0.75 miles	0.290	0.460	2.268	-0.540*	-0.215
	(0.286)	(0.293)	(1.858)	(0.242)	(0.183)
Controls					
Sub-market Fixed Effects	Yes	Yes	Yes	Yes	Yes
Constant	13.745**	13.805**	13.561**	13.636**	13.902**
	(0.064)	(0.065)	(0.058)	(0.059)	(0.065)
Observations	2572	2572	2572	2572	2572
R-squared	0.87	0.87	0.86	0.87	0.87

Note: Standard errors in parentheses; * significant at 5%; ** significant at 1%

Table 5: Proximity to newly Granted Easements

Variable	(1) Within half mile of new easement	(2) Include time trend near easement	(3) Only easements from 1997-2002
Single Family House Characteristics			
Age	-0.008**	-0.007**	-0.009**
	(0.001)	(0.001)	(0.002)
Age quadratic	0.000**	0.000**	0.000**
	(0.000)	(0.000)	(0.000)
Living area (square feet)	0.000**	0.000**	0.000**
	(0.000)	(0.000)	(0.000)
Parcel size (log)	0.137**	0.135**	0.161**
	(0.008)	(0.008)	(0.010)
Number of bedrooms	0.027**	0.029**	0.025*
	(0.009)	(0.009)	(0.011)
Number of bathrooms	0.157**	0.163**	0.168**
	(0.007)	(0.007)	(0.008)
Number of garage spaces	0.037**	0.043**	0.033**
	(0.009)	(0.009)	(0.011)
Distance to town	-0.010	-0.006	-0.009
	(0.011)	(0.011)	(0.014)
Distance to town quadratic	0.001	0.000	0.000
	(0.001)	(0.001)	(0.001)
Number of adjacent units	0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)
Proximate density (housing units per acre)			
0 to 0.25 miles	0.047**	0.045**	0.081**
	(0.010)	(0.010)	(0.013)
0.25 to 0.50 miles	-0.116**	-0.116**	-0.150**
	(0.016)	(0.016)	(0.019)
0.50 to 0.75 miles	-0.097**	-0.089**	-0.074**
	(0.023)	(0.023)	(0.026)
Sales near ultimate easements			
Within half mile of eventual easement	-0.205**	-0.247**	-0.225**
	(0.047)	(0.085)	(0.051)
Within half mile×after easement	0.158*	0.166+	0.175**
(treatment effect of having proximate easement)	(0.073)	(0.088)	(0.079)
Within half mile×linear trend		0.000	
		(0.001)	
Time		0.001	0.000
		(0.001)	(0.001)
Time quadratic		0.000	0.000
		(0.000)	(0.000)
Controls			
Sub-markets fixed effects	Yes	Yes	Yes
Year of sale fixed effects	Yes	No	No
Constant	13.180**	13.001**	13.229**
	(0.085)	(0.085)	(0.085)
Observations	2553	2553	2060
R-squared	0.87	0.87	0.82

Note: Standard errors in parentheses; * significant at 5%; ** significant at 1%

Table 6: Comprehensive Planning and Existing Protected Lands – The Failure to Pass Binding Comprehensive Planning

	(1)	(2)	(3)	(4)
Variable	Time controls	Time and conservation interactions, 25 to 50	Time and conservation interactions, 50 to 75	Time and parcel size interactions
Parcel characteristics				
Lot size (acres/log)	0.135**	0.137**	0.136**	0.156**
	(0.008)	(0.008)	(0.008)	(0.030)
Number of adjacent units	0.000	0.000	0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)
Proximate density (housing units per acre)				
0 to 0.25 miles	0.043**	0.051**	0.048**	0.045**
	(0.010)	(0.010)	(0.010)	(0.010)
0.25 to 0.50 miles	-0.126**	-0.112**	-0.119**	-0.126**
	(0.016)	(0.016)	(0.016)	(0.016)
0.50 to 0.75 miles	-0.084**	-0.098**	-0.090**	-0.083**
	(0.023)	(0.023)	(0.023)	(0.023)
Time measures – 2 kinked linear spline				
Start to announcement (January 2000)	0.000	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Announcement to end of special legislative sessions (September 2001)	0.004**	0.003	0.003	-0.002
	(0.001)	(0.001)	(0.001)	(0.002)
Post-session (September 2001-July 2005)	0.001	0.001	0.001	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)
Share protected land and time interactions				
Share of Land Protected×time period 1		-0.012**	-0.016**	
		(0.003)	(0.004)	
Share of Land Protected×time period 2 (time before the special session)		0.032**	0.047**	
		(0.011)	(0.016)	
Share of Land Protected× time period 3		-0.002	-0.004	
		(0.005)	(0.000)	
Parcel Size×time period 1				0.001
				(0.001)
Parcel Size×time period 2 (time before the special session)				-0.006**
				(0.001)
Parcel Size×time period 3				0.002**
				(0.001)
Controls				
Sub-markets	Yes	Yes	Yes	Yes
Housing attributes	Yes	Yes	Yes	Yes
Constant	13.551**	13.661**	13.635**	13.576**
	(0.062)	(0.066)	(0.066)	(0.068)
Observations	2553	2553	2553	2553
R-squared	0.87	0.87	0.87	0.87

