

ECONOMETRIC MODEL OF SKI CONDO PRICES  
IN NEW ENGLAND

By

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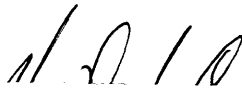
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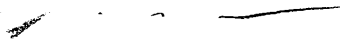
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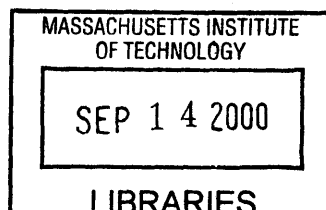
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**ROTCH**



## Abstract

### ECONOMETRIC MODEL OF SKI CONDO PRICES IN NEW ENGLAND

By

John David Corey

Submitted to the Department of Architecture On August 9, 2000  
in partial fulfillment of the Requirements for the  
Degree of Master of Science in Real Estate Development

What does the future hold for ski condo prices in New England? To answer this question historical condo prices were collected for The Village of Loon Mountain Development in Lincoln, NH. Skier visits, snowfall, employment, condo stock and interest rate information was also collected from around the region in order to compare changes in these variables with the changes in past ski condo prices.

Using over 600 sales transactions from 1977 to 2000, a price index was created. This index allows for a more manageable view of the data as condo location, condo size, and condo style effects were removed using a hedonic model. Remaining was a yearly index that tracked real condo prices as a function of time. Over the length of study, the index had a few years of upward momentum, but all in all real ski condo prices have fallen over the 24 year period.

Using the price index, three equations were created that will be the foundation of the econometric model: Skier Visits (a measure of condo demand), Change in Stock (a measure of condo supply) and the Real Price Equation (a measure of condo price). The econometric model uses these three equations to predict future condo supply and demand in order to establish a future price.

Five simulations about the future were run to see the affects of changing the input variables. The cases start with pessimistic outlooks on snowfall, resulting in low skier turnout, low new condo supply and further depressing condo prices. Even the most optimistic snowfall case, 90 inches of snow per season, increases demand through skier visits, which in turn prices, starts the construction boom and eventually brings prices back down to pre-boom levels. Case 5, which predicts future snowfall along the linear trend line and doubles forecasted employment growth, forecasts stable condo prices even with a boom in condo construction. Like the other cases, condo stock response immediately to the increase in condo prices; however, with a more robust economy, the prices remain stabilize as more condos come on-line due continued strong demand. This allows for a continued building boom for the foreseeable future.

Ultimately what can be concluded from this analysis is that ski condo prices are not going to appreciate. In every simulation, prices either fall or stabilize. Sure there is an instance where prices increase for a year or two, but these ultimately return to pre-boom levels. Since the ability for developers to supply ski condos quickly, prices will remain flat through 2009.

Thesis Supervisor: William C. Wheaton

Title: Professor of Economics

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## CHAPTER 1: Introduction

### Question:

What does the future hold for ski condo prices? This is the central question that this thesis will answer. The purpose of this paper is to analyze historical real estate prices and to derive an econometric model that can be used to predict future ski condo prices using economic, demographic, and atmospheric inputs.

### Approach:

Using the Loon Mountain ski area in Lincoln, NH as the sample area, conclusions will be drawn on the real estate prices in the Northeast ski area as a whole. Within Lincoln, the selected development studied is The Village of Loon Mountain. This is a large development of residential condominiums across from the slopes of Loon Mountain. The first condos were developed in the mid-1970's and construction (although sporadic) still continues today.

The paper is broken down into three main sections. The first part analyzes historical ski condo prices and constructs a price index in order to better identify trends. The second part, creates three equations that will become building blocks for the econometric model: supply, demand and price. The three equations: 1) the Skier Visit Equation, 2) the Condo Stock Equation and 3) the Price Equation, will be used to forecast ski condo prices in the third part. Here the econometric model is used to run simulations to predict supply and price of ski condos using various inputs (employment, snowfall, and interest rates). The equations work together to predict supply and demand for ski condos. The first equation works independently and is used to predict skier visits to the

region. The second and third equations both use the Skier Visit Equation, but work together to determine the new number of condos constructed and their prices. The model will then be used to simulate future outcomes in ski condo prices and construction based on employment, snowfall and interest rates.

Timeframe:

The study is also broken into two time periods: analysis of historical trends and forecast of probable outcomes. The historical segment stretches from 1977 through 2000, 24 years. The forecast period will run from 2001 to 2009, 9 years.

Conclusions:

The paper will make several conclusions throughout the analysis. First, through the construction of the real price index, it will be shown that ski condo prices have fallen all but a few of the 24 years studied. Second, skier visits to the Northeast ski areas have been increasing slowly over the same period, but has been tied more to the region's growing economy and less to the area's natural snowfall. However, both play a role in skier visits. Third, condo stock in the region is highly correlated with ski condo prices and reacts almost immediately, keeping prices in check. Fourth, through many simulations of future snowfall and employment, future ski condo price appreciation is highly unlikely.

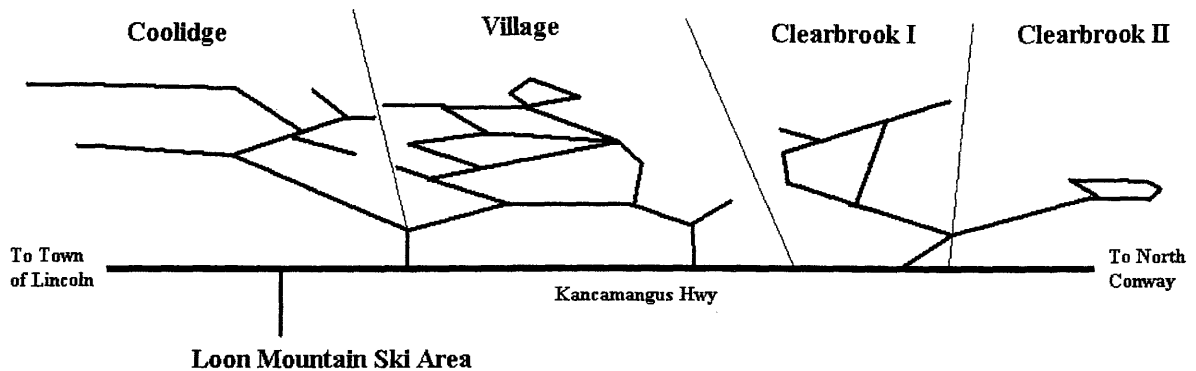
## CHAPTER 2: HISTORICAL

### Study Area:

The first phase is dubbed the “Village”, which is the original section and was primarily built out from 1975-1985. The majority of these condos are built as triplexes with two outside units and one inside unit. The location of the development along with the placement of the triplexes gives almost every condo mountain views. The views of the Loon Mountain’s ski trails and its close proximity to the ski area’s amenities have kept this development’s demand high. This consistent attractiveness is especially important during the severe depression in the late 1980’s and early 1990’s as many other developments in the area just “boarded up” and were not sales on public record. The Village of Loon Mountain remained viable throughout the entire study period.

Two other phases were built from about 1983-1988: Clearbrook I and Clearbrook II. These two sections were built to the east of the Village, are considered the same development, share in the same amenities, but have different entrances. The condos are similar as they are built as triplexes, although slightly larger, but dissimilar as they have inferior views when compared to the original section, as they are further down the Kancamangus Highway. The final phase at The Village of Loon Mountain, Coolidge, is built to the west of the Village. This section is considered superior as the condos are built as mostly singles and duplexes, have sweeping views of the entire Loon Mountain Ski Resort, are spaced to allow more privacy between units, and are designed with a more traditional steep-roofed “chalet” feel. A sketch of the entire development is shown in the exhibit below.

## Village of Loon Mountain



### Ski Condo Sales:

The Village of Loon Mountain, a multi-phased condominium complex directly across from Loon Mountain, will act as the real estate price barometer. The first condominiums were built in the mid-70's and the first arm's length sales started in 1977.

The sales data for The Village of Loon Mountain was garnered from two sources: the Town of Lincoln's Tax Assessor's Office and the Registry Review. The Town of Lincoln, in order to assess property taxes, tracks condo sale transactions, which include the sale price, closing date, style of condo and location. This information was available on-line at the town offices going back until 1993 and then located on tax assessment cards until 1984. From 1977 through 1984, the sales data was obtained through a commercial source: the Registry Review. This real estate and financial newspaper tracks real property sales for the entire state of New Hampshire. Through this source, sale price, date, and location were retrieved. The locations were not comprehensive and were backtracked using the published grantee name and then comparing it against Village of Loon Mountain condo owner lists. 49 condos (7.9% of the entire sample) were not

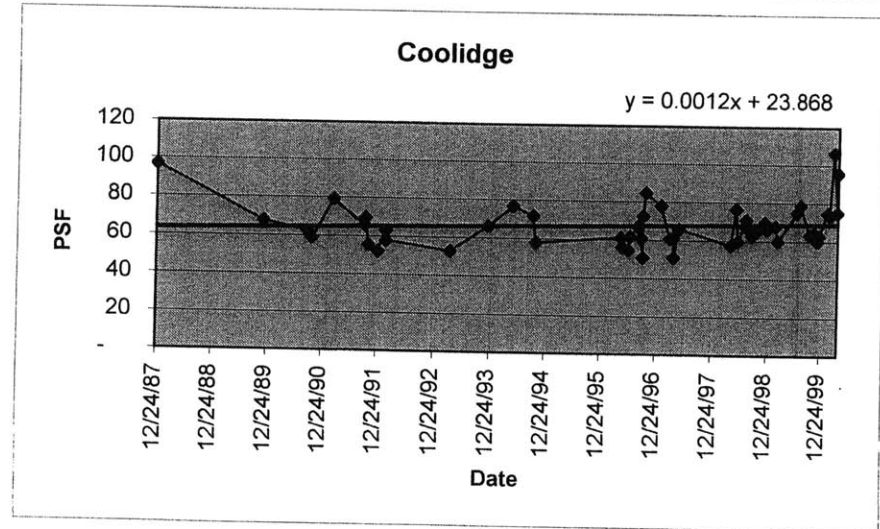
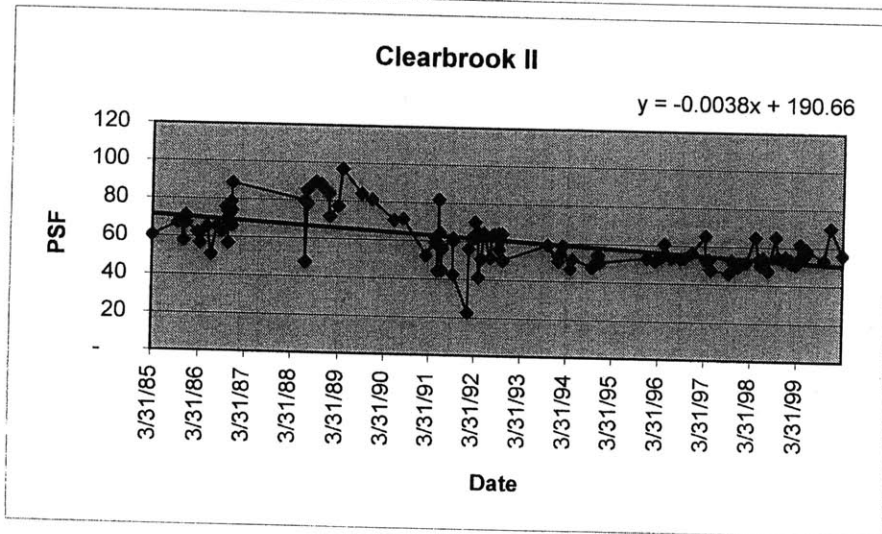
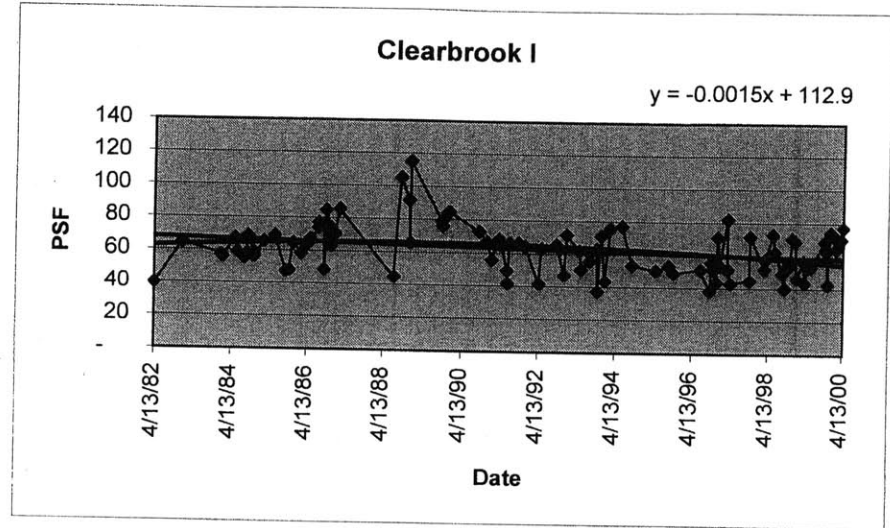
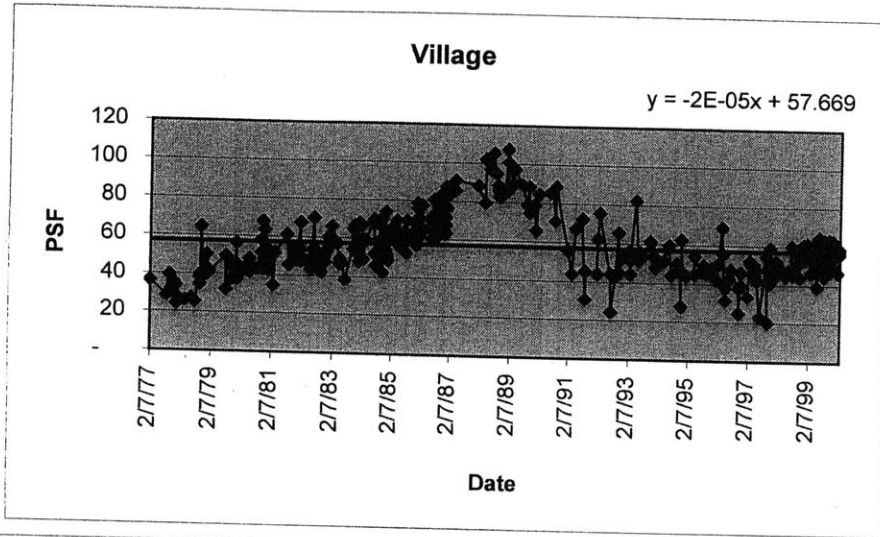
identified as to what style they were. An assumption was made, blending the two most popular styles during the early years of development (the timeframe where all the missing styles were located). In Appendix A, which shows all the condo sales data, these missing style condos are labeled “Aspen or Burke” and have a missing unit number. Keep in mind that these two styles differ in size by a mere 68 square feet, less than 5%.

By graphing the transaction price per square foot (PSF), some interesting trends are visible. In Exhibit A, four charts show every condo sold in each of the four phases of The Village of Loon Mountain (Village, Clearbrook I, Clearbrook II, and Coolidge) since its inception. Ignoring the affects of inflation (nominal numbers), an amazing peak in prices in 1989 is immediately visible. Prices jumped 43 percent in less than three years (1987-1989). Although, looking at the entire period, linear trends show flat sales prices persisted throughout the entire period. Clearbrook I, Village, and Coolidge, albeit differing in timeframe, do show price fluctuations, but center around flat horizontal trend lines. Clearbrook II prices, even without adjusting for inflation, center around a gradually descending sales price line. The initial conclusion is that condo prices overall have been flat.

Exhibit B shows the same data, but this time adjusting for inflation. During the study period inflation plays a considerable roll in real condominium prices. The Consumer Price Index for Urban Consumers (CPI) is used in the analysis to check the affects of inflation. Exhibit C displays both the CPI Index and the yearly change in CPI throughout the study timeframe. The inflation measure used was the Consumer Price Index for All Urban Consumers (CPI). Bear in mind that 1977 is the base year (all numbers are in 1977 dollars). The year used to baseline is irrelevant, while the trend is

