Purchase of Development Rights (PDR) Programs:

Have We Paid too Much?

Qingbin Wang and Brian Silver

American Agricultural Economics Association
Annual Meeting
July 30 - August 2, 2000
Tampa, Florida

Qingbin Wang is an assistant professor and Brian Silver is a graduate student in the Department of Community Development and Applied Economics at the University of Vermont.

Correspondence to: Dr. Qingbin Wang, Department of Community Development and Applied Economics, 204 Morrill Hall, University of Vermont, Burlington, VT 05405

Phone: (802) 656-4564, Fax: (802) 656-1423, E-mail: **qwang@zoo.uvm.edu**

Purchase of Development Rights (PDR) Programs: Have We Paid too Much?

Abstract

While many states such as Vermont have adopted the Purchase of Development Rights (PDR) programs to protect farmland, few studies have examined how the prices of such development rights are determined and whether the prices are close to the market value. Using data from the state of Vermont, this study first examines the effects of development restrictions on the market price of rural and semi-rural properties and then addresses the question of whether the prices paid for development rights are close to the market value. Our results based on an hedonic model suggest that development restrictions do reduce the market value of rural and semi-rural properties in Northern Vermont but the prices paid by Vermont's PDR programs are significantly higher than the estimated market value.

Introduction

The steady decline in farmland in the US has rapidly emerged as a major concern of the public and policymakers (Daniels, Schnidman et al., Hanley). While the changes in farm land in the state of Vermont and the United States during 1959 to 1992 are presented in Figure 1, it is clear that the loss in farmland is a problem in Vermont as well as in the United States. Although a small percentage of the lost farmland might be converted to wood land, most of the lost farmland has been converted to developed uses such as highway strip centers, shopping centers, office complexes, residential development, and industrial uses. In response to the steady decline in agricultural land, many states have adopted alternative measures such as the purchase of development rights (PDR) programs to protect farmland or at least to slow down the conversion

of agricultural land into development uses (Daniels, Hanley). Public interest in the protection of agricultural land has been spurred by a number of considerations. First, loss of open space to development and the change in rural land uses from working farm practices to non-farm developments threaten to eliminate scenic amenities. Second, farmland conversion has resulted in negative economic consequences for those who depend on agriculture for their livelihoods. Third, in some areas, there is a concern that farmland conversion will be detrimental to the natural aesthetic appearance of the region and thus could cause the loss of environmental quality, tourism income, and natural resource based recreational amenities (Albers). Fourth, the public has expressed concerns over the loss of local food production capabilities and reducing availability of locally grown fresh food products.

Under a PDR program, a conservation agency or land trust purchases the development rights from the landowner and therefore legally protects the land from development although the landowner may continue to use the land for particular purposes such as farming and recreation (Daniels, Wright). In the state of Vermont, the Vermont Housing and Conservation Board (VHCB) has spent about 29 million dollars to purchase the development rights of about 70,000 acres of land since the inception of the state's PDR program in 1987 (VHCB). The PDR programs in Vermont and five other Northeast states have spent a total of almost 400 million dollars since the late 1970s and have protected about 0.24 million acres of farmland (US Bureau of Census). While almost all the PDR programs are funded by a combination of tax revenues, grants and tax-deductible donations, there are two related questions: how are the prices of development rights determined and whether the conservation agencies have paid too much or too little for the development rights? The major objective of this study is to address these two questions using data from Northern Vermont.

In order to minimize the costs to taxpayers, publicly operated expenditure programs such as PDR must be run as efficiently as possible. The programs must also be fair to the landowner who is giving up the "development rights." When the state and private citizens enter into purchase and sale agreements, a price that is fair to both parties must be determined in order to be equitable to both taxpayers and property owners. While the property owner typically attempts to collect the highest price possible from the state, the PDR program managers have a fiduciary responsibility to the taxpayers to negotiate the lowest price they can from the property owner. Because program managers may not have the typical motivations of real property market participants and may not face a typical set of risk factors in their investment decisions regarding development right purchases, one concerns is how to ensure that the public is fairly charged for the purchase of development rights.