Note: Standard errors in parentheses; * significant at 5%; ** significant at 1%

Table 1: Summary statistics Mean and (Standard Deviation)

	(1)	(2)	(3)	(4)
Variable	Base specification	Total building bulk	Just Easement Land	Homeowner Association Owned Undeveloped Land
Real (2005) single family house price	1,173,811			
	(1,420,331)			
Chain-weighted-index adjusted single	1,301,085			
Family house price (2005)	(1,588,410)			
Age	10.05			
	(15.96)			
Living area (square feet)	3398			
	(2259)			
Parcel size (acres)	.876			
	(3.14)			
Number of bedrooms	3.98			
	(1.09)			
Number of baths	4.04			
	(1.822)			
Number of garage spaces	1.88			
	(0.86)			
Distance to town	4.84			
	(3.86)			
Number of adjacent units	3.81			
	(8.41)			
Proximate density (housing units per acre)				
0 to 0.25 miles	1.203	31.2		
	(1.150)	(19.4)		
0.25 to 0.50 miles	0.673	16.8		
	(.669)	(12.1)		
0.50 to 0.75 miles	0.485	11.8		
	(0.401)	(7.9)		
Share protected land				
0 to 0.25 miles	0.349		0.001	0.346
	(.269)		(.0176)	(0.720)
0.25 to 0.50 miles	0.189		0.001	0.035
	(.135)		(0.010)	(0.070)
0.50 to 0.75 miles	0.078		0.001	0.032
	(0.231)		(0.006)	(0.061)
Sub-markets				
1	410			
2	1019			
3	647			
4	503			
-unmatched	89			
N	2572	2572	2572	2572

Appendix Table 1:
Private Parcels With Conservation Easements or Owned by Land Trusts in Eagle County

	Trust Name	Effective Date	Account No.	Owner/Grantor
Conservation Easement				
1	Roaring Fork Conservancy	6/21/2000	R028142	TOWN OF BASALT
2	Colorado Open Lands	12/26/1997	R006096	BECK, CLAIRE K. - CLAIRE FAUST KEELER
3	Colorado Open Lands	12/26/1997	R006097	BECK, CLAIRE K. - CLARIE FAUST KEELER
4	Colorado Open Lands	2/6/1999	R016470	SCUDDER RANCH LLC
5	Colorado Open Lands	2/6/1999	R016475	SCUDDER RANCH LLC
6	Conservation Fund	7/7/2004	R045507	LEGRANDE BAIR RANCH CO
7	Conservation Fund	7/7/2004	R025984	JAMES CRAIG BAIR RANCH CO
8	Conservation Fund	7/7/2004	R025985	JAMES CRAIG BAIR RANCH CO
9	Conservation Fund	7/7/2004	R043555	JAMES CRAIG BAIR RANCH CO
10	Conservation Fund	7/7/2004	R051943	JAMES CRAIG BAIR RANCH CO
11	Rocky Mountain Elk	12/3/1997	R022692	SAWMILL RANCH LLC
12	Eagle Valley Land Trust	1/28/1998	R048583	WEBSTER, MOLLY M.
13	Eagle Valley Land Trust	1/28/1998	R048584	WEBSTER RANCH LLC
14	Eagle Valley Land Trust	10/5/1998	R055569	DIAMOND S RANCH INC
15	Eagle Valley Land Trust	11/26/2001	R012025	TOWN OF VAIL
16	Eagle Valley Land Trust	11/26/2001	R012650	TOWN OF VAIL
17	Eagle Valley Land Trust	11/20/2003	R629168	WESTERMANN, MARJORIE
18	Eagle Valley Land Trust	12/2/2003	R008078	POTATO PATCH PARTNERS RLLLP
19	Eagle Valley Land Trust	12/22/2003	R051678	REGER, MICHAEL L.
20	Eagle Valley Land Trust	12/22/2003	R051682	REGER, MICHAEL L.
21	Eagle Valley Land Trust	12/22/2003	R051687	REGER, MICHAEL L.
22	Eagle Valley Land Trust	12/22/2003	R051688	REGER, MICHAEL L.
23	Eagle Valley Land Trust	12/31/2003	R054465	BUFFEHR CREEK PARTNERS
24	Eagle Valley Land Trust	12/2/2003	R054466	BUFFEHR CREEK PARTNERS
25	Eagle Valley Land Trust	12/31/2003	R054467	BUFFEHR CREEK PARTNERS
26	Eagle Valley Land Trust	12/2/2003	R054468	BUFFEHR CREEK PARTNERS
27	Eagle Valley Land Trust	12/12/2003	R055860	LEVINE, S. ROBERT
28	Eagle Valley Land Trust	9/13/2005	R057377	EAGLE COUNTY
29	Eagle Valley Land Trust	12/6/2005	R028368	WALDEN, LINDA
Owned				
30	Roaring Fork Conservancy	6/22/2005	R056477	ROARING FORK CONSERVANCY
31	Conservation Fund	unkown	R050651	CONSERVATION FUND
32	Wilderness Land Trust	unkown	R605741	WILDERNESS LAND TRUST
33	Wilderness Land Trust	unkown	R605742	WILDERNESS LAND TRUST
34	Wilderness Land Trust	unkown	R605743	WILDERNESS LAND TRUST
35	Eagle Valley Land Trust	3/13/2001	R012025	TOWN OF VAIL
36	Eagle Valley Land Trust	3/13/2001	R012650	TOWN OF VAIL
37	Conservation Fund	7/7/2004	R056202	UNITED STATES OF AMERICA