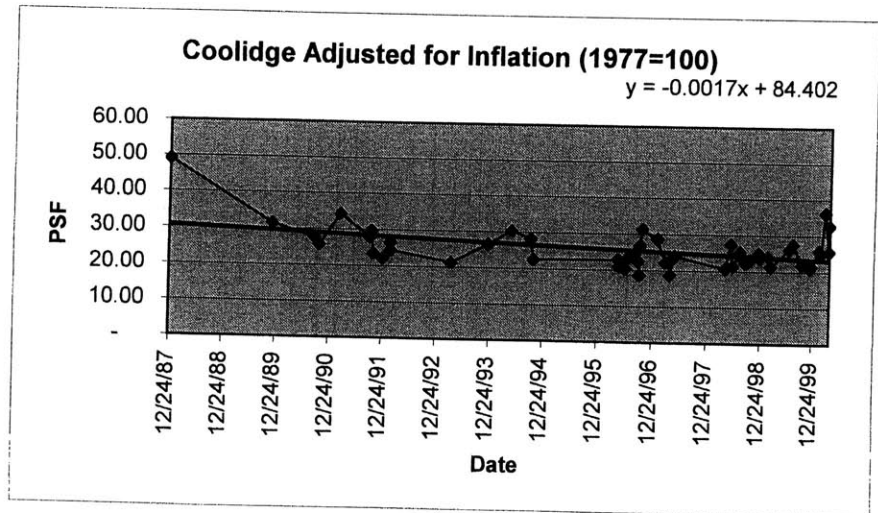
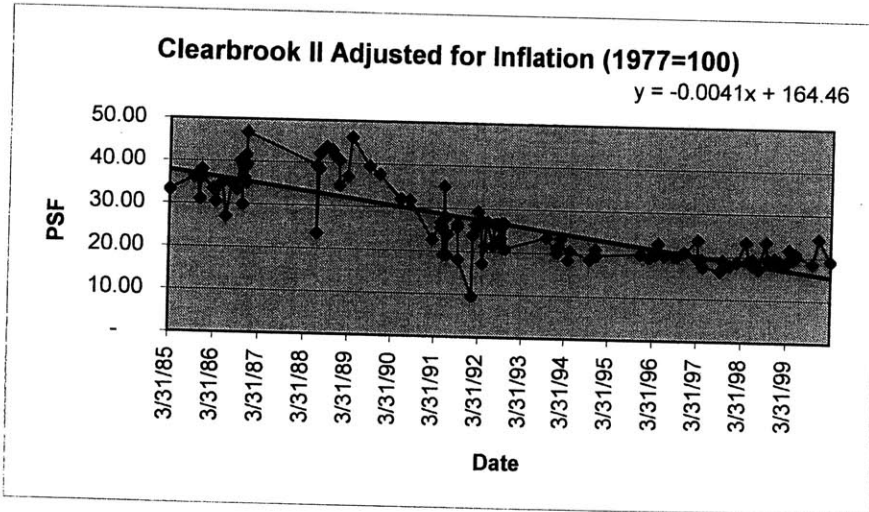
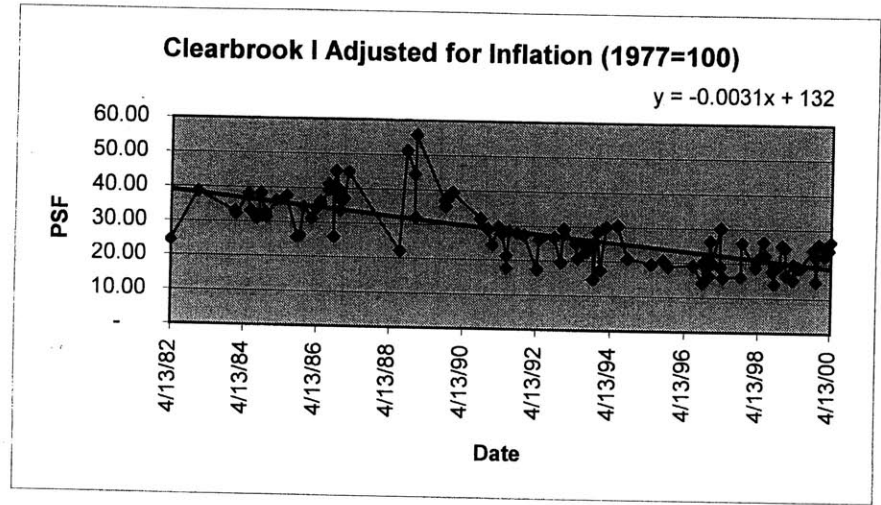
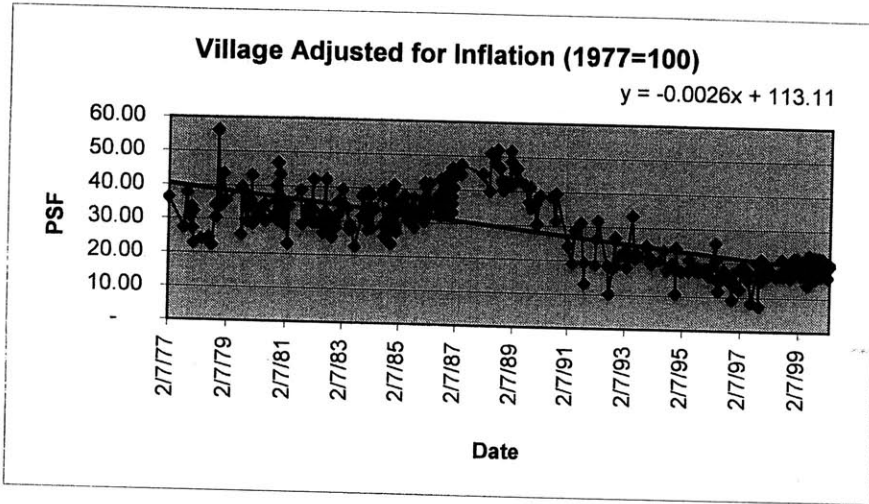
**EXHIBIT A**

**Village of Loon Mountain Condo Sale Prices (PSF) Unadjusted for Inflation**



**EXHIBIT B**

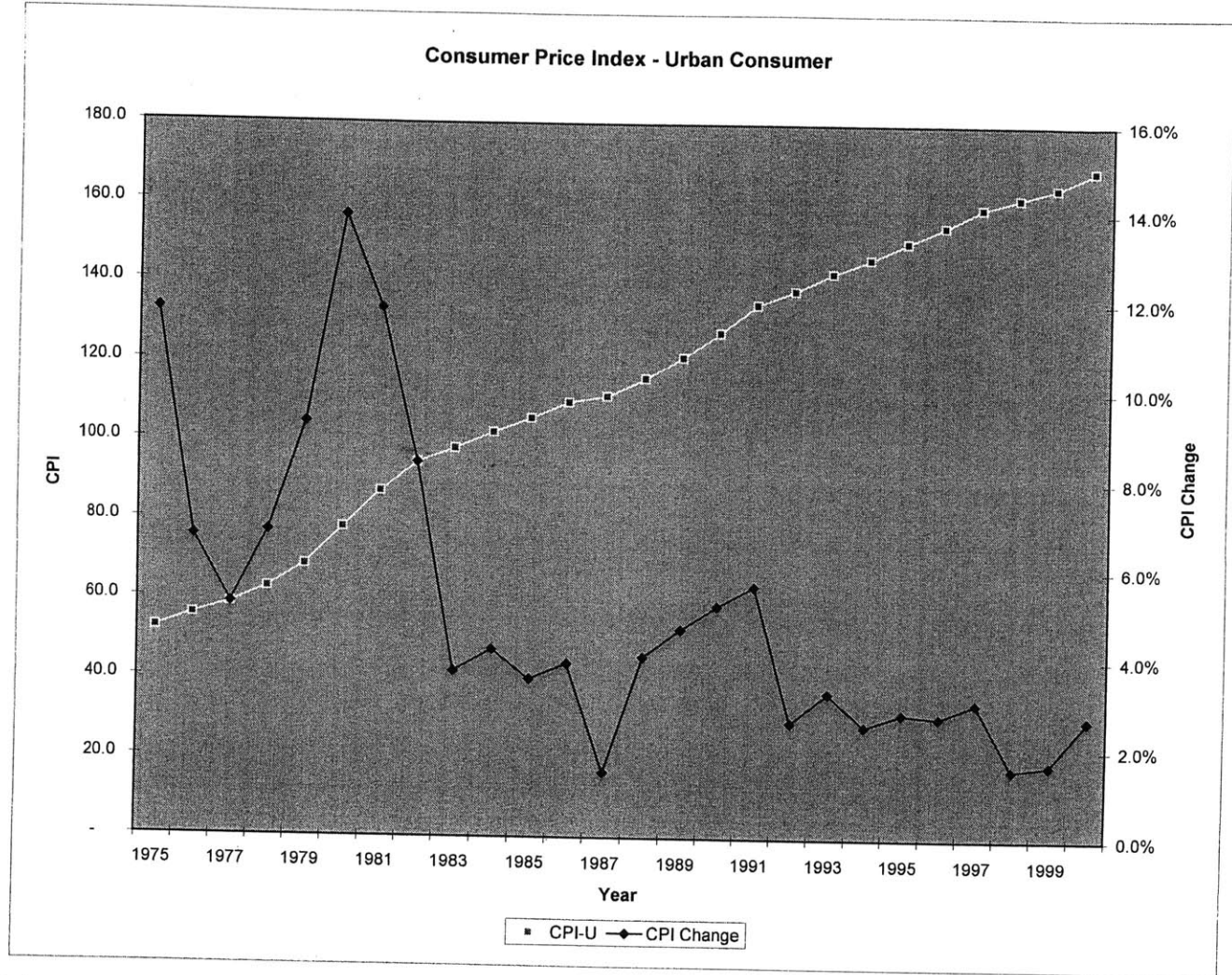
**Village of Loon Mountain Condo Sale Prices (PSF) Adjusted for Inflation**



**EXHIBIT C**

**Consumer Price Index**

<u>YEAR</u>	<u>CPI</u>	<u>CHG CPI</u>
1974	46.6	
1975	52.1	11.8%
1976	55.6	6.7%
1977	58.5	5.2%
1978	62.5	6.8%
1979	68.3	9.3%
1980	77.8	13.9%
1981	87.0	11.8%
1982	94.3	8.4%
1983	97.8	3.7%
1984	101.9	4.2%
1985	105.5	3.5%
1986	109.6	3.9%
1987	111.2	1.5%
1988	115.7	4.0%
1989	121.1	4.7%
1990	127.4	5.2%
1991	134.6	5.7%
1992	138.1	2.6%
1993	142.6	3.3%
1994	146.2	2.5%
1995	150.3	2.8%
1996	154.4	2.7%
1997	159.1	3.0%
1998	161.6	1.6%
1999	164.3	1.7%
2000	168.7	2.7%



Source: U.S. Department of Labor, Bureau of Labor Statistics



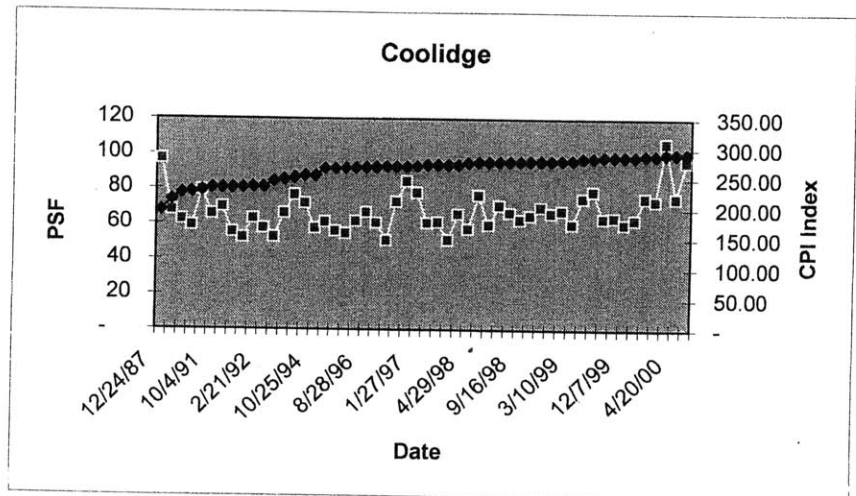
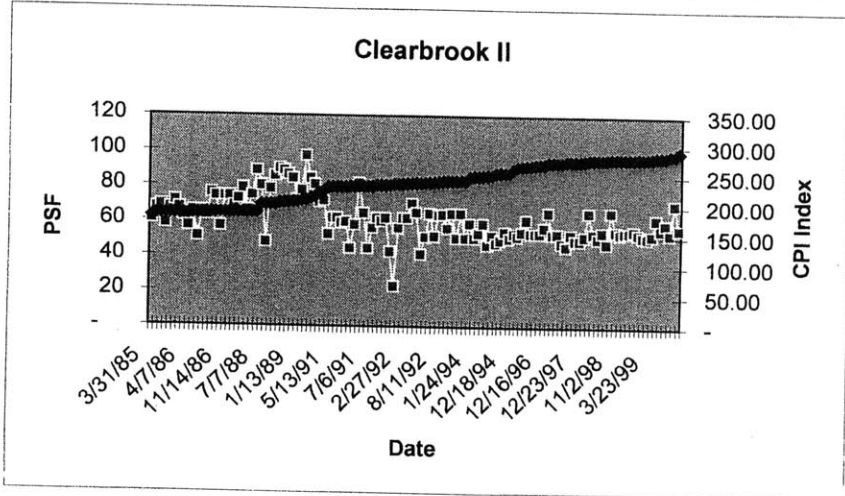
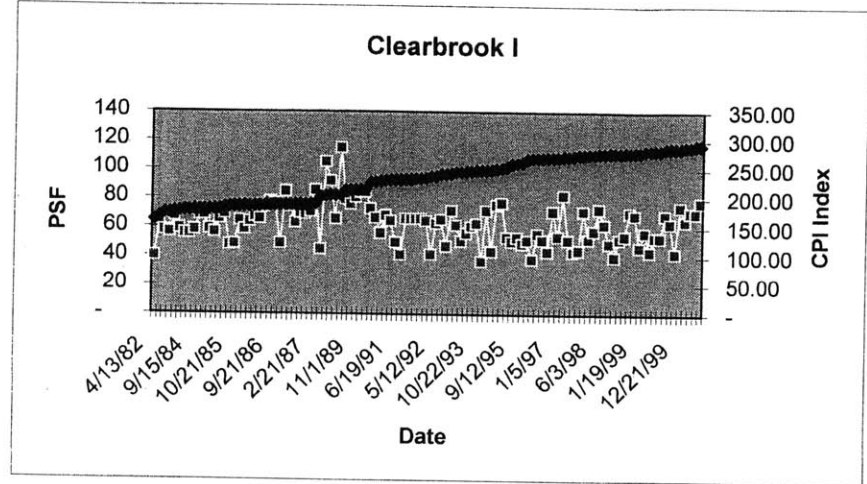
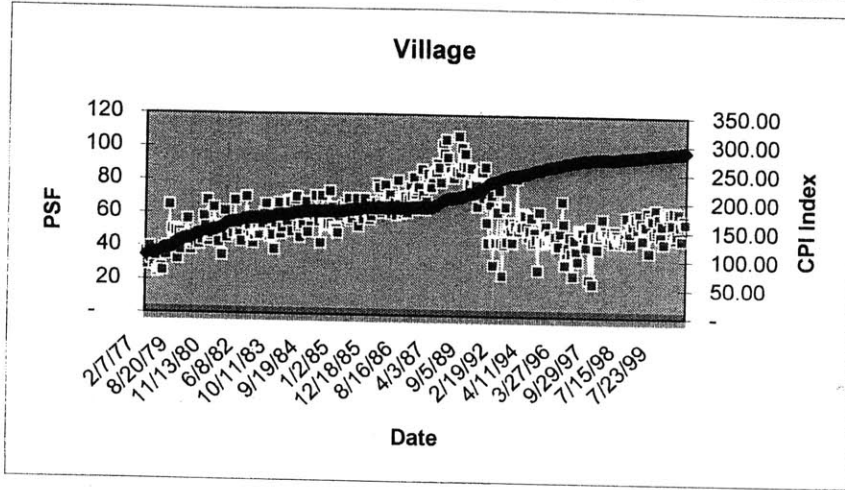
extremely telling. From these graphs, a convincing downward trend in condo sales prices is apparent in all of the sections of The Village of Loon Mountain. The peak in the late 1980's, especially in the Village section, tends to be flattened out when inflation affects are added. Although inflation makes the peak look better (smoothing out the steepness and appearing more moderate), inflation throughout the 1990's tolls heavily on real condo prices. These graphs really illustrate the all time low in condo prices in the late 1990's.

The last set of graphs (Exhibit D) show the nominal per square foot sale prices again, but now charts them against the CPI. These graphs are helpful as they illustrate how condo prices tracked with inflation. The condos within The Village of Loon Mountain track with or even beat inflation prior to 1989. During 1989 and through 1991, condo prices reverted back to pre-peak pricing (if not below) and severely underperformed inflation for the next decade. The widening spread between condo sales prices and the CPI line identifies this underperformance.

In order to assure that seasonality would not affect our analysis, a regression test was performed. Using the condo price per square foot as the dependent variable and the quarter in which the condo sold (Q1, Q2, Q3 and Q4) as independent "dummy" variables, a regression shows no price premium in one season over the next (an  $R^2$  of .00197 is shown in Exhibit E as well as the full ANOVA table). Although no seasonality was detected, a majority of the sales were consummated in the fourth quarter (October, November, and December). Presumably, more people think of skiing as the winter season approaches, causing more real estate transactions. The graphs to the right show

**EXHIBIT D**

**Village of Loon Mountain Condo Sale Prices (PSF) Unadjusted for Inflation vs. CPI Index**



**EXHIBIT E**

**Seasonal Regression**

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.044433089
R Square	<b>0.001974299</b>
Adjusted R Square	-0.002910003
Standard Error	14.50131165
Observations	617

ANOVA

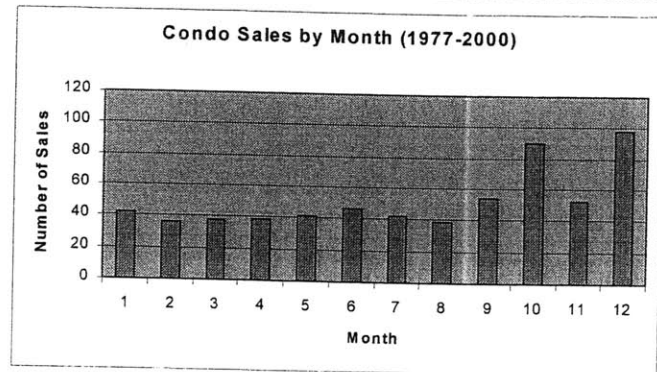
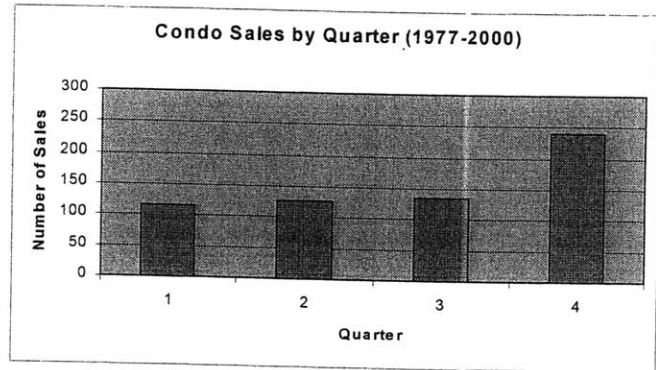
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	255.0036173	85.00120575	0.404213221	0.750024868
Residual	613	128906.5682	210.2880395		
Total	616	129161.5718			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept (Qtr 1)	60.08814354	1.346412985	44.62831553	9.8553E-195	57.44400376	62.73228332	57.44400376	62.73228332
Quarter 2	-1.792808205	1.865953006	-0.960800298	0.337031409	-5.457241501	1.871625091	-5.457241501	1.871625091
Quarter 3	-0.383139894	1.835896813	-0.208693589	0.834756771	-3.988547634	3.222267845	-3.988547634	3.222267845
Quarter 4	-0.250395041	1.639825628	-0.152696138	0.878688152	-3.47075033	2.969960248	-3.47075033	2.969960248

the heavy concentration of activity later in the calendar year: Sales by Quarter, Sales by Month.

Price Index Equation:

In order to view the sales data from The Village of Loon Mountain condo development clearly, a price index was created. This was done by performing a linear regression analysis on the condo sales data and developing a hedonic model<sup>1</sup>. In other words, a model that



looks only to the historical data in the series and nowhere else to build a trend. By creating an index, we are able to strip out two endogenous factors affecting sale price: condo location (e.g. which phase the condo is built in) and condo style (including size and number of bedrooms). By removing these two items, we are able to view the trend with only time as a factor.

The data included in the price equation are as follows:

- 1) Sale price per square foot
- 2) Phase of development (dummy variable for each phase)
- 3) Condo Style (dummy variable for each style)
- 4) Year (dummy variable for each year)

A dummy variable is either a 1 or a 0, representing true or false. In regards to the phase, the original phase (Village) is considered the intercept and therefore does not have

---

<sup>1</sup> For a discussion of the use of hedonic models, see the article by Norman G. Miller.

a dummy, while the others (Clearbrook I, Clearbrook II and Coolidge) each have a dummy. By using this type of variable, we are able to strip away any consistent irregularities that can be related to one phase versus another. For example, if condos in the Coolidge section always trade for a higher price per square foot than the other sections, then the regression will attribute this to the 1 in the phase column and not to just randomness in sale price. Condo style represents the design of the condo, the number of bedrooms, and the number of bathrooms. By using dummy variables in this instance, we are able to remove an irregularity that might be apparent in the series for one style of condo that has more bathrooms than the others. Between the four phases of The Village of Loon Mountain, 24 styles of condo were observed and are listed in the regression equation. Note that the Cannon style is considered an intercept (like Village in the phase variable) and has a zero coefficient. Each year is also assigned as an independent variable in our equation (1977 is the intercept). Here the regression will attribute price swings in regards to time, allowing us to create a price index using only time and excluding swings in price attributable to which phase the condo is built or in what style.