Although the regulation and court decisions indicate that the development rights should be purchased at the market value, there is seldom any law that ensures the PDR agencies to compensate the land owner at the market value for the development rights. Unlike many government agencies that estimate market value for the purposes of property acquisition, PDR agencies generally do not have secondary appraisers to review easement appraisals. Although review appraisals have been mandated for the VHCB since 1996 due to the use of federal transportation funds for the purchases of conservation easements, there is no oversight body that has the authority to confirm that these reviews take place.

The lack of a legal mandate to purchase these easement properties at market value and the uncertainty of using review appraisals have brought about some doubt on the reliability of the easement valuations under the PRD programs. While a fair price is important for the taxpayers

and landowners, it is interesting to examine whether the VHCB has paid too much or too little for the development rights under the PDR programs.

A Survey of Professional Appraisers in Vermont

Anecdotal evidence via personal conversations with participants in the development rights market, including VHCB staff, real estate brokers, farm and farmland owners, and professional appraisers, indicated that many of them have the perception of some degree of misvaluation or mispayment for conservation easements on the part of development rights purchasers. In order to more accurately quantify this concern, a brief survey of persons who are knowledgeable with development rights valuations and purchases was developed to determine if this anecdotal evidence merited further investigation.

A survey was developed and sent to certified general appraisers in the state of Vermont in August 1996. The survey was sent to this classification of appraisers because only certified general appraisers are legally authorized to perform development rights valuations. Our mailing list included all the 87 certified appraisers registered with both the Vermont Secretary of State's Office and the Vermont Real Estate Commission at the time of the survey. The survey asked the appraisers questions pertaining to their knowledge about prices paid for development rights by the VHCB and whether they felt prices paid for development rights were reflective of market value for these rights. If a appraiser felt that the purchase prices were not reflective of market value, he or she was asked to indicate if it was higher or lower than the market value. The appraisers were also asked to estimate how divergent, in percentage terms, these prices were from market value in their opinion. Additionally, they were asked at what frequency they felt these development rights purchases were misvalued. The appraisers were also asked to give

specific examples of misvalued purchases. While all the 87 appraisers were sent a copy of the survey, 56 completed surveys were returned, resulting in a response rate of 64.4%. Of those who returned the surveys, approximately 61.4% of the respondents or 39.6% of the total population reported that they were familiar with the PDR programs. Of those who reported being familiar with VHCB purchases, 93.3% reported that they felt these purchases were at least sometimes unreflective of market value for similar properties. As shown in Figure 2, 80% of the respondents felt that the prices paid by VHCB were at least 10% above the market value, 52% felt that these prices were at least 20% above the market value, and 28% felt that these prices were at least 30% above market value. On the other hand, 20% felt that these prices were at least 10% below the market value, 16% felt that these prices were at least 20% below the market value, and 4% felt that these prices were at least 30% below market value. Note that the respondent groups in Figure 2 are not exclusive. For example, appraisers who reported that prices paid by PDR were at least 20% over the market value were also included in the group that reported the prices paid by PDR were at least 10% above the market value.

A total of fifteen respondents also submitted comments. Twelve or 80% of them were from appraisers who responded that the prices for conservation easements were higher than the market value. Comments from respondents who reported overpayments were not only more numerous but also more critical of the problem as compared with the comments from those who reported underpayments. For example, development rights values in rural areas were referred to as "fictional", "unrealistic" or "nonexistent". One appraiser felt that the market was "controlled" by a "small number" of appraisers. A couple of appraisers pointed out on their questionnaires that there can be no such thing as development rights value on farmland or wetlands which are simply unsuitable for building development. Another respondent cited a number of examples

where the VHCB had purchased development rights in areas where there was no evidence that any development rights value existed.