Appendix Table 2: Composition of Submarkets by Community

Market 1	Market 2	Market 3	Market 4
Bachelor Gulch	Arrowhead	Avon	Cotton Ranch
Beaver Creek	Berry Creek Ranch	Eagle	Dotsero
Booth Creek	Cordillera	Eagle Ranch	Gypsum
East Vail	Edwards	Eagle Vail	Gypsum Valley
Lionshead	Homestead	Minturn	
Mountain Star	Lake Creek Valley	Wildridge	
Sandstone	West Vail		
Valley Ridge			
Vail Golf Course			
Vail Village			

Figure 1: Eagle County Single Family Appreciation

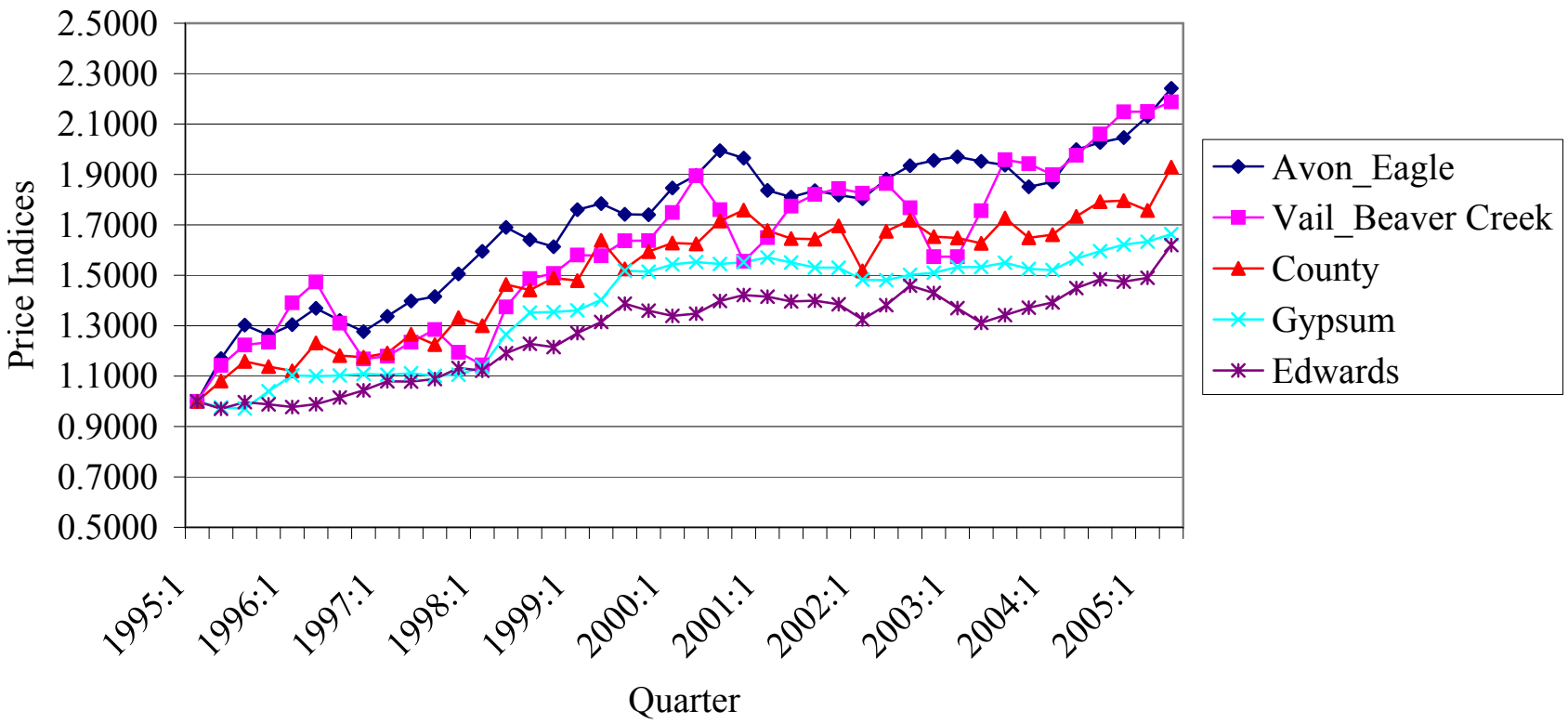

Figure 2: Easement Activity in Eagle County