The constant for the regression equation is below and the coefficients are to the right:

$$\text{Price Index} = 39.1 + \dots$$

The statistics for this regression are as follows:

Usable Observations	616.
Degrees of Freedom	567.
Centered R <sup>2</sup>	0.6841
Uncentered R <sup>2</sup>	0.9824
Mean of Dependent Variable	59.4724
Std Error of Dependent Variable	14.4176
Standard Error of Estimate	8.4391

Before using the regression equation to construct an index, some trends can be drawn from this analysis. Note that in the phase variables, Coolidge has the largest coefficient of +11.8. This means that the Coolidge phase commands the highest price of the entire development. This result is in fact true as these condos have a superior location with the best views, better spacing between condos, and a “freshness” to the development as it is the newest section. When looking at the styles, bear in mind that they are all relative to the Cannon style. Immediately apparent is that they almost all trade at a discounted price per square foot to the Cannon. This is because the Cannon model is the smallest unit sold in the development (1,118 SF) and usually achieves the highest per

Variable	Coefficient
Clearbrook I	4.7
Clearbrook II	1.7
Coolidge	11.8
Cannon	-
Aspen	(6.8)
Burke	(7.1)
Aspen or Burke	(6.5)
Dartmouth	(14.8)
Dartmouth Deluxe	(10.1)
Columbia II	(7.2)
Columbia II Deluxe	(9.0)
Cannon Deluxe	5.3
Columbia	(13.1)
Pedestal	(10.0)
Super Dartmouth	(23.7)
Super Cannon	(5.0)
1500 Deluxe	(2.2)
1700 Deluxe	(22.1)
2300 Deluxe	(14.0)
1800 Standard	(17.2)
1600 Deluxe	3.0
1800 Deluxe	(10.6)
2200 Standard	(7.6)
2200 Deluxe	(3.6)
1600 Standard	(0.6)
Special Design	1.2
1500 Standard	-
1977	-
1978	6.8
1979	11.5
1980	16.2
1981	18.6
1982	20.0
1983	23.5
1984	25.2
1985	30.6
1986	36.9
1987	49.3
1988	51.7
1989	49.5
1990	41.3
1991	25.1
1992	21.8
1993	21.8
1994	19.7
1995	15.6
1996	17.2
1997	15.6
1998	20.5
1999	23.7
2000	33.9

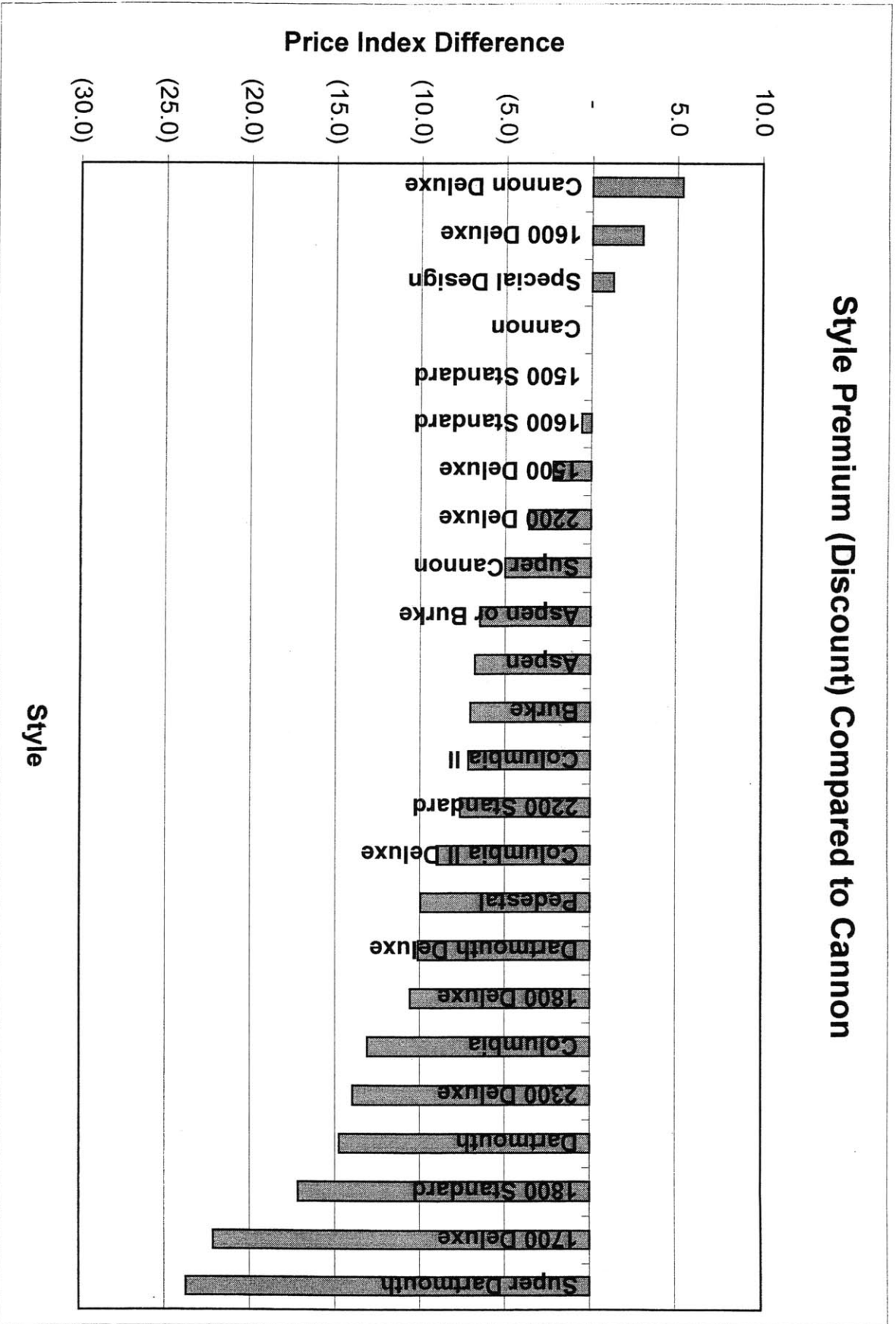
square foot price; opposite to this are the large units. The Super Dartmouth, for example, trades for more money as it is larger (2,810 SF), but per square foot the least (-23.7), signifying a condo with the most “bang for the buck”. The Cannon Deluxe trades for the largest premium (+5.3). This style has the same square footage as the Cannon, but has an additional bathroom. A chart of the styles and their discounts versus the Cannon are shown in Exhibit F. Trends in the yearly variables will be noticeable in the price index constructed below.

In order to construct the index a phase needs to be selected, and in this case, the original phase or Village was selected. The resulting index will not show a price for any condo because condo style is not included, only the price for time. For 1977, the index is fixed at 39.1, the constant. For 1978, the index is 39.1 plus that year’s coefficient, 6.8 totaling 45.9.<sup>2</sup> Each year is done using the same method until the entire price index is created. One more important step needs to be taken next, which is an adjustment for inflation. In order to achieve the real price index, a base year is chosen and then the indexed numbers are computed in relation to that year. The base year will be the current year, 2000. By using the CPI index, inflation was removed and left is an index entirely in year 2000 dollars. The real price index for The Village of Loon Mountain appears below:

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<sup>2</sup> Chart to follow shows 46.0 due to rounding error.

### Style Premium (Discount) Compared to Cannon



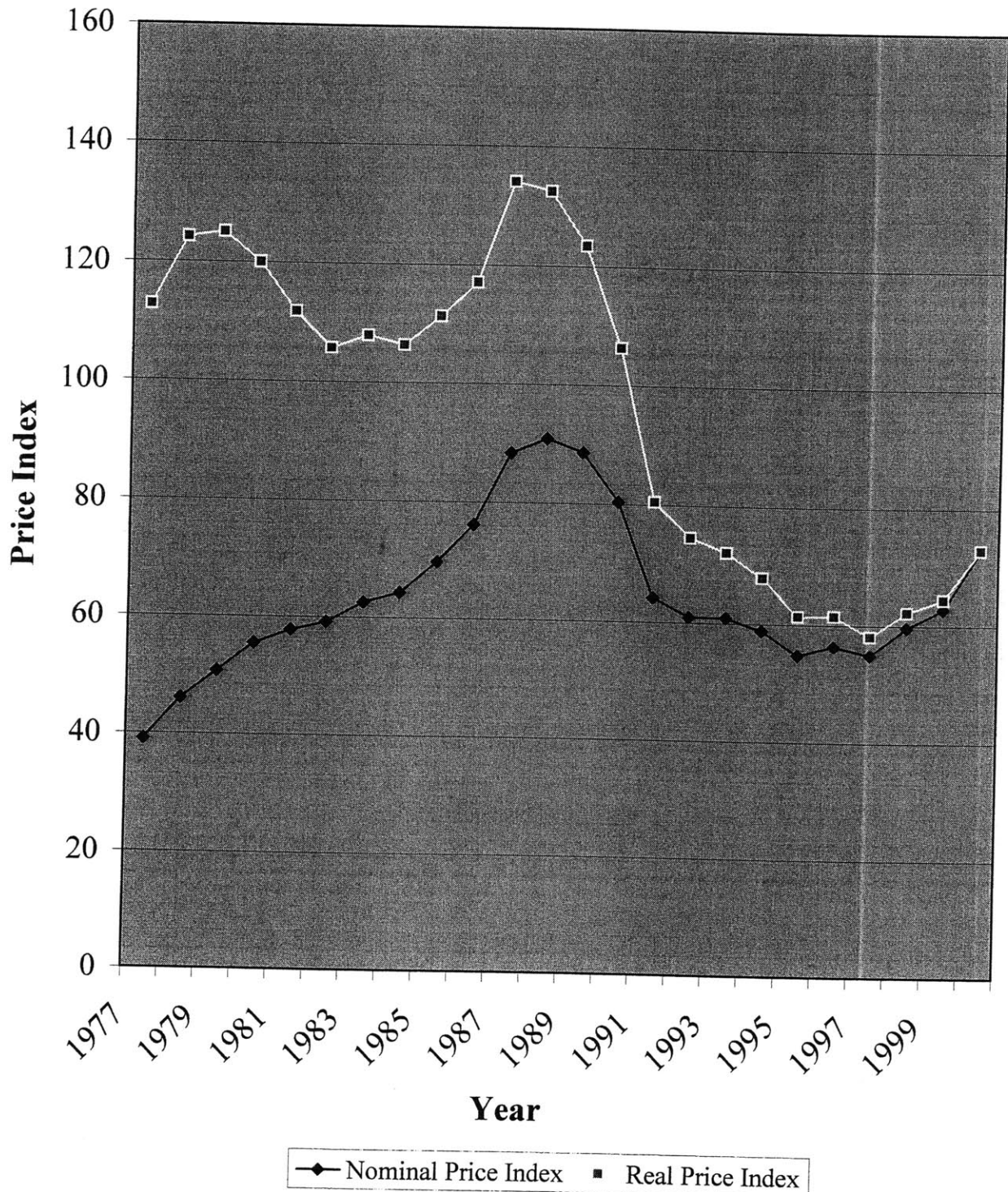


<b>Year</b>	<b>Nominal Price Index</b>	<b>Real Price Index</b>
1977	39.1	112.9
1978	46.0	124.1
1979	50.6	125.0
1980	55.4	120.1
1981	57.7	112.0
1982	59.2	105.8
1983	62.6	108.0
1984	64.3	106.5
1985	69.7	111.5
1986	76.1	117.1
1987	88.4	134.1
1988	90.9	132.5
1989	88.6	123.5
1990	80.4	106.5
1991	64.2	80.5
1992	61.0	74.5
1993	60.9	72.1
1994	58.8	67.9
1995	54.7	61.4
1996	56.3	61.5
1997	54.8	58.1
1998	59.6	62.3
1999	62.8	64.5
2000	73.0	73.0

A graph of this data is visible in Exhibit G. The top series in the graph is the real price index (adjusted for inflation), where the bottom series is not. The real price index reveals several things. First, the inflation during the late 1970's and early 1980's (some years over 10%) had a large negative impact on the real ski condo price. Nominally, during this period, it looks as if the prices had a nice steady climb until 1989, but adding the affects of inflation tells a different story. From 1979 through 1984, real condo prices actually declined. The index started in 1979 at 125.0 and ended in 1984 at 106.5, a decline of 15%. However, condo prices did continue to climb from 1984 through 1987 and with both moderated inflation and higher nominal prices fully recovered to 1987

**EXHIBIT G**

**Village of Loon Mountain Condo Price Index**



levels. After 1988, it was tragic. Through over building, changes in tax laws, and changes in preference, condo prices began their nominal decent until 1997. When inflation is added during this period, the index appears to be in a free fall. In the eight years from 1989 through 1997, the index collapses from 134.1 to 58.1, almost a 57% decline. Only in the past three years has the index turned upward, but as will be shown, appears to be no more than a blip. Overall during the study timeframe, the trend has been downward. If a condo was purchased by an owner/user as a second home to use as a ski house, then it was probably enjoyed throughout the study period and turned out to be a good purchase. But if an investor bought, the experience has been much different since the real prices have depreciated over the long-term hold.

In order to predict ski condo prices going forward, both supply and demand must be studied. In this thesis, demand is measured by skier visits. Presumably, as more people ski the more demand there will be for housing. This is especially true as most of the Northeast ski areas are a multiple hour drive from major population centers (Boston and New York City) and the skier's need lodging for a several nights stay. Supply is measured strictly by the number of built condos. In this study supply is limited to condos within the Lin-Wood area. Equations for each of these determinants will be created next.

## CHAPTER 3: Demand

### Skier Visits:

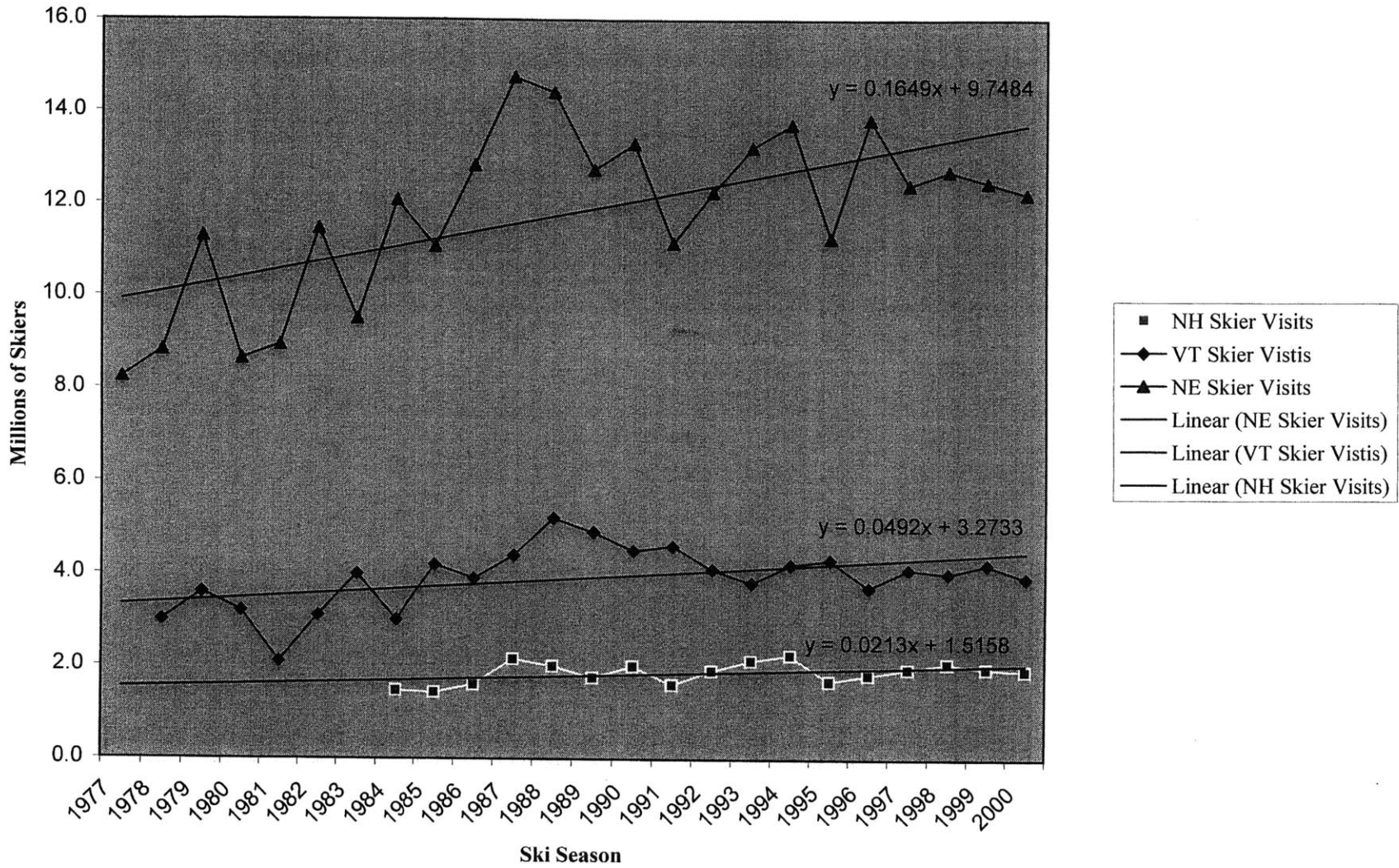
A skier visit is defined as one-person alpine skiing for one day. The measure is performed by ticket sales, where one ticket sold equals one skier day. Multiple-day ski passes are counted by the number of ski days purchased within each pass. Loon Mountain skier visits are not published independently, so statewide and region-wide data will be used. Note that nordic or “cross-country” skiing represents less than 5% of skier visits and has been omitted from the analysis.

By viewing the graphs of skier visits in Exhibit H, (a table of the data is located in Appendix B) three series of data are evident. The bottom series are skier counts for the state of New Hampshire. Ski NH, a New Hampshire Ski Area Association, was able to provide statewide skier counts from the 2000 season to the 1984 season. The Vermont Ski Area Association fared better with skier visit data ranging from 2000 to 1971. Both these series are helpful to compare trends, but are not sufficient for the analysis.

The top series shows skier counts for the Northeast of the United States as tracked by the National Ski Area Association (NSAA). This data contains skier counts for all of the New England states (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut) as well as New York. This series tracks well with both New Hampshire and Vermont. Note that the series is extremely volatile. During the study period it is not abnormal to see skier visits increase or decrease more than 25% between two given years. For example, from the 1981 to the 1982 season, skier visits in the Northeast jumped from 9.0 million to 11.5 million, a 28.1% increase. In 1983, skier visits dropped by 17%.