This survey indicates that many professional appraisers in Vermont are concerned about a systematic problem in the valuation of development rights for the VHCB. A majority of the surveyed appraisers believed that the purchase prices of development rights were higher than the market value. These results from the survey suggest that there is a need for further study into the field of development rights valuation.

An Hedonic Model Analysis

An hedonic price model is used to identify the factors that determine the price of rural and semi-rural properties and estimate the market value for development rights. Results from the model are then used to examine the difference between the prices paid by VHCB and the prices estimated from the estimation.

Conceptual framework

Hedonic pricing theory suggests that commodities are composed of a number of attributes, characteristics or traits and that each of these attributes contributes some fractional amount to the total price at which the consumer is willing to pay for the good or at which the supplier is willing to sell the good (Waugh, Goodman, Bowman and Ethridge, Rosen, Griliches). The hedonic model assumes a continuous function relating the price of a good to its various attributes or characteristics and consumers select a particular good by equating the marginal utility of each attribute to its marginal price. To estimate the market value of attributes, the

model obtains a vector of implicit marginal values by differentiating the price (P) with respect to the ith element, z_i, and evaluating the derivative at the level of the attributes purchased or sold. The model can be expressed as:

$$P = f(z_1, z_2, ..., z_n),$$

where P is the price, and z_i is the ith attribute. The hedonic technique obtains observations on prices of a commodity with varying levels of characteristics, attributes or qualities. A regression model is then used to estimate the hedonic price function. The gradients of the hedonic price function are the implicit prices of the attributes, and the ratio of the implicit price of one attribute to another reflects the consumers' marginal rate of substitution between the two attributes.

In this study, it is hypothesized that prices and hence market values of rural and semi-rural real properties are based upon an hedonic function of a number of determinants or characteristics. In simply comparing the price per acre or price per property of conservation easement restricted parcels to similar unrestricted parcels, it is difficult to ascertain if price differentials between the two parcel types are due simply to the development restriction encumbrance. This is because other factors or attributes could be influencing the price in one direction or another. When including conservation easement as a physical characteristic variable, a significant difference between these land use types would indicate the direction and degree of the effect on prices of restrictions on agricultural land. The difference between the contribution of conservation easement encumbered and unencumbered lands should also approximate the market values of the conservation easements themselves.

Hedonic pricing models attempt to predict the value or price of a good based on the contribution of characteristics of that good. In the case of this study, regression analyses have

been conducted to estimate the effects on price of certain characteristics of real properties located in the northern Vermont region.

Data Set and Variables

In order to analyze the effect of conservation easement encumbrances on farm land price levels, a thorough examination of actual sale data of improved farm as well as rural and semi-rural vacant land parcels was undertaken. Data were gathered from a wide variety of sources. These data sources included public land records, town assessment records, town clerk's office files, a number of professional appraisers' files, farm loan company files, Vermont Housing and Conservation Board files, as well as personal interviews and correspondences with property owners and participating parties in sale transactions. Most of the properties were also visually inspected by the second author of this paper over the period from the summer of 1992 to the spring of 1999.

Sale data of farm and farmland are somewhat limited when compared to sale data of other types of properties. These types of property are infrequently sold in comparison to other classes of properties such as small acreage residential properties or building sites. However, sufficient data were found to study specific market reactions to value. Because of the relative scarcity of transactions, the research period includes an extensive time period, from approximately January 1987 through January 1999. The geographical region was limited to northern Vermont counties encompassing Addison, Caledonia, Chittenden, Franklin, Grand Isle, Lamoille, Orleans, Orange, and Washington counties. Sale data were also limited to properties with parcel sizes larger than 25 acres. This size level is considered to be a reasonable limitation. Parcel sizes smaller than this level are generally not considered to be agriculturally viable parcels

in their own right. Parcels smaller than this are generally utilized as small to large rural

residential building lots or similar nonagricultural uses. These parcels are not considered to be in

the same market as the larger agricultural parcels in this study. Parcel sizes ranged from 25 acres

to approximately 579 acres.

Two classes of properties were examined in the overall analysis: improved farm

properties including barns, dwellings and outbuildings, and vacant land parcels. Vacant land

portions of improved farm properties typically contribute a significant portion to the total farm

asset value. Stand alone vacant land properties and vacant land portions of improved farm

properties are generally considered to be comparable to one another, competitive and have

similar highest and best uses. It was therefore considered to be reasonable to analyze vacant land

parcels as improved farm parcels with no contribution of value from land or building

improvements. Farm properties also display wide degrees of variability as to characteristics,

particularly in the areas of building and land improvements, land classes and locational

influences. However, the data were considered to be extensive and conclusive enough to identify

certain market reactions.

A total of 276 transfers of improved farm parcels and vacant land parcels which occurred

between April 1987 and December 1998 were found in the data search. It is recognized that this

is not a complete and comprehensive list of all agricultural real property transactions within the

study geographic area and time period. Of these transfers, 91 or approximately 33.0% were

improved farm properties and 185 or approximately 67.0% were vacant land parcels.

Nearly two-thirds of the collected data consisted of unencumbered vacant land, while an

additional one-quarter of the sales were unencumbered parcels with buildings. Less than 10% of

the collected sales were of either improved or unimproved encumbered properties. This is due primarily to the rarity of sales of encumbered properties.

Physical, socio-demographic as well as locational data associated with each sale were compiled. A time variable was also included within a sale date index. The selected variables were thought to be factors that influence the value of agricultural lands in the study area. Similar variables have been utilized in many previous studies. A summary of the variable names and a brief description of the variables are reported in Table 1.

Regression Models and Results

While the dependent variable is the price, independent variables are divided into several broad categories: time, physical characteristics, geographic location, and the socio-demographic characteristics associated with the area population. This can be expressed in the following function:

$$\text{SP} = f\,(\text{T, P, S, L})$$

where SP is the sale price, T is time, P is a vector of physical characteristics, S is a vector of sociodemographic characteristics, and L is a vector of locational characteristics.

While several regression models were estimated and tested, the estimation results of these models are not reported in this paper. For the major purpose of this study, the market value of development rights are estimated using a selected regression model and the results are reported in Table 2. It is clear that the average price paid by VHCB for development rights in Northern Vermont is significantly higher that the average market value estimated from the regression

model. This is true in terms of per property or per acre. Detailed results of the regression models and estimation are available from the authors.

Conclusions and implications

Five major conclusions can be drawn from this study. First, there is a concern by professional appraisers that there is systematic misspending by the VHCB. The survey conducted indicated that nearly all of the appraisers with knowledge of VHCB spending believed that the agency was not paying market value for development rights. The majority of these respondents felt that the agency was spending too much for the conservation easements. It can be concluded from this survey that there is a need for further investigation into the spending habits of VHCB.

Second, the results of the regression analyses indicate that the VHCB has historically spent in excess of market value as estimated by the regression models in this thesis. Considerably more acreage and a larger number of properties could have been protected with conservation easement restrictions had the VHCB paid closer to market value levels.

Third, it appears that encumbered wooded land is not effected by encumbrances of conservation easements to a great degree. This is likely due to the fact that many wooded land acreage located on farm parcels are unlikely to witness any development in the near future.

Fourth, the percentage difference in prices per acre due to conservation easement encumbrances appears to be larger than the percentage difference in prices per property due to conservation easement encumbrances. If easement prices are based on a percentage difference per acre, rather than a percentage difference per property, easement price could be easily inflated.

Fifth, other property characteristics have a significant impact on price levels. For example, stanchion barns seem to add considerably less per animal unit than do the more efficient freestall barns. Dwellings and outbuildings add to prices, with dwellings contributing two to three times the values that outbuildings add. Land capability classes have a significant impact on property values, with development capability being the more influential of the two classes. Sociodemographic characteristics also contribute significantly to prices. Population and per capita incomes showed positive relationships to sale price per property. Per capita income seems to have a slightly higher impact on sale price than populations. Locations of properties did not yield statistically significant results.