**EXHIBIT H**

**Alpine Skier Visits**



These swings as the Skier Visit Equation will predict, are influenced predominately by the economy (as measured by employment), snowfall, and previous year's skier turnout. In the above example, snowfall in 1982 was 104.8 inches, which is an all time high during our timeframe. As can be expected, skier visits spiked during that year of phenomenal snowfall.

From skier's surveys done through Ski NH, of the total skier visits in New Hampshire, 54% are categorized as "overnight ski party". These skiers come typically in groups of three or four and spend the weekend. "During the months of December, January and February, the overnight ski party is most likely to come from Massachusetts, 51.7%; New Hampshire, 22.2%; Rhode Island, 5.4%; Maine, 3.8%; Connecticut, 3.2%; New York, 2.7%; Florida, 2.7% and Canada, 0.9%." During spring skiing, "the months of March and April, the overnight visitor is most likely to come from: Massachusetts, 63.2%; New Hampshire, 16.4%; Canada, 7.3%; New Jersey, 3.1%; Connecticut 2.3% ...".<sup>3</sup> Since an extremely heavy concentration of skiers to New Hampshire (and presumably Loon Mountain) come from the Boston area, economic factors from Eastern Massachusetts will be used to predict future skier visits in the final econometric model.

#### Snowfall:

Snowfall is measured in inches and was retrieved from the National Oceanographic and Atmospheric Association (NOAA). NOAA operates an automated weather station in Plymouth, NH, 25 miles south of Loon Mountain (Station #276945). This station monitors snowfall daily and produces reports for monthly totals. It was chosen for its proximity to the study area as well as its comprehensive data for the entire

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<sup>3</sup> SkiNH study of the Skiing Industry in NH. 1996.

study timeframe. The snowfall was totaled by the ski season (November – April) in order to better match the skier visit counts. Looking at Exhibit I, a steady, but significant downward trend in snowfall is clear. This is consistent with popular global warming views and a visibly noticeable reduction in yearly snowfall in the Northeast. The chart continues the trend line until the year 2009.

Exhibit J tracks both snowfall and skier visits. This graph is interesting as it shows some tie between the two series, but a regression was run to explain Skier Visits as a function of only snowfall, but a low correlation was obtained ( $R^2$  of 7.4%). Presumably through the extensive use of artificial snow throughout the region causes more of a disparity between natural snowfall and skier visits.

Interestingly, by applying a curvilinear trend to the same data, a concave line tracks closest to the data points. This curved line predicts a “bottoming out” of snowfall in 1992 and an upward momentum going forward. This second trend will be used for sensitivity in the final model. This trend is displayed in Exhibit K and will be explained further in the next section.

#### Employment:

The economic factor used to help measure demand is the employment rate for Eastern Massachusetts (Greater Boston). The economic information was sourced through the Federal Reserve, which provides both historical data as well as forecasted data (see Exhibit L).

**EXHIBIT I**

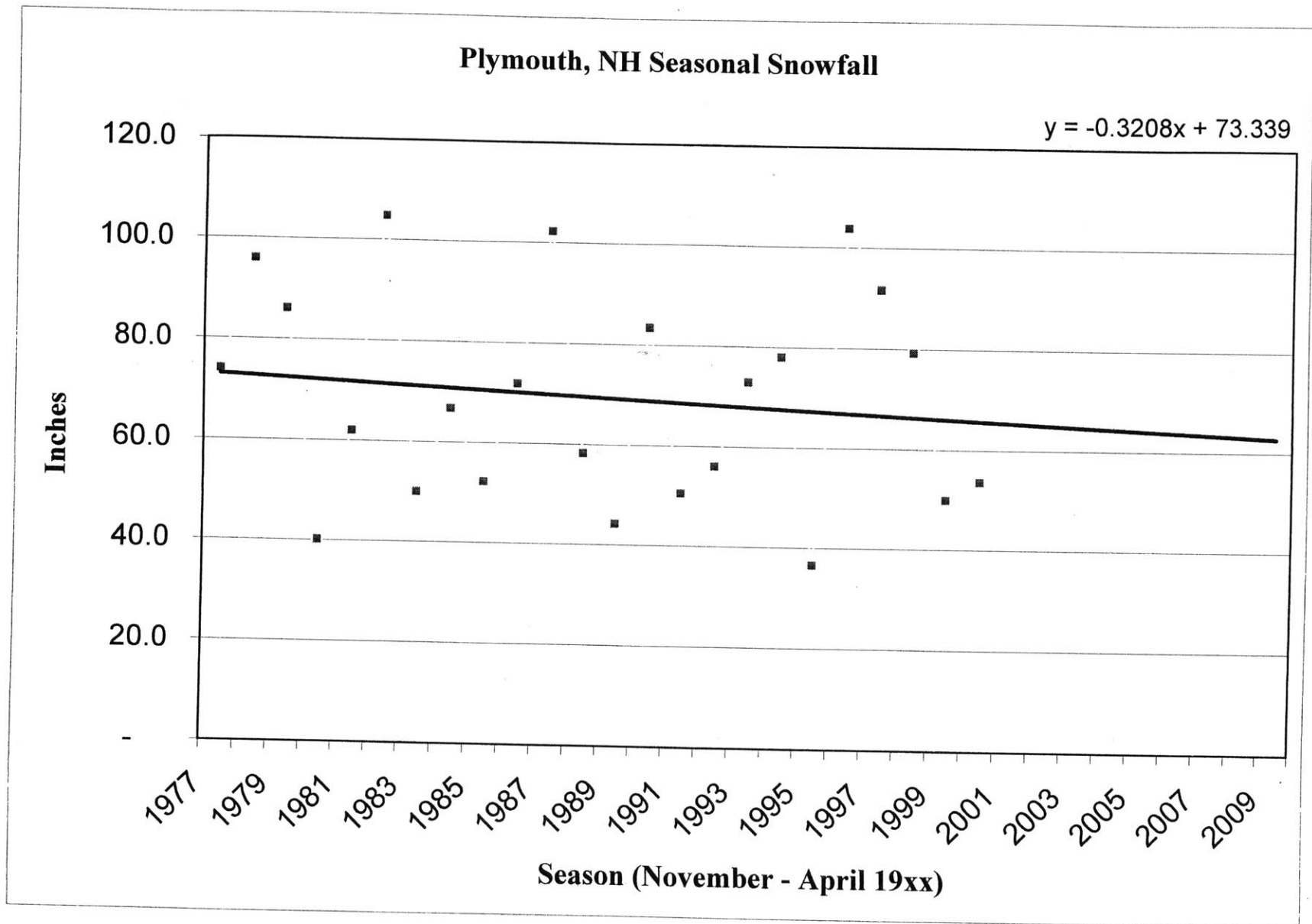
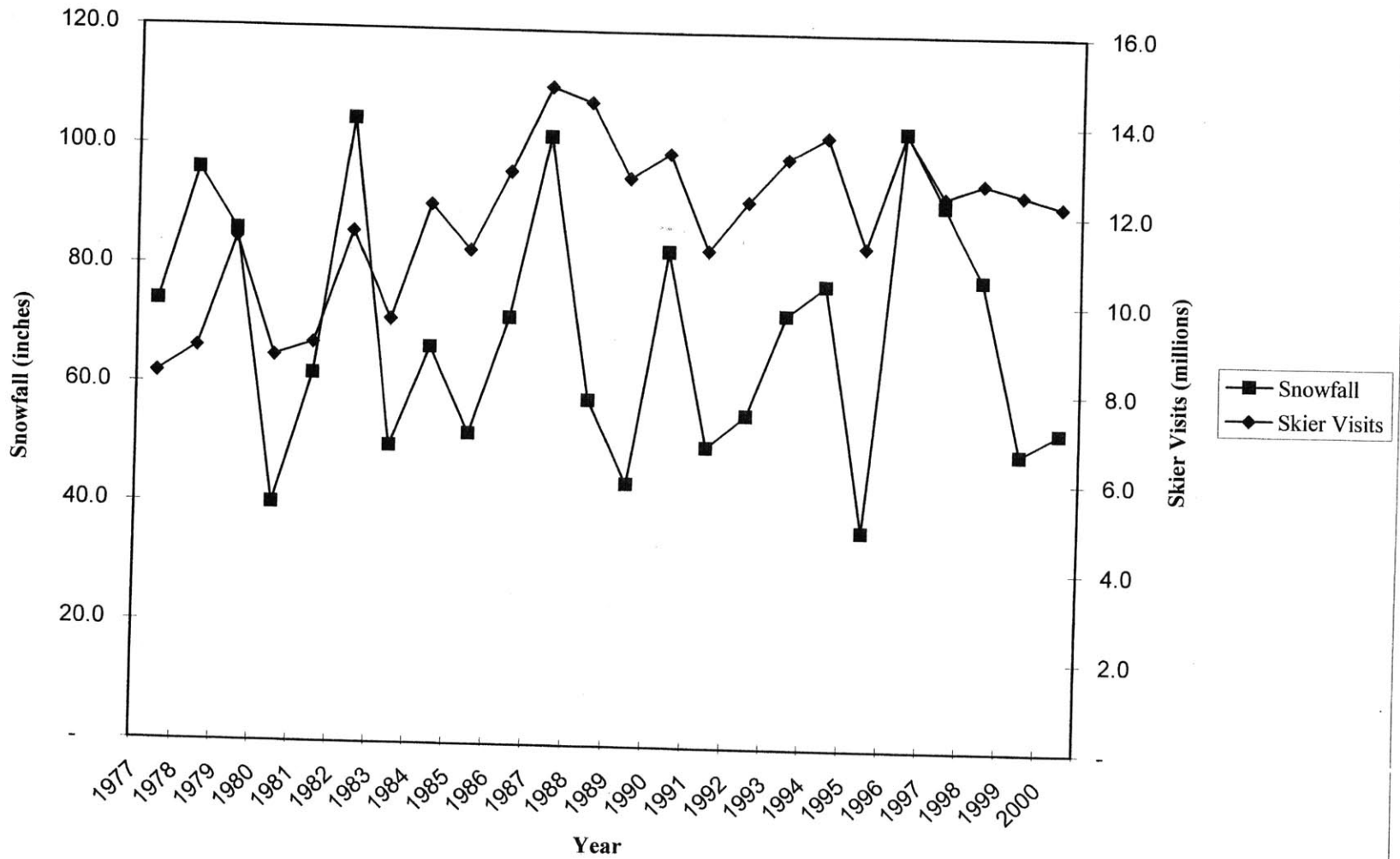




EXHIBIT J

Skier Visits & Snowfall



**EXHIBIT K**

30

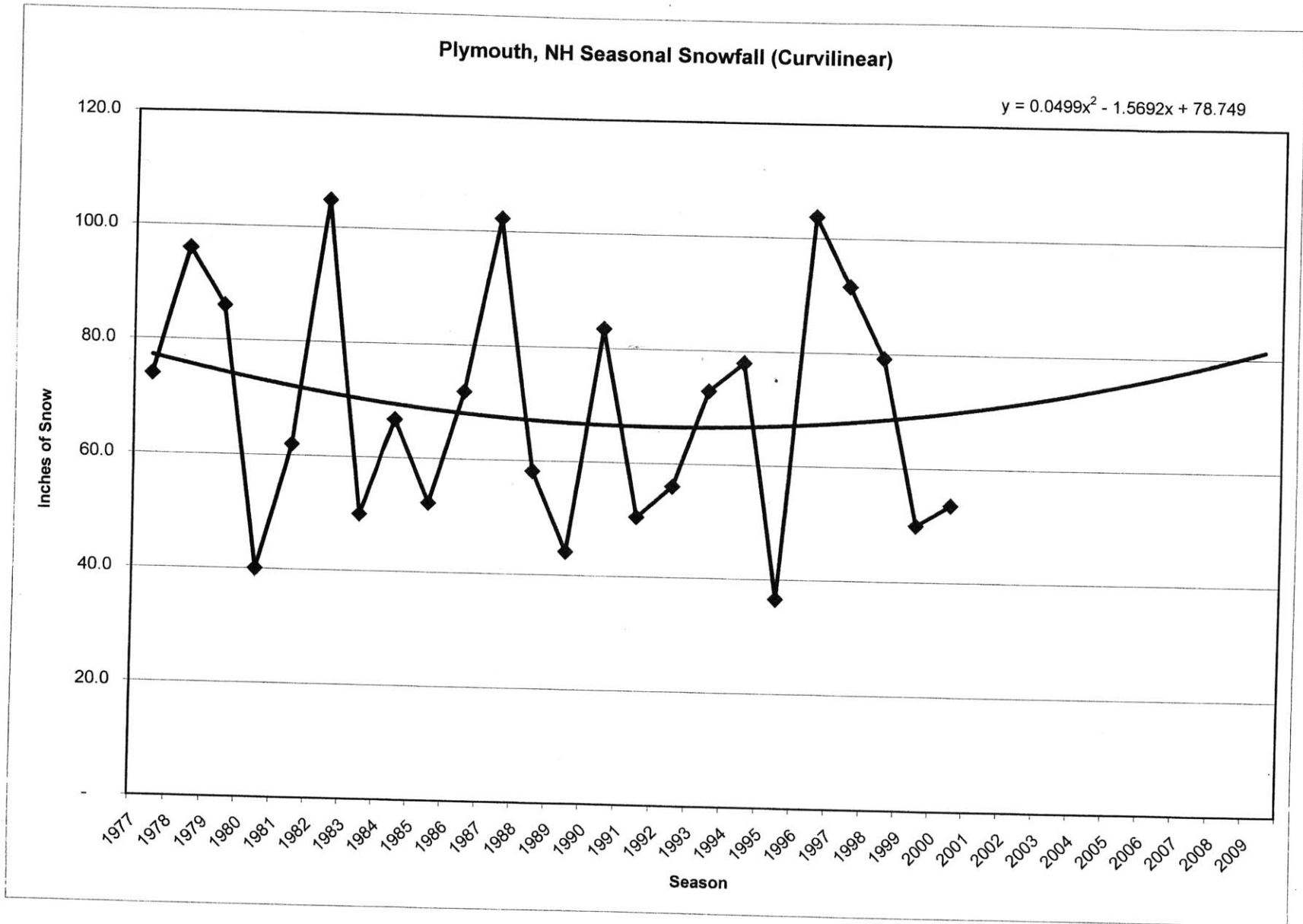
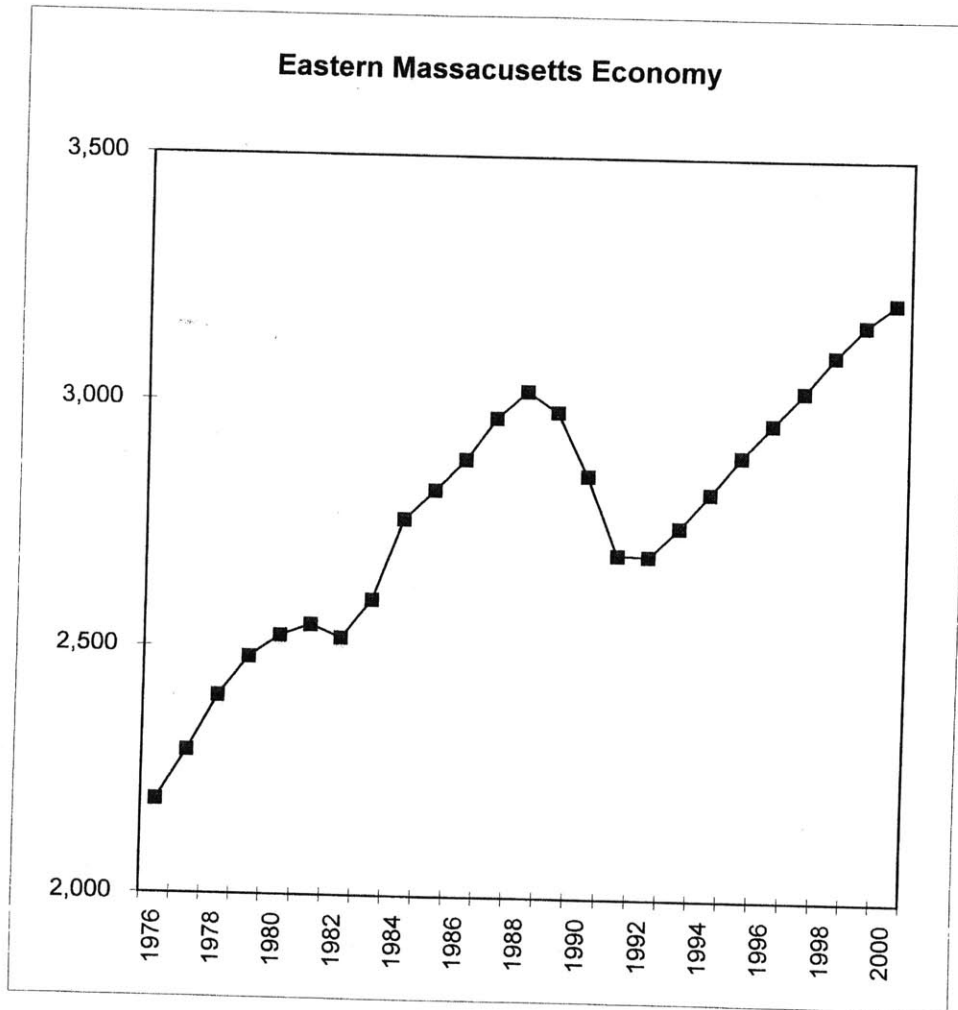


EXHIBIT L

Eastern Massachusetts Economy

Year	Employment (EMP)	CHG EMP
1976	2,190	
1977	2,290	4.3%
1978	2,401	4.6%
1979	2,480	3.2%
1980	2,524	1.8%
1981	2,547	0.9%
1982	2,521	-1.0%
1983	2,599	3.0%
1984	2,763	5.9%
1985	2,822	2.1%
1986	2,885	2.2%
1987	2,970	2.9%
1988	3,026	1.8%
1989	2,984	-1.4%
1990	2,856	-4.5%
1991	2,696	-5.9%
1992	2,694	-0.1%
1993	2,753	2.2%
1994	2,822	2.5%
1995	2,897	2.6%
1996	2,963	2.2%
1997	3,030	2.2%
1998	3,104	2.4%
1999	3,167	2.0%
2000	3,212	1.4%
2001	3,234	0.7%
2002	3,265	0.9%
2003	3,294	0.9%
2004	3,325	0.9%
2005	3,359	1.0%
2006	3,391	0.9%
2007	3,423	0.9%
2008	3,453	0.9%
2009	3,483	0.9%



### Skier Visit Equation:

In order to forecast future condo prices, a skier visit regression must first be performed. Using the National Ski Area Association's Northeast skier counts as the dependent variable, it was found that Eastern Massachusetts employment, natural snowfall and previous year's visits (visits-1) create an equation that explains 72% of the variation in skier visits. Although these three variables do not explain all the variance, explaining almost three-quarters of all variation with only three variables is very good. Looking at the t-statistics in the ANOVA table in Exhibit N, all the variables are significant. In other words, each of the independent variables in the regression (employment in eastern Massachusetts, snowfall and the year before skier visits) is an important factor affecting current year skier visits. Since Massachusetts' skiers make up the majority of skier visits (between 52% and 63%), that state's economy plays a major role in determining how many people can afford to ski. Natural snowfall also has a significant positive correlation with skier visits; presumably, the more natural snowfall in and around the region causes more skier visits. Finally, using last year's visits in the equation accounts for the momentum factor that is evident (last year's skier is likely this year's skier). The final equation follows:

$$\begin{aligned} \text{Skier Visits} = & [-4.802] + [.003 * (\text{Employment})] \\ & (-1.72) \qquad (2.36) \\ & + [.043 * (\text{Snowfall})] + [.406 * \text{Skier Visits-1}] \\ & (3.93) \qquad (2.29) \end{aligned}$$

More variables could be added to this equation to get a tighter fit (higher R<sup>2</sup>). Such variables could be the snowfall in the Boston area (to get people thinking about skiing), employment in New Hampshire, other state's economies, ski area prices, and ski condo rental rates. All these inputs would arguably affect skier visits, but the above

equation is good because it allows explanation of skier counts based on only two inputs: employment and snowfall (visits-1 is hedonic). The fewer the inputs, the less assumptions needed to make when trying to forecast skier visits.