Purchases of development rights at prices above market value, contrary to public policy, have likely been engaged in by state funded PDR programs, particularly the Vermont Housing and Conservation Board. There are several policy implications indicated by this behavior. First, the citizenry may, indeed, wish to pay more than market value for these development rights. There are many reasons why a government agency might want to pay additional amounts over market value for conservation restrictions, as has been discussed in earlier chapters. State funded PDR programs that maintain that they will purchase development rights at market value must be diligent in their fiduciary responsibility to taxpayers and make certain that these purchases are made at market value. The alternative to this approach would be to change public policies, and allow state funded PDR programs to purchase development rights at a level above market value. Some percentage premium could be agreed upon via traditional political mechanisms. Indeed, this level of spending may be necessary for such programs to attract a sufficient number of contributors. However, there is little that can be gained by purchasing these development rights at an above market value level, while claiming market value purchases.

Second, the citizenry may wish to continue the policy of paying market value for properties. If the policy of purchasing development rights at market value is to continue, then a thorough review of appraisal practices utilized by state funded PDR programs should be encouraged. It is not enough for these agencies to merely place the onus of review on appraisers alone. Although an argument can be made that PDR program personnel do not have the expertise to review the appraisals that they have commissioned themselves, this does not excuse them from their fiduciary responsibility to spend public funds efficiently. Although inflated values are likely derived from appraisals written for PDR programs by private appraisers, it is the duty of the PDR program to make certain that these appraisals are indeed reliable.

Third, in order to determine if these appraisals are reliable, constant review of the appraisals utilized by the agencies should be implemented. All appraisals should be subject to review by at least one other appraiser. One of the respondents to the Certified General Appraiser Survey in this report claimed that a small number of appraisers controlled the market for development rights. This claim should be investigated. If only a small number of individuals are writing these inflated appraisals, then the pool of qualified appraisers should be expanded. More funds should be dedicated to the appraisal costs of conservation easement acquisition. Although appraisals can be very expensive, as much as $6,000 to $7,000 on a very extensive project, this high cost is dwarfed by the potential average overpayment of approximately $87,000 per project as indicated by these results.

Fourth, it may also be in the interest of to publicly funded PDR programs to require that some personnel on staff attend valuation seminars or classes which include instruction as to appraisal procedures, terminologies, methodologies as well as Uniform Standards of Professional Appraisal Practice (USPAP). Additionally, the Internal Revenue Service should be encouraged

to examine appraisals of development rights donations utilized for tax reduction purposes more
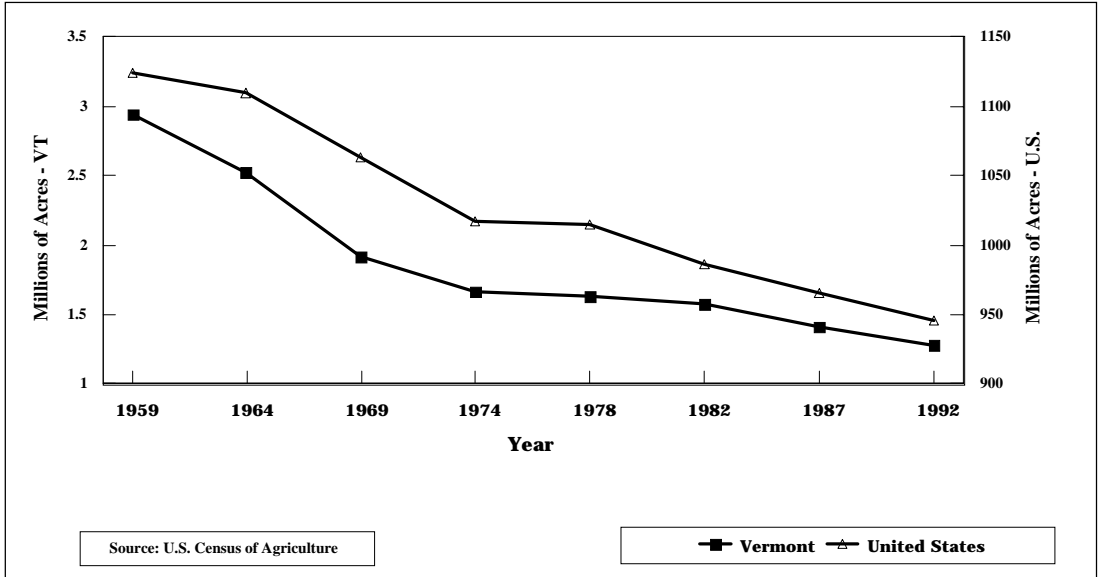
thoroughly.

Figure 1. Changes in farm land in the state of Vermont and the United States, 1959-1992
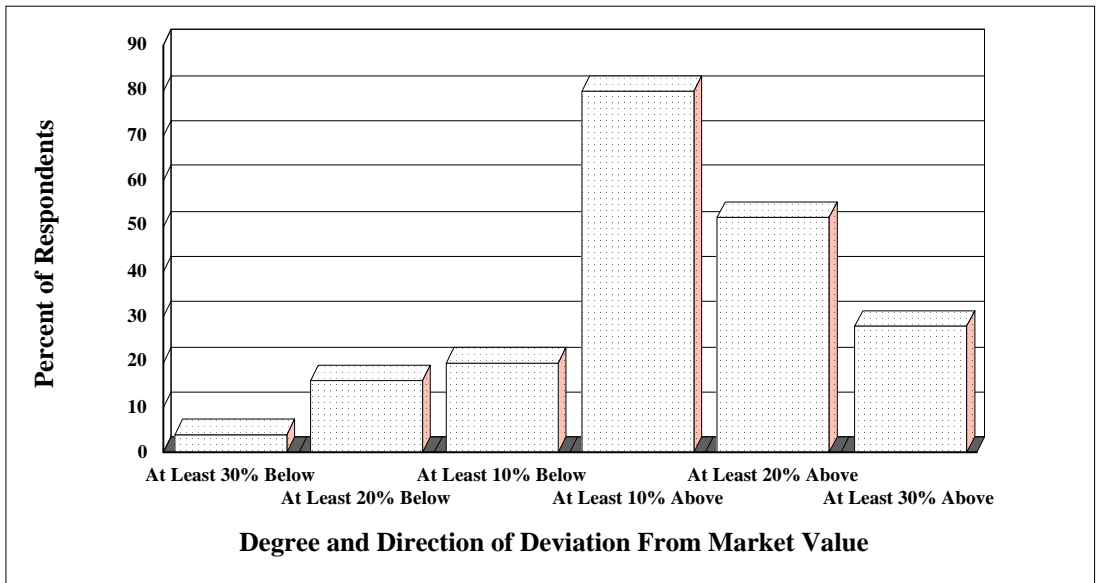

Figure 2. Perception of professional appraisers regularding the prices of development rights paid by VHCB