In order to arrive at our final goal of forecasting ski condo prices, future skier visits needs to be determined. This forecast will depend on the predetermined factors that make up skier visits (Massachusetts employment, New Hampshire snowfall, and ski visits-1). Ski visits-1 is easy as it depends on the year before calculation and requires no input or guess. The Employment variable, on the other hand, needs direct input. The Federal Reserve not only tracks historical employment data, but also predicts future employment levels. From the data back in Exhibit L, the Federal Reserve has predicted employment to grow for the next nine years at an anemic 0.9%. This trend will be used for most of the projections, but a 1.8% growth will be used for a more optimistic case (Case 5).

Snowfall is harder to predict. As previously mentioned, two trend lines can be applied to the snowfall data. The first is a linear trend. Referring back to Exhibit I, the trend is downward sloping with the following linear equation where  $x$  is the number of years from 1977:

$$\text{Snowfall} = -0.3208x + 73.339$$

The results from this equation will be used in the “linear trend” case.

The second trend applied was a curvilinear trend that can be seen again in Exhibit K. This trend is concave and predicts a low point in snowfall in 1992 and a recovery from 1993 forward. Notice that the resulting equation has a positive second-degree

coefficient and will predict increasing snowfall into the future. The equation follows with  $x$  being the number of years from 1977:

$$\text{Snowfall} = 0.0499x^2 - 1.5692x + 78.749$$

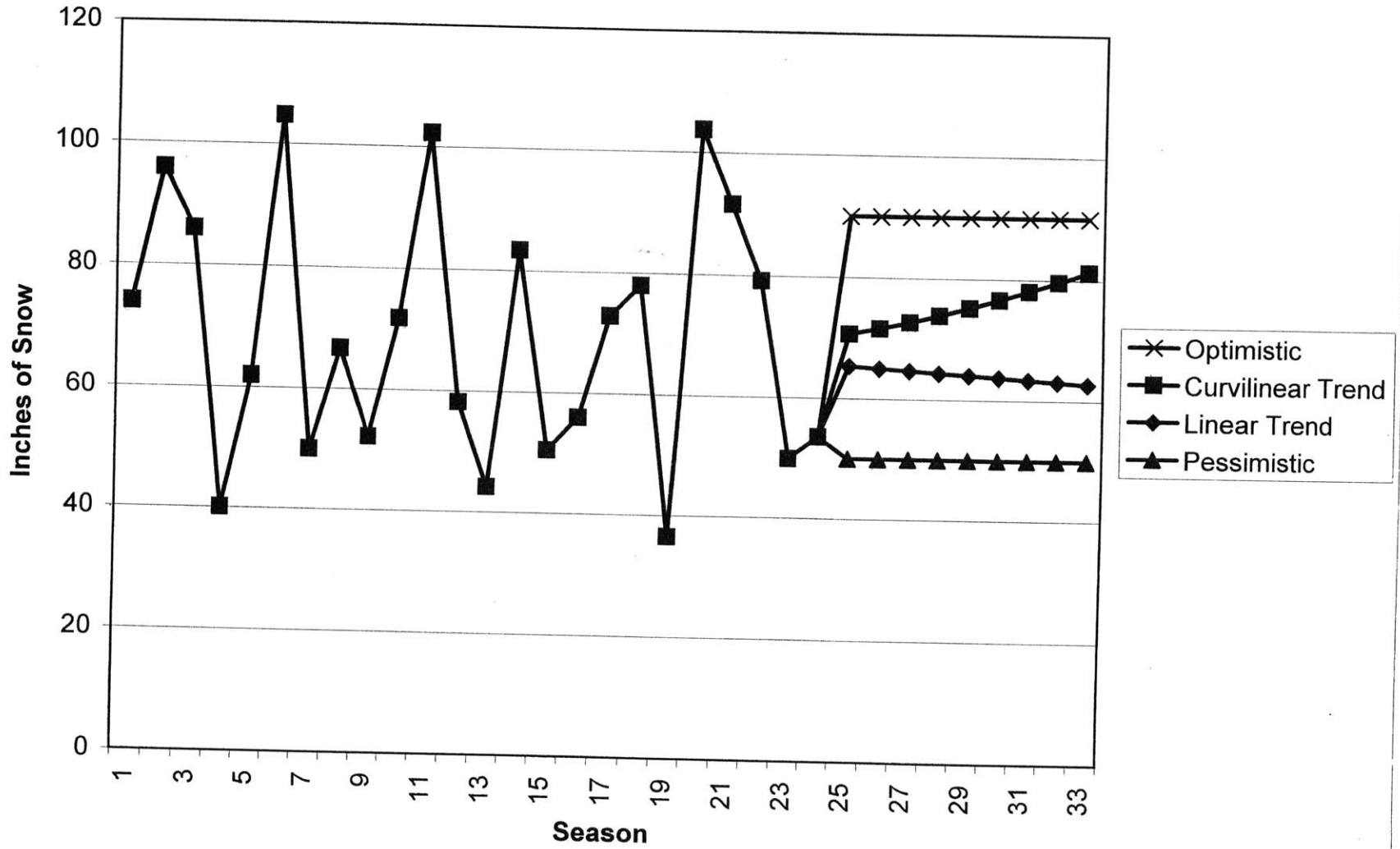
In order to perform more sensitivity in our final analysis, two more snowfall predictions will be made: pessimistic (50 inches per season) and optimistic (90 inches per season). Although these amounts might seem unrealistic, it allows comparison against several banner years or several bust years of snowfall. In Exhibit M a graph summarizes all snowfall estimates for Plymouth, NH using linear and curvilinear trends as well as the pessimistic and optimistic projections.

How important are the individual factors that make up the Skier Visit Equation: employment and snowfall? In order to test this, a sensitivity analysis was performed. Skier visits were calculated three times: 1) Base, where nothing was changed; 2) EMP Up, where the employment figures were scaled up by 2%, and 3) Snowfall Up, where the snowfall amounts were scaled up by 2%. The resulting skier visits from EMP Up and Snowfall Up were then compared back to the Base scenario. The following matrix should make the sensitivity runs clear:

	Base	EMP Up	Snowfall Up
Employment	0%	2%	0%
Snowfall	0%	0%	2%

EXHIBIT M

Historical Snowfall & Future Estimate



The following results were obtained:

<b>SKIERS VISITS</b>					
<b>Year</b>	<b>Base</b>	<b>EMP Up</b>	<b>Snowfall Up</b>	<b>EMP Up vs. Base</b>	<b>Snowfall Up vs. Base</b>
2001	13.3	13.5	13.4	1.6%	0.4%
2002	13.9	14.2	13.9	2.1%	0.6%
2003	14.2	14.5	14.2	2.3%	0.6%
2004	14.4	14.7	14.5	2.4%	0.6%
2005	14.5	14.9	14.6	2.5%	0.6%
2006	14.7	15.1	14.8	2.5%	0.6%
2007	14.9	15.2	14.9	2.5%	0.6%
2008	15.0	15.4	15.1	2.5%	0.6%
2009	15.1	15.5	15.2	2.5%	0.6%

When scaling up the employment numbers by 2% (EMP Up), a significant jump in skier visits can be seen from the chart above. At times during the study time frame, a 2.5% increase in skier visits is obtained (2005-2009). Comparing this outcome to the Snowfall Up scenario, scaling snowfall by a similar percentage, employment affects the total skier visits far greater than does snowfall. For example, in 2006, when changing employment by 2%, that year's skier visits jumps by 2.5%. But when snowfall is adjusted up by 2%, only a 0.6% increase is observed. Economy has a substantial greater role in determining skier visits than does snowfall.

A quick way to see these roles is by an elasticity measure. This is calculated by taking the outcome percentage change and dividing it by the input percentage change. For example, the employment elasticity on skier visits is  $2.5\% / 2\%$  or 1.25 (skier visits change by 1.25 times the change in employment). The elasticity for snowfall on skier visits is a mere  $.6\% / 2\%$  or .33 (changes in snowfall have less of an affect on skier visits than does the economy as measured by employment).



Some of the reasons behind this are that ski mountains are less susceptible to natural snowfall as artificial snowmaking has become the norm. Another reason behind the disparity is the fact that skiing is an expensive sport and is more influenced by fluctuations in the economy as opposed to other sports that require less travel, equipment, and entry fees.

## CHAPTER 4: SUPPLY

### Condo Stock:

Condo stock is the variable to describe the total number of condos in the “Lin-Wood” area, a combination of the two townships Lincoln and Woodstock, NH. Since no official condo count is available, a manual count was performed on all residential condos. “Lin-Wood” is defined as starting on US Route 3 in Woodstock, NH (just north of town) at the Alpine Village development, running south into US Route 112, then into Lincoln, NH, through the Lincoln town center, past Loon Mountain Ski resort and ending at the Clearbrook II residential development (see the map in Exhibit N). This area contains the highest concentration of ski condo development for Loon Mountain and is the area most influenced by the ski area. A list of all the developments is included in Appendix C. Every condo was counted as one, regardless of style: a single townhouse, duplex, triplex, multiplex or affiliated with a hotel. From Exhibit O, a dominant spike in development occurs from 1984 through 1989.<sup>4</sup> This thesis will not attempt to explain this phenomenon, which is heavily linked to the United States Government tax policy regarding second home’s depreciation benefits. The information, however, will be used to help predict the change in condo prices as the stock and change in stock fluctuate. From the graph, note that during the five to six year boom, over 75% of all the condos in the area were built. This frenzy of development could only remain viable for so long, as can be seen from the lack of development during the last decade (only 160 condos constructed or 7.4% of the total stock).

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<sup>4</sup> See Appendix D to see condo construction at only The Village of Loon Mountain.

**EXHIBIT N**

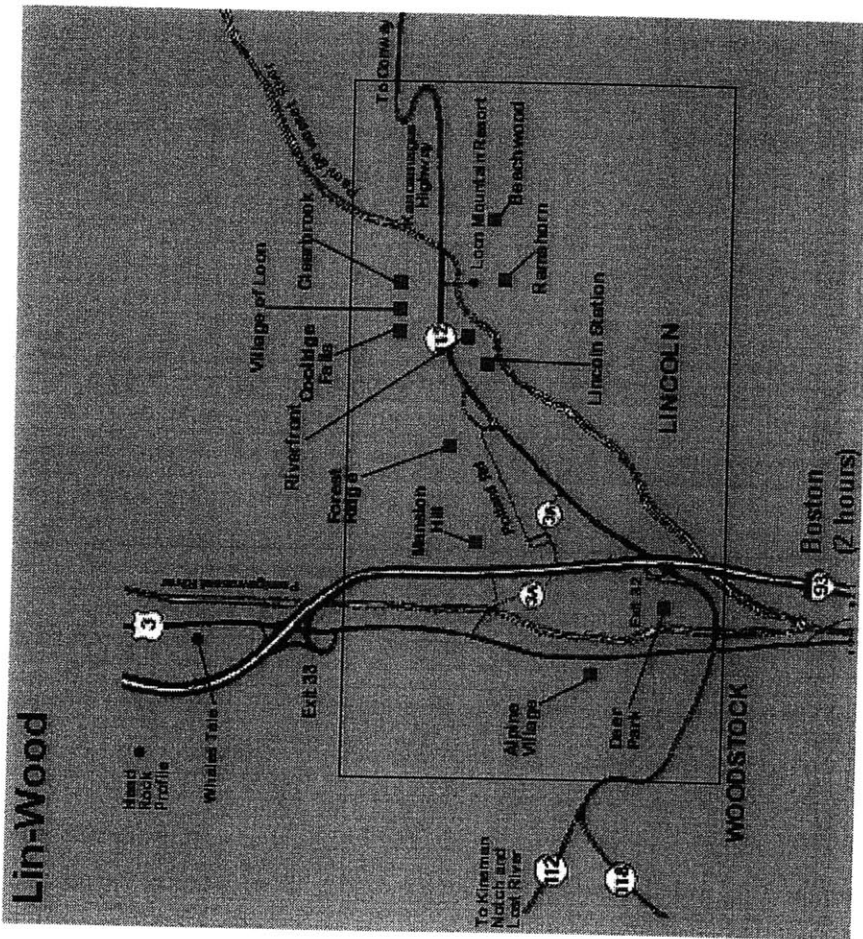
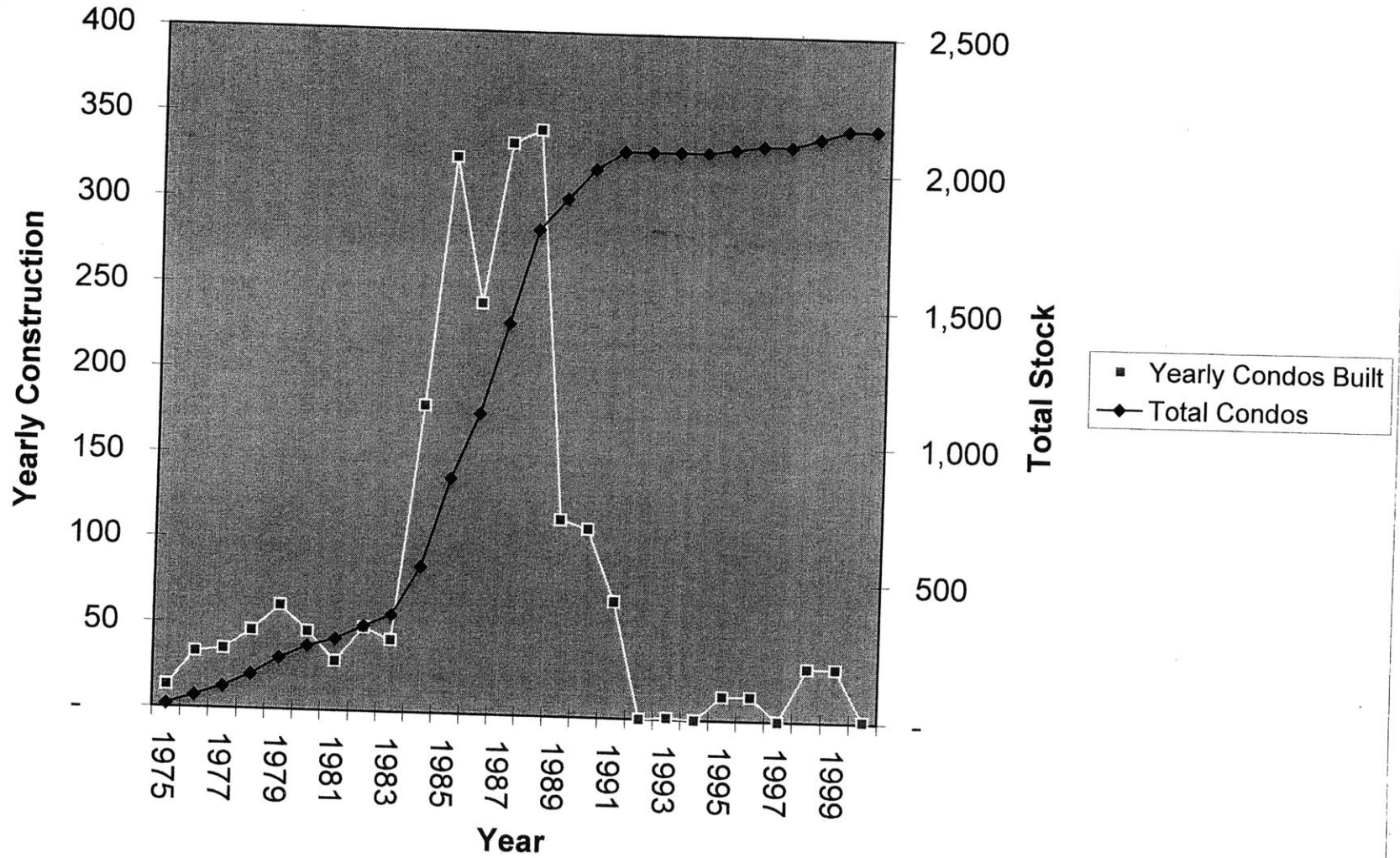


Exhibit O

### Lin-Wood Ski Condo Stock



Condo Stock Equation:

This equation is used to predict the number of new condos constructed. Using past condo completions from 1977 through 2000, a regression was performed in order to construct the Condo Stock Equation. The change in the number of condos (new condos constructed) is the dependent variable. The change in the number of condos is dependent on the number of condos built the year before, the real price index, and skier visits. Using only these three variables an R<sup>2</sup> of .71 is achieved. Almost three-fourths of the variation in condo construction can be explained by only these three variables. The regression ANOVA output is displayed in Exhibit P. The first variable is hedonic and depends only on backward looking information. This variable captures the momentum in condo construction, which in fact there is, as the variable possesses a significant t-statistic of 1.94. The next variable in the regression is the real price index that was calculated earlier in order to look at the sales data yearly, without noise or preference affects. Again this index is used to measure the trend in ski condo prices throughout the study period. It uses The Village of Loon Mountain as the sample for the entire region. The last variable, skier visits, is significant as the more skiers there are in the area, the more development will occur.

The equation found to predict the change in condos follows:

$$\begin{aligned} \text{Change in Stock} = & [-365.699] + [0.400 * (\text{Change in Stock} - 1)] \\ & \quad \quad \quad (-2.13) \quad \quad \quad (1.95) \\ & + [1.96 * (\text{Real Price Index})] + [19.336 * (\text{Skier Visits})] \\ & \quad \quad \quad (2.36) \quad \quad \quad (1.82) \end{aligned}$$

**EXHIBIT P**

**Change in Stock Equation**

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.843593345
R Square	<b>0.711649732</b>
Adjusted R Square	0.666120742
Standard Error	65.55953602
Observations	23

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	201544.6497	67181.54989	15.63069455	2.29837E-05
Residual	19	81663.00249	4298.052763		
Total	22	283207.6522			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-365.6992607	171.9113414	-2.127255001	0.046716672	-725.5139452	-5.88457613	-725.5139452	-5.88457613
X Variable 1	0.399985715	0.205646437	1.945016506	0.066724366	-0.030437359	0.830408788	-0.030437359	0.830408788
X Variable 2	1.964343489	0.834072879	2.355122123	0.029418751	0.218608348	3.710078629	0.218608348	3.710078629
X Variable 3	19.33607438	10.62309286	1.82019254	0.084520612	-2.898321425	41.57047019	-2.898321425	41.57047019

As can be seen, Change in Stock works hand in hand with the Real Price Index (the second variable) and all three equations (supply, demand and price) are needed to predict future sales prices and future condo construction.

An interesting relationship can be obtained from this equation that relates the number of new condos constructed for a given jump in real prices. In short, it can tell us how many condos are built when prices go up by x%? To answer this question, three scenarios were set up with different price jumps: 5%, 10%, 15%. When the Real Price Index variable in the above equation was inflated by these percentages (keeping the other variables constant) the number of condo constructions increased tremendously. The following matrix displays the results and shows how highly sensitive condo construction is on price swings.

Increase in Real Prices	5%	10%	15%
Increase in Condo Starts	23%	43%	67%

It seems that with any increase in real prices, condo construction quickly responds. In the final econometric model, it will be demonstrated how this immediate response by the market keeps condo prices stagnant.

## CHAPTER 5: Model

### Real Price Equation:

The Real Price Equation will be the one used to forecast ski condo prices. Using the Real Price Index as the dependent variable and Skier Visits, Real Price Index-1, Stock-1, and Real Prime as independent variables, a regression was run. The regression's ANOVA table is shown in Exhibit Q and achieved an overall  $R^2$  of 94%. With this high of correlation, there is little else that could be added to get a better fitted line.

The real prime interest rate is the prime rate with affects of inflation removed. For example, if the prime lending rate is 8.5% and inflation, as measured by the CPI, is running 3.5%, the real cost of money is 5.0%. As the real cost of money increases, it is intuitive that less people will be able to buy ski condos and the prices will deflate. See Exhibit R for a chart and table of the prime rate and real prime rate during the study period

The coefficients from the regression are interesting to look at. Skier Visits and Real Price Index-1 are positively correlated to condo prices. In other words, as the number of skiers increased, the prices for condos increased and if the price of condos increased the year before, the equation predicts they will increase in the current year. Stock-1 and Real Prime behaved dissimilar. When last year's condominium stock increased, the current price for condos decreased. Negative relationship also holds also for the Real Prime variable, as money becomes more expensive to borrow, the price for



**EXHIBIT Q**

**Price Equation**

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.970233296
R Square	<b>0.941352648</b>
Adjusted R Square	0.928319904
Standard Error	7.152659373
Observations	23

ANOVA

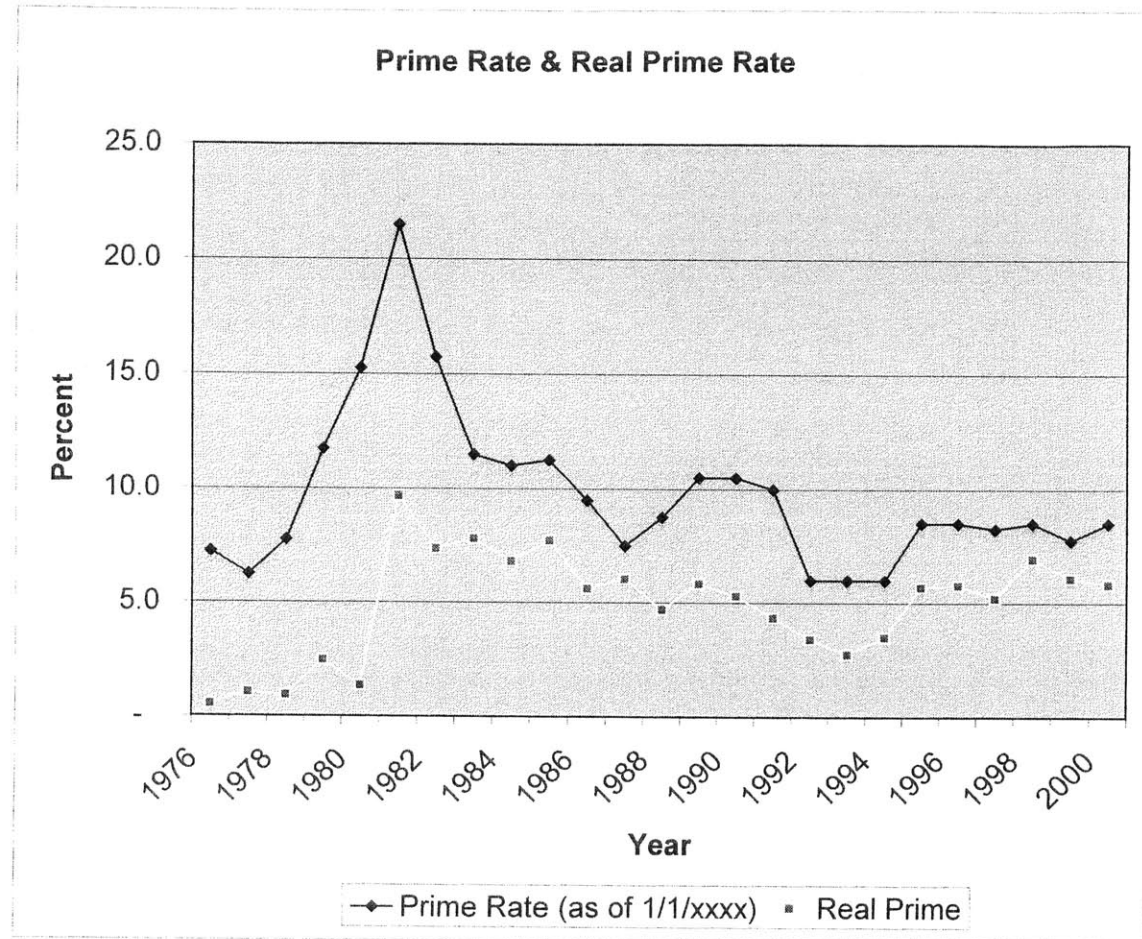
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	14781.26272	3695.31568	72.22980761	7.77473E-11
Residual	18	920.88965	51.16053611		
Total	22	15702.15237			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	1.799536834	14.17689472	0.126934485	0.900399483	-27.98503679	31.58411046	-27.98503679	31.58411046
X Variable 1	3.565264624	1.211657721	2.942468457	0.008707603	1.019664243	6.110865006	1.019664243	6.110865006
X Variable 2	0.727463828	0.082444309	8.82369976	5.90679E-08	0.554254628	0.900673027	0.554254628	0.900673027
X Variable 3	-0.012957814	0.00321821	-4.02640415	0.000791871	-0.019719027	-0.0061966	-0.019719027	-0.0061966
X Variable 4	-0.512153013	0.727405817	-0.704081548	0.490391303	-2.040377109	1.016071082	-2.040377109	1.016071082

**EXHIBIT R**

**Prime Interest Rate**

<u>Year</u>	<u>As of Jan-01</u>	<u>Real Prime</u>
1976	7.25	0.53
1977	6.25	1.03
1978	7.75	0.91
1979	11.75	2.47
1980	15.25	1.34
1981	21.50	9.67
1982	15.75	7.36
1983	11.50	7.79
1984	11.00	6.81
1985	11.25	7.72
1986	9.50	5.61
1987	7.50	6.04
1988	8.75	4.70
1989	10.50	5.83
1990	10.50	5.30
1991	10.00	4.35
1992	6.00	3.40
1993	6.00	2.74
1994	6.00	3.48
1995	8.50	5.70
1996	8.50	5.77
1997	8.25	5.21
1998	8.50	6.93
1999	7.75	6.08
2000	8.50	5.82



ski condos fall. All four relationships are intuitive and explain almost all the variation in the model.

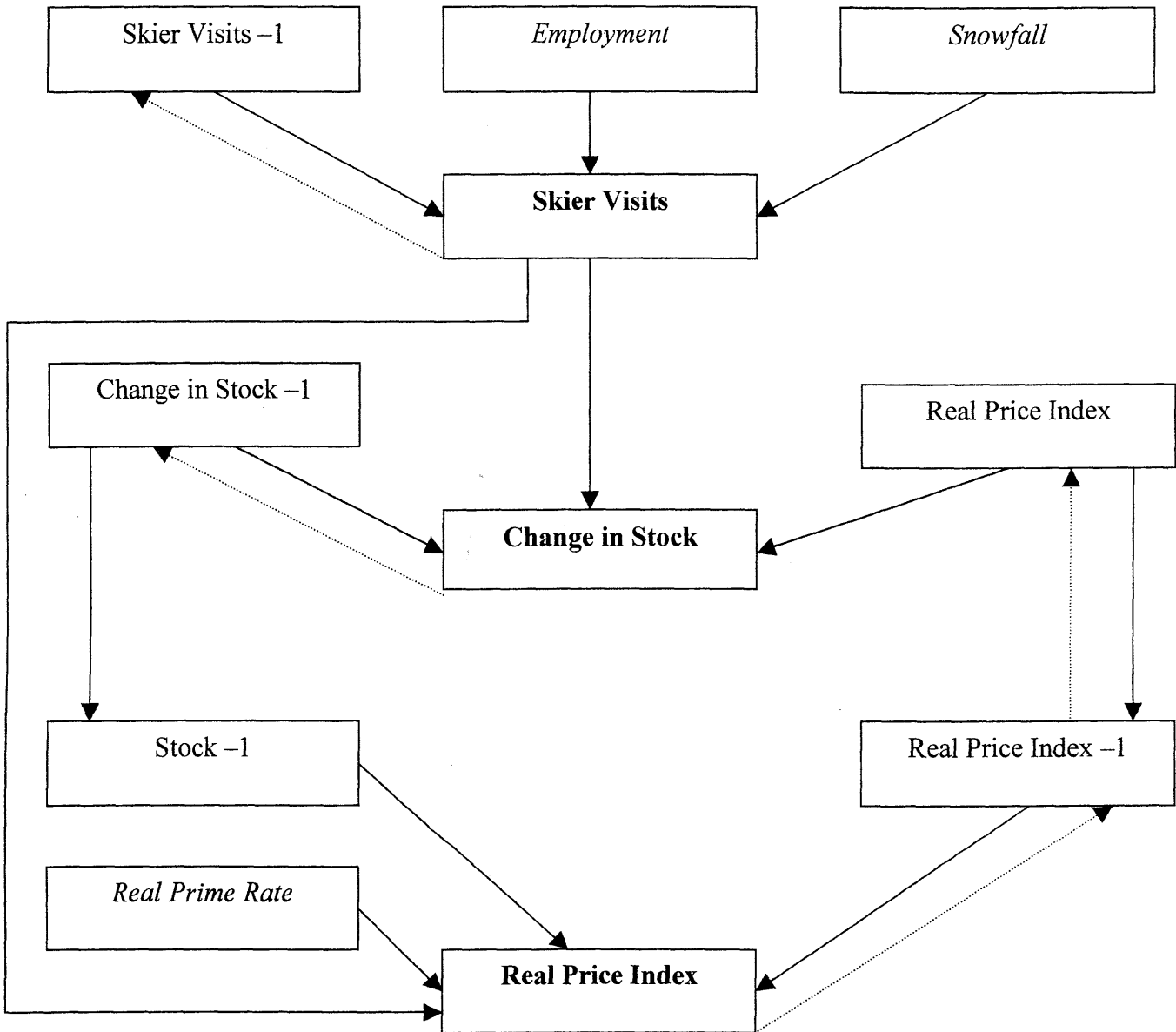
One t-statistic of note is the one for the Real Price Index-1. With a value of 8.82, this independent variable has lots of affect on the change in prices. It seems that momentum in condo prices (past prices having an affect on today's prices) plays a large role in determining prices. Arguably, there seems to be a large "herd mentality" that drives the prices either up or down.

The Price Equation follows:

$$\begin{aligned}
 \text{Real Price Index} = & \mathbf{1.800} + [3.565 * (\text{Skier Visits})] + [0.727 * (\text{Real Price Index-1})] \\
 & \quad (.13) \qquad \qquad (2.94) \qquad \qquad \qquad (8.82) \\
 - & [0.013 * ((\text{Stock-1}))] - [0.512 * (\text{Real Prime})] \\
 & \qquad \qquad \qquad (-4.03) \qquad \qquad \qquad (-.70)
 \end{aligned}$$

Again, this equation works directly with the Change in Stock Equation and all three are needed to construct the model. The chart on the next page will help show the relationships with the three equations that form the econometric model (*italics* are direct inputs, squares are variables, and **bold** signifies final equations).

### Econometric Model of Ski Condo Prices



## CHAPTER 6: Simulation

Using the three equations: Skier Visits, Real Price Index and Change in Stock, it is now possible to predict future prices and future condo stock. These three equations, drive off of only three variables: Real Prime Rate, Employment and Snowfall. In order to run the model, the real prime rate, employment and snowfall will need to be predicted for the forecast period of nine years. The Federal Reserve forecasts employment numbers through 2009, which can be seen again in Exhibit L. The prediction is for employment growth in the Boston area to average 0.9% per annum. This is an anemic growth rate for an area currently flourishing in the high-tech and financial industries. A sensitivity analysis doubling this growth rate to 1.8% over the forecast period is performed in the fifth scenario.

The Federal Reserve does not forecast interest rates and therefore this data will need to be calculated using past information. As discussed above, the real prime rate is the prime rate with inflation removed. From 1991 to 2000, the prime rate has fluctuated from a low of 6.0% to a high of 10.0% and has a mean average of 7.8%. Inflation, as tracked by the CPI, has had a range of 1.6% to 5.7% and an average of 2.9%. The difference between these two averages is 4.9%, but for the sake of simplicity, 5.0% will be used for the Real Prime Rate from 2001 to 2009.

As mentioned earlier, two trends have been fitted to the historical snowfall in the Plymouth, NH area: a linear trend and a curvilinear trend. The linear trend forecasts natural snowfall to decrease throughout the forecast period, while the curvilinear trend line shows a slowly up ticking snowfall. To increase the sensitivity in the analysis, two

more snowfall amounts will be used. The first test will show a bust season for snow. The model will use 50 inches of snow in this scenario. The second test will be for a banner snowfall; 90 inches of snow will be forecasted through the year 2009 in order to see the affects of exceptional ski conditions on ski condo prices and stock. The following schedule summarizes the four scenarios ranging from worst case to best case (snowfall is in inches). A graph of historical snowfall with these scenarios is displayed back in Exhibit M.

<u>Year</u>	<u>Bust</u>	<u>Linear</u>	<u>Curvilinear</u>	<u>Banner</u>
2001	50.0	65.3	70.7	90.0
2002	50.0	65.0	71.7	90.0
2003	50.0	64.7	72.8	90.0
2004	50.0	64.4	73.9	90.0
2005	50.0	64.0	75.2	90.0
2006	50.0	63.7	76.6	90.0
2007	50.0	63.4	78.1	90.0
2008	50.0	63.1	79.6	90.0
2009	50.0	62.8	81.3	90.0

The following chart summarizes all five runs using the econometric model.

<b>Case</b>	<b>Snowfall Schedule</b>	<b>Employment Growth</b>	<b>Real Prime Rate</b>
1	Bust	0.9%	5.0%
2	Linear	0.9%	5.0%
3	Curvilinear	0.9%	5.0%
4	Banner	0.9%	5.0%
5	Linear	1.8%	5.0%

#### Case 1 – Bust Snowfall

The first case is the most pessimistic outcome for the next nine years: worse than normal snowfall, non-stellar employment growth for the Boston area and a consistent 5% real prime rate. As can be seen in Exhibits S.1-S.3, these inputs produce several

**EXHIBIT S.1**

**Ski Visits - Bust Case**

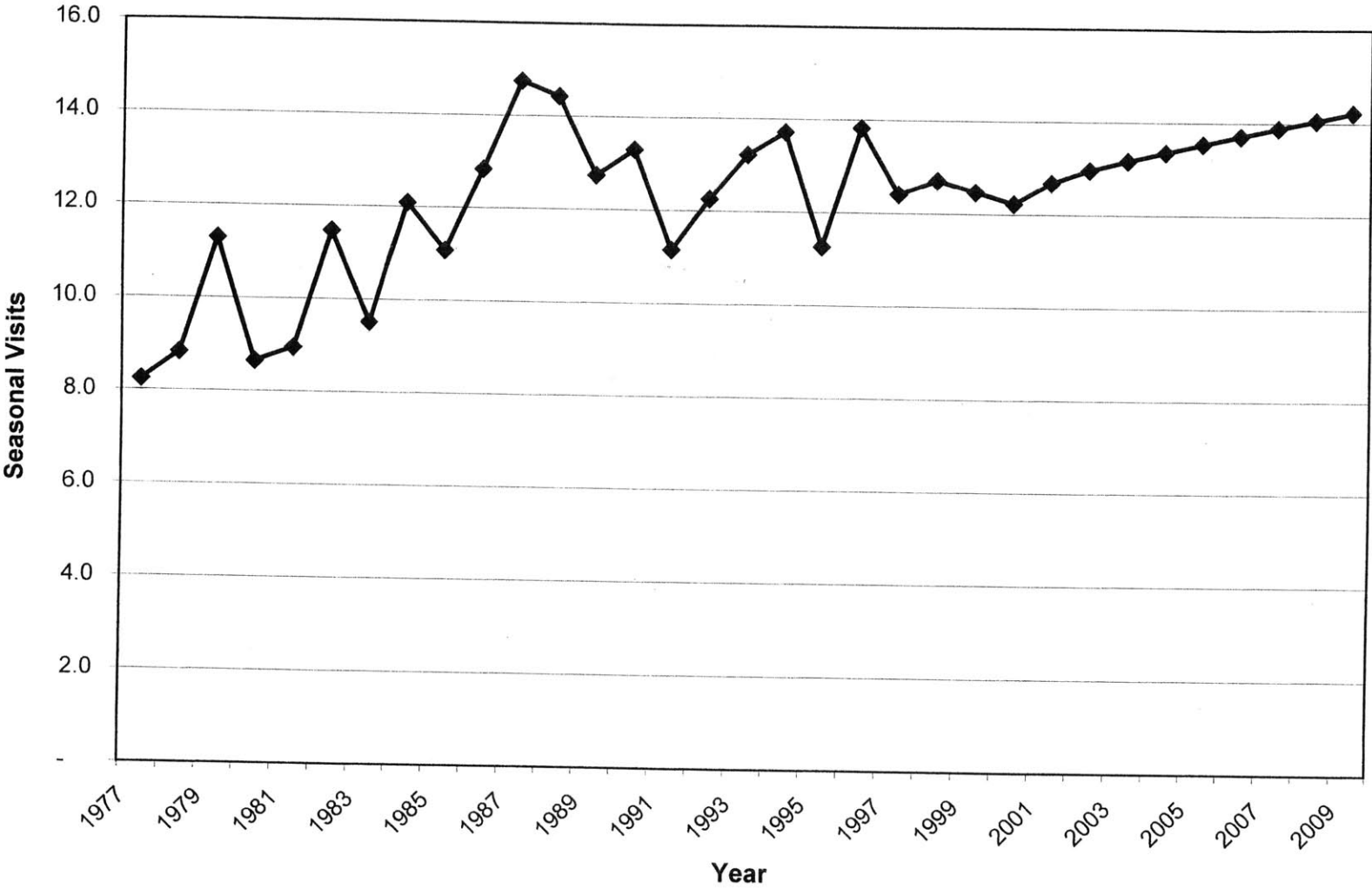
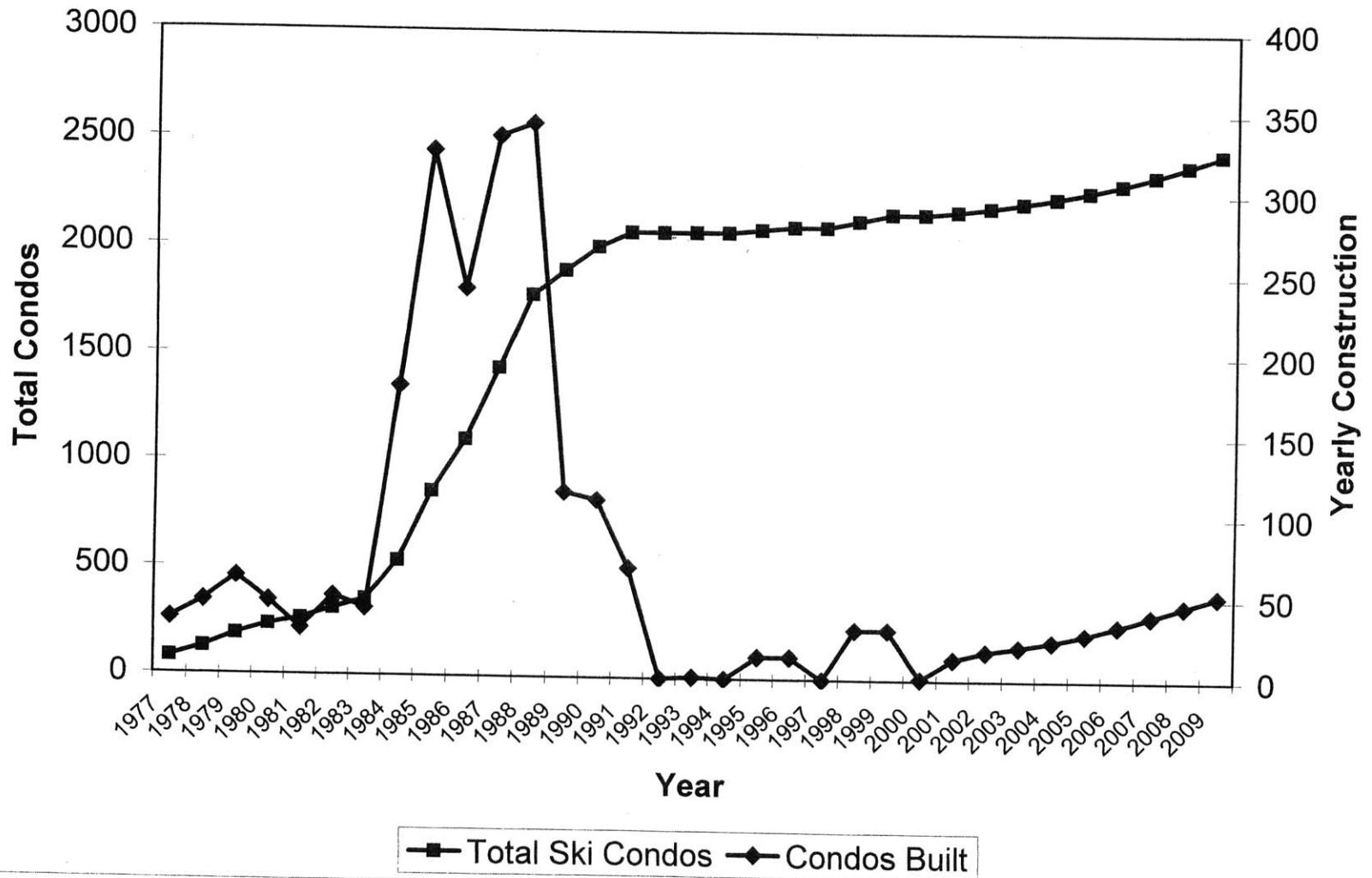


EXHIBIT S.2

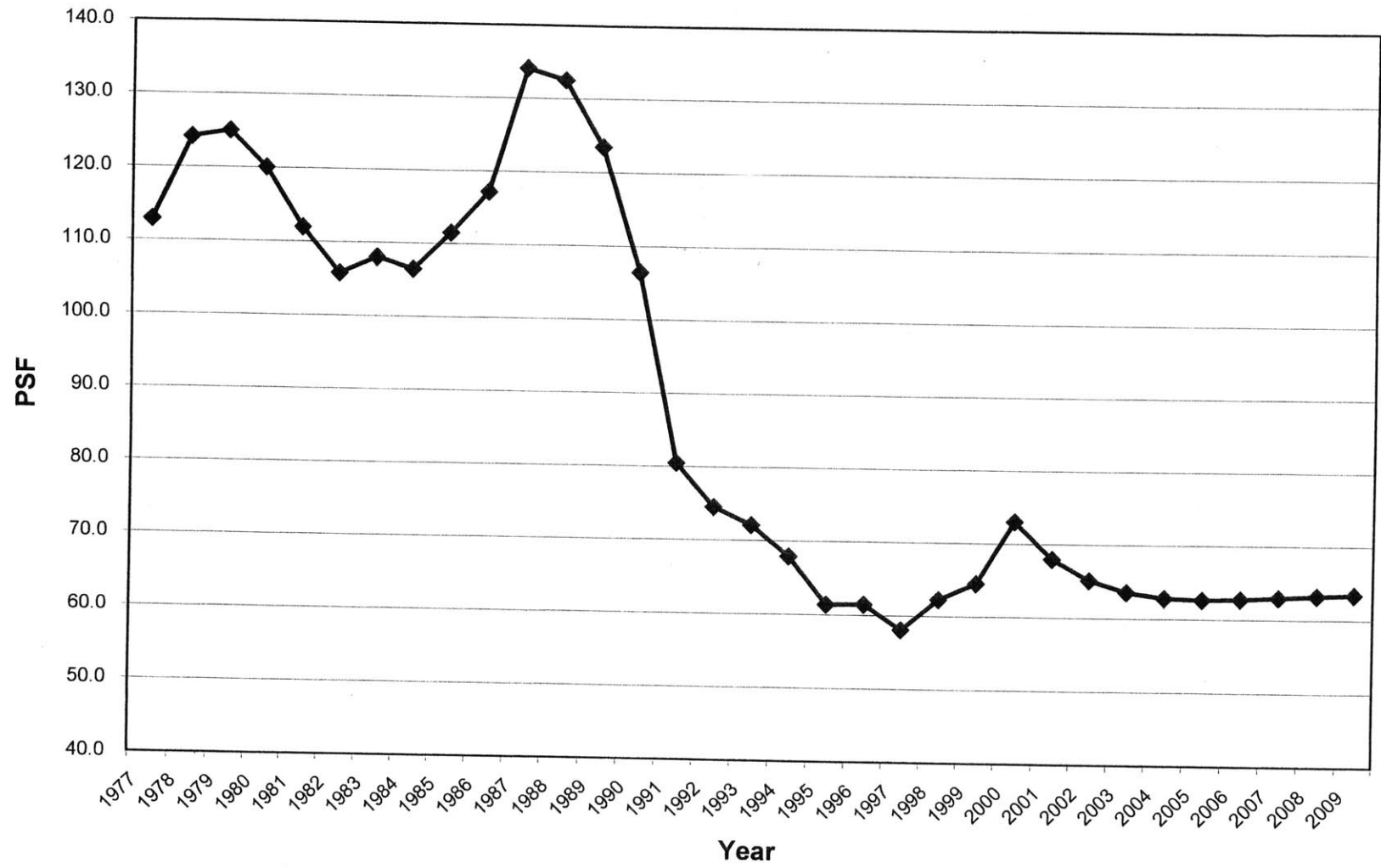
Ski Condo Stock - Bust Case





**EXHIBIT S.3**

**Real Price Index Forecast (Year 2000 \$'s) - Bust Case**



interesting projections. In regards to the skier visits for the northeast region, the model predicts a first year increase of 3.7%, and reverses a two-year downward trend. The growth gradually wanes to 1.2% as the skier count approached the long-term trend.

The skier visit forecast is fed directly into both the Price Index Equation and the Stock Equation. The flat skier visit growth translates into a reversal in ski condo prices as well as further stagnated condo construction. The Price Equation produces a reversal in the recent up tick in ski condo prices with a first year (2001) 6.9% drop in prices as the model senses too much condo stock per number of skier visits leading to little new condo construction for the immediate future.

#### Case 2 – Linear Declining Snowfall

The second case looks a bit more positively on forthcoming snowfalls (Exhibits S.4 -S.6. This case continues the decreasing linear trend observed in historical snowfalls. The line decreases snowfall  $-0.5\%$  per annum from 2001 to 2009. Like the “bust” scenario, skier visits increase, but this time more markedly, by 9.0% in the 2001 ski season and reverses a two-year downward trend. As ski counts return to the longer run trend, the increase slows to about 1% annually, keeping in line with the growth in employment. Feeding the projected skier counts into both the Stock and Price Equations, creates a small condo building boom, even though prices stagnate. The condo stock increases at about 3.5% per year, which attracts any potential price appreciation from demand stemmed by the higher skier visits and causes condo prices to stabilize and eventually slowly decline.

EXHIBIT S.4

Ski Visits - Linear Trend Case

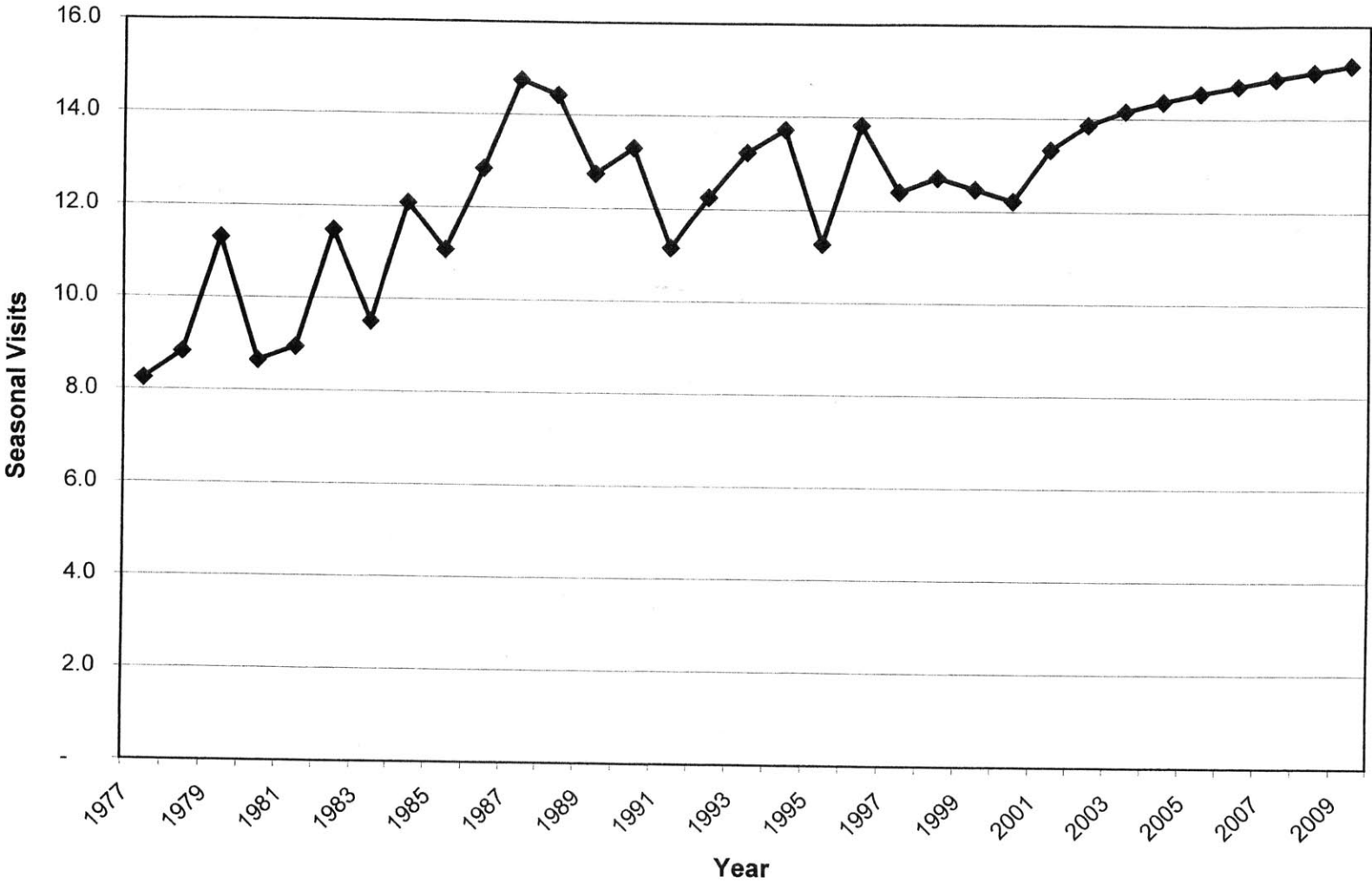
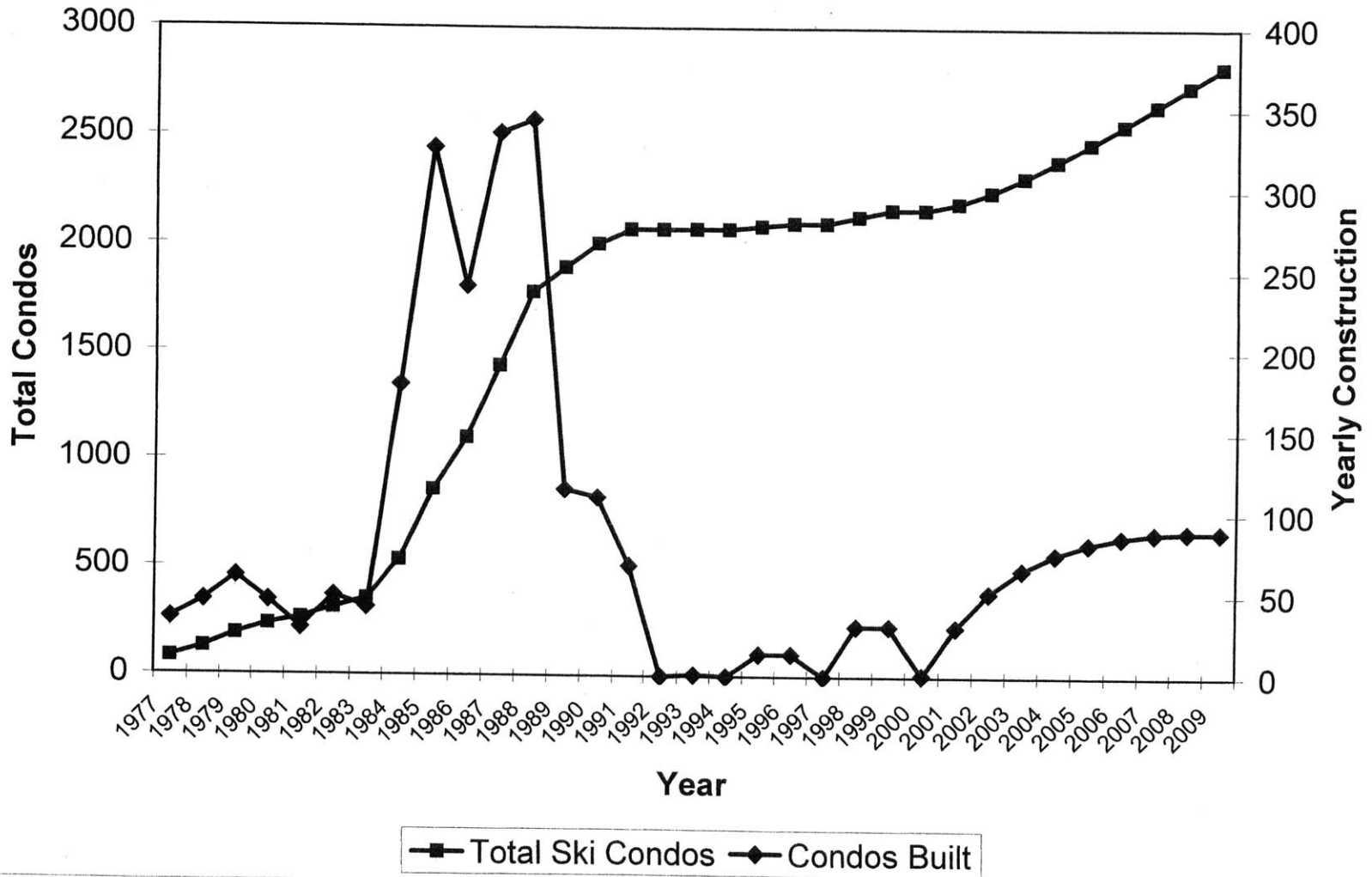


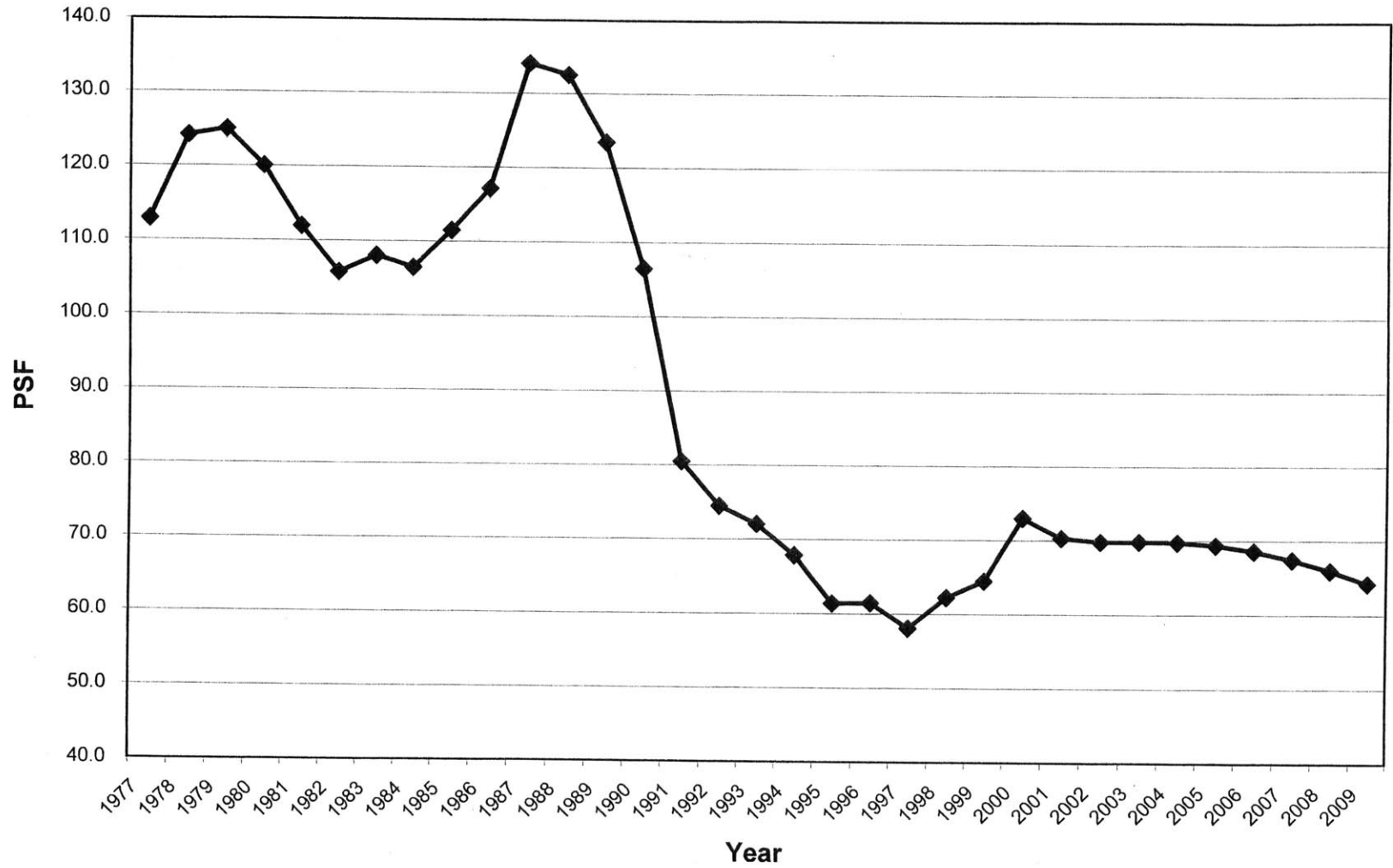
EXHIBIT S.5

Ski Condo Stock - Linear Trend Case



**EXHIBIT S.6**

**Real Price Index Forecast (Year 2000 \$'s) - Linear Trend Case**



### Case 3 – Upward-sloping Curvilinear Snowfall

A more optimistic view looks at the curvilinear trend applied to the snowfall amounts. Looking back to Exhibit K, this trend predicts a snowfall bottom in 1992 and a slow increase going forward. From 2001 to 2009, snowfall is expected to increase 1.4% in the first year to as much as 2.1% in the ninth year. Inserting this nine-year snowfall into the Skier Visit Equation produces a significant pop in 2001 of 10.9% and returns northeast skier counts to 13.6 million (Exhibit S.7) The boom in skiing tapers off through the forecast period and in 2009 achieves yearly growth of 1.7%. Condo construction supply immediately jump starts in reaction to the higher skier visits and achieves a consistent supply of new condos of 4.8%. Like the other two scenarios, though, the supply is enough to keep prices in check, which the model shows a predominately flat price response (Exhibits S.8 -S.9).

### Case 4 – Banner Snowfall

If a banner future is predicted for snowfall in the region, there is a dramatic reaction in skier visits, condo prices and new supply as can be seen in Exhibits S.10-S.12. Skier counts immediately jump 17.6% and reach late 1980's levels. The increases continue, albeit slower, through 2003, when they plateau at a 1.0% yearly increase. The boom continues with condo prices and development. In this scenario, the recent up tick in condo prices (in 1999 and into 2000) is held and actually continues for a few more years. Ski condo stock reacts similarly with a spike in activity in the first year and carries through until 2006 when construction starts to back down. The prices react positively with the greater demand, but unlike construction, tapers off early on in 2004. The model

EXHIBIT S.7

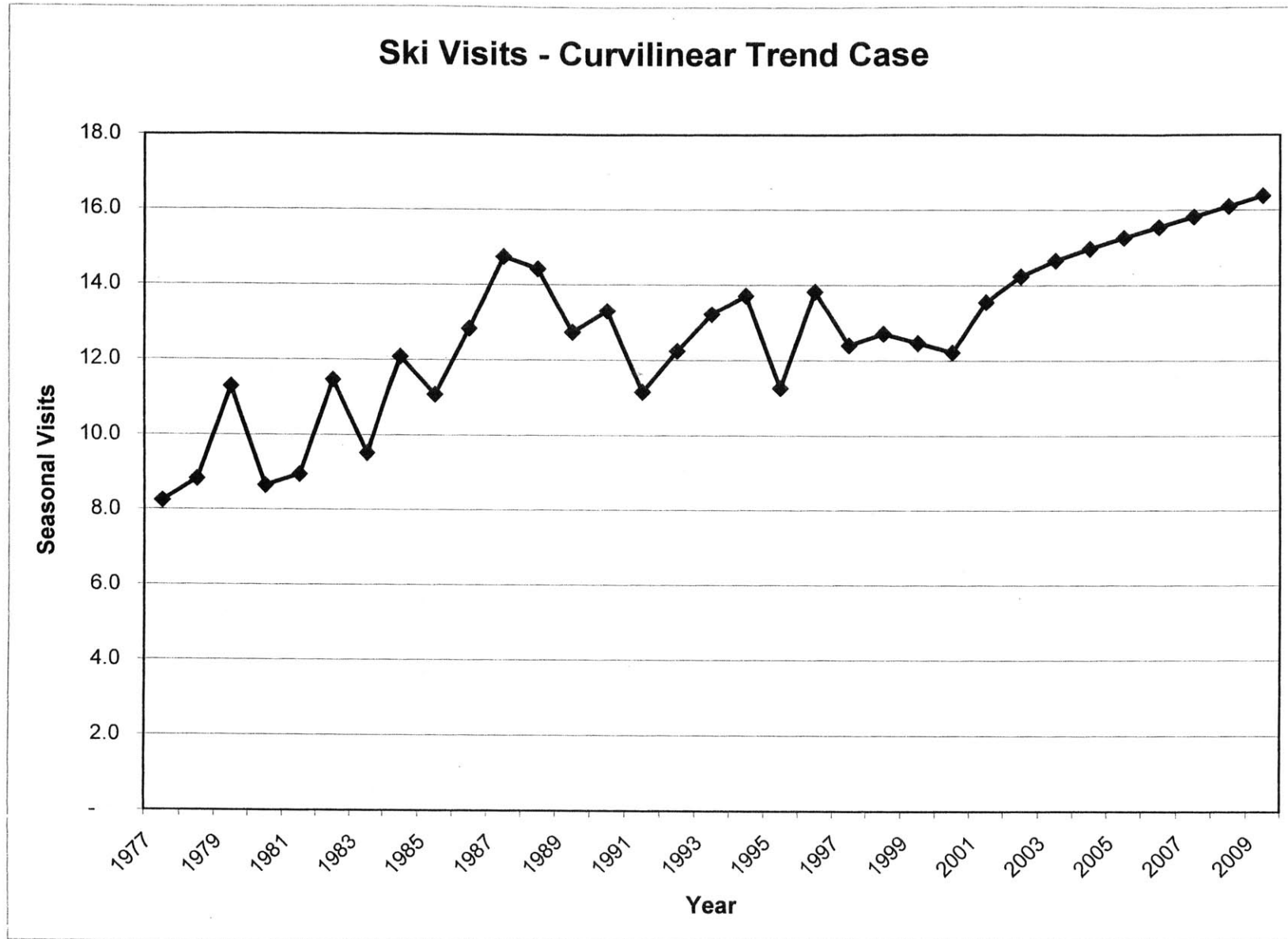
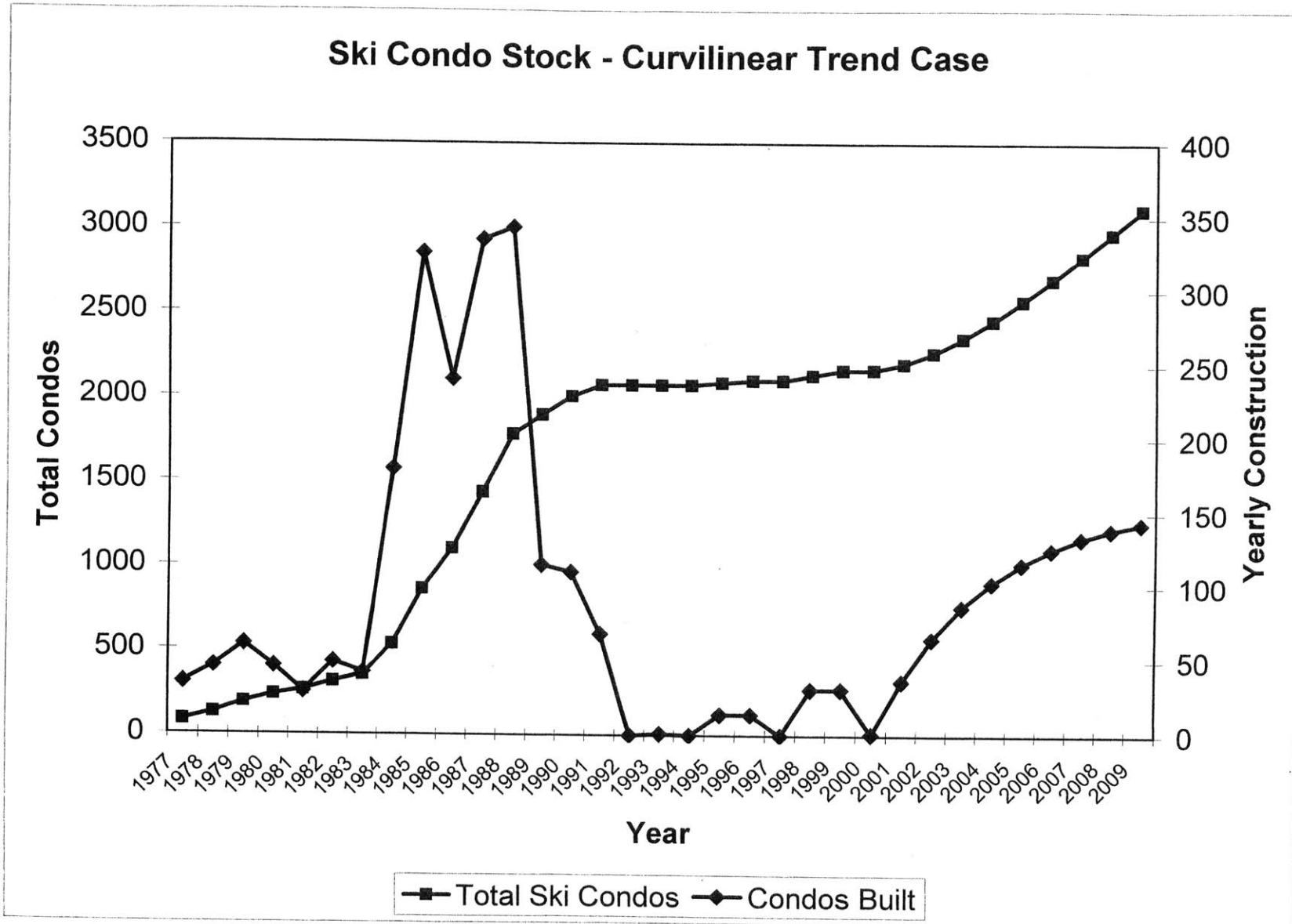


EXHIBIT S.8

09





**EXHIBIT S.9**

19

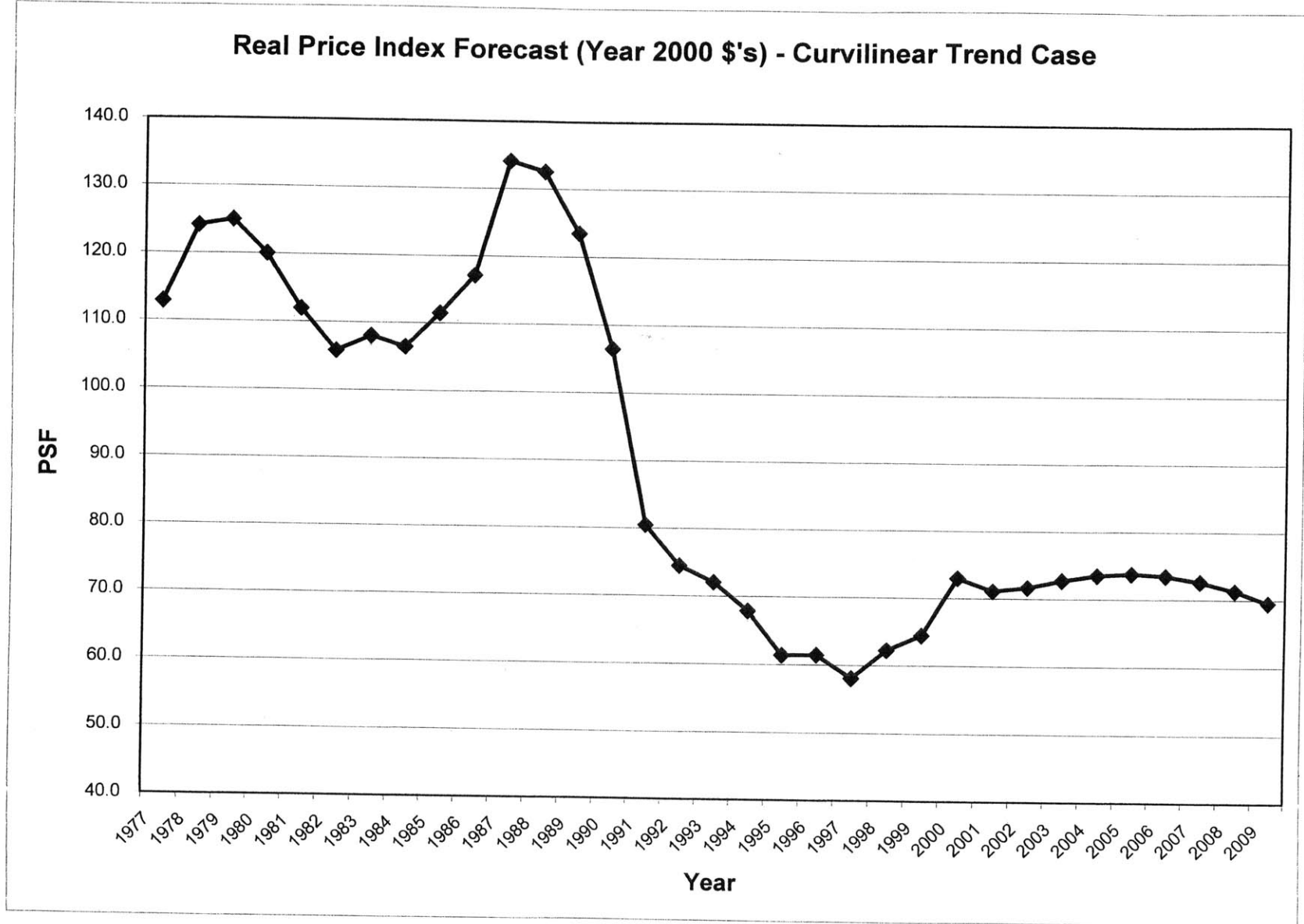


EXHIBIT S.10

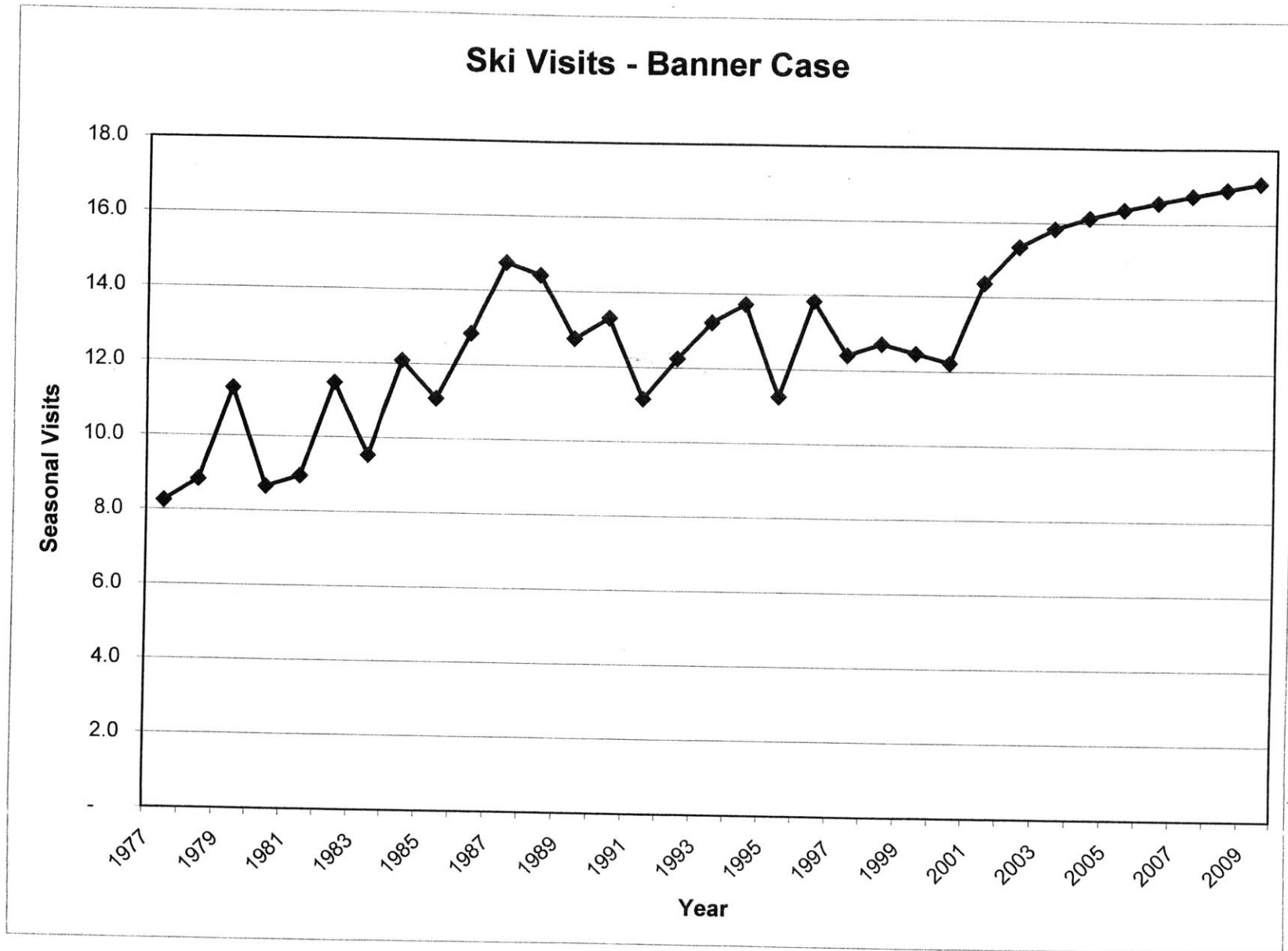