Table 1. Variable names and descriptions

Variable	Full Name	Description
SP*	Sale price	Sale price
SPPA*	Sale price per acre	SP / TAC
SDIND	Sale date index	Dates numbered by month
SBS	Stanchion barn size	Number of animal units capacity
FBS	Free stall barn size	Number of animal units capacity
TBS	Total barn size (SBS + FBS)	Number of animal units capacity
BQI	Barn quality index	Index, 1 to 5, 1=poor, 5=excellent
UPRIGHT	Number of upright silo units	1 unit = 15,000 cubic ft.
BUNKER	Number of bunker silo units	1 unit = 15,000 cubic ft.
TSILO	Total number of silo units	UPRIGHT + BUNKER
DS	Dwelling size	Size in square feet gross floor area
DQC	Dwelling quality & condition index	Index, 1 to 5, 1=poor, 5=excellent
DSQI	Dwelling size & quality index	DS × DQC
OBN	Number of outbuildings	Square feet area of all outbuildings
OBQC	Outbuilding quality & condition index	Average of outbuilding quality index
OBQCNI	Outbuilding size/quality/condition index	OBN × OBQC
AWS	Animal waste storage	1= present, 0 = none
TAC	Total acreage	Total number of acres
BSAC	Building site acreage	Total building site acreage
UNENCVL	Unencumbered vacant land	Total unencumbered open land acreage
UNENCWD	Unencumbered wooded land	Total unencumbered wooded land
ENCVL	Encumbered vacant land	Total encumbered open land acreage
ENCWD	Encumbered wooded land	Total encumbered wooded land
TOTUNENC	Unencumbered acreages	Total unencumbered acreages
TOTENC	Encumbered acreages	Total encumbered acreages
LCAG	Land Class – Agriculture	Capability classes (1 to 11)
LCDEV	Land Class – Development (Septic)	Capability classes (1 to 6)
LCI	Land Class Index	LCAG × LCDEV
CHIT	Chittenden County	1 for Chittenden and 0 otherwise
ABUTCHIT	Abutting Chittenden Country	1 for abutting Chittenden
AWAYCHIT	Away from Chittenden County.	1 for away from Chittenden
TOWNSIZE	Town Size	Town size in square miles
TOWN90	Town population in 1990	1990 Town population
TOWN90SQ	Square of town population in 1990	TOWN90 * TOWN90
PERCGR	Percent town population growth	1980-90 town population growth rate
TOTARPOP	Area population	Town & abutting towns population
DENS80	Town population density, 1980	1980 Town population density
DENS90	Town population density, 1990	1990 Town population density
DENSCHNG	% change in population density	Change in 1980-90
DENSCHNGSQ	Square of DENSCHNG	DENSCHNG * DENSCHNG
PERCAPINC	Per capita income	1990 Town per capita income

Table 2. A Comparison between the estimated market value and the price paid by VHCB for development rights

	Average Prices Paid by VHCB	Estimated Market Value	Difference in Dollars	Difference in Percentage
Value of development rights per acre	$416	$252	$164	39.4%
Value of development rights per property	$142,620	$55,000	$87,620	61.4%

References

Albers, Jan, *Hands on the Land: A History of the Vermont Landscape*, MIT Press, February 2000.

Daniels, Thomas L. "The Purchase of Development Rights: Preserving Agricultural Land and Open Space." *Journal of the American Planning Association* 57 (1991): 421-31.

Goodman A. "Andrew Court and the Invention of Hedonic Price Analysis." *Journal of Urban Economics* 44 (1998): 291-198.

Griliches, Z. "Hedonic Price Indexes for Automobiles: An Econometric Analysis of Quality Change." Government Price Statistics, Hearings, Subcommittee on Economic Statistics, Joint Economic Committee, 1st Session, United States 87th Congress, May 1961.

Hanley, Nick, Hilary Kirkpatrick, Ian Simpson, and David Oglethorpe. "Principles for the Provision of Public Goods from Agriculture: Modeling Moorland Conservation in Scotland." *Land Economics* 74 (98): 102-113.

Rosen, Sherwin. "Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition." *Journal of Political Economy* 82 (1974): 34-55.

Schnidman, Frank, Michael Smiley, and Eric G. Woodbury. *Retention of Land for Agriculture: Policy, Practice and Potential in New England*. Cambridge, Mass.: Lincoln Land Institute, 1990.

Vermont Housing and Conservation Board. Annual Report to the General Assembly, various issues, Montpelier: VHCB.

Waugh, F. "Quality Factors Influencing Vegetable Prices." *Journal of Farm Economics* 11 (1929).

Wright, John B. "Conservation Easements: An Analysis of   Donated Development Rights*."*

Journal of the American Planning Association 59 (1993): 487-93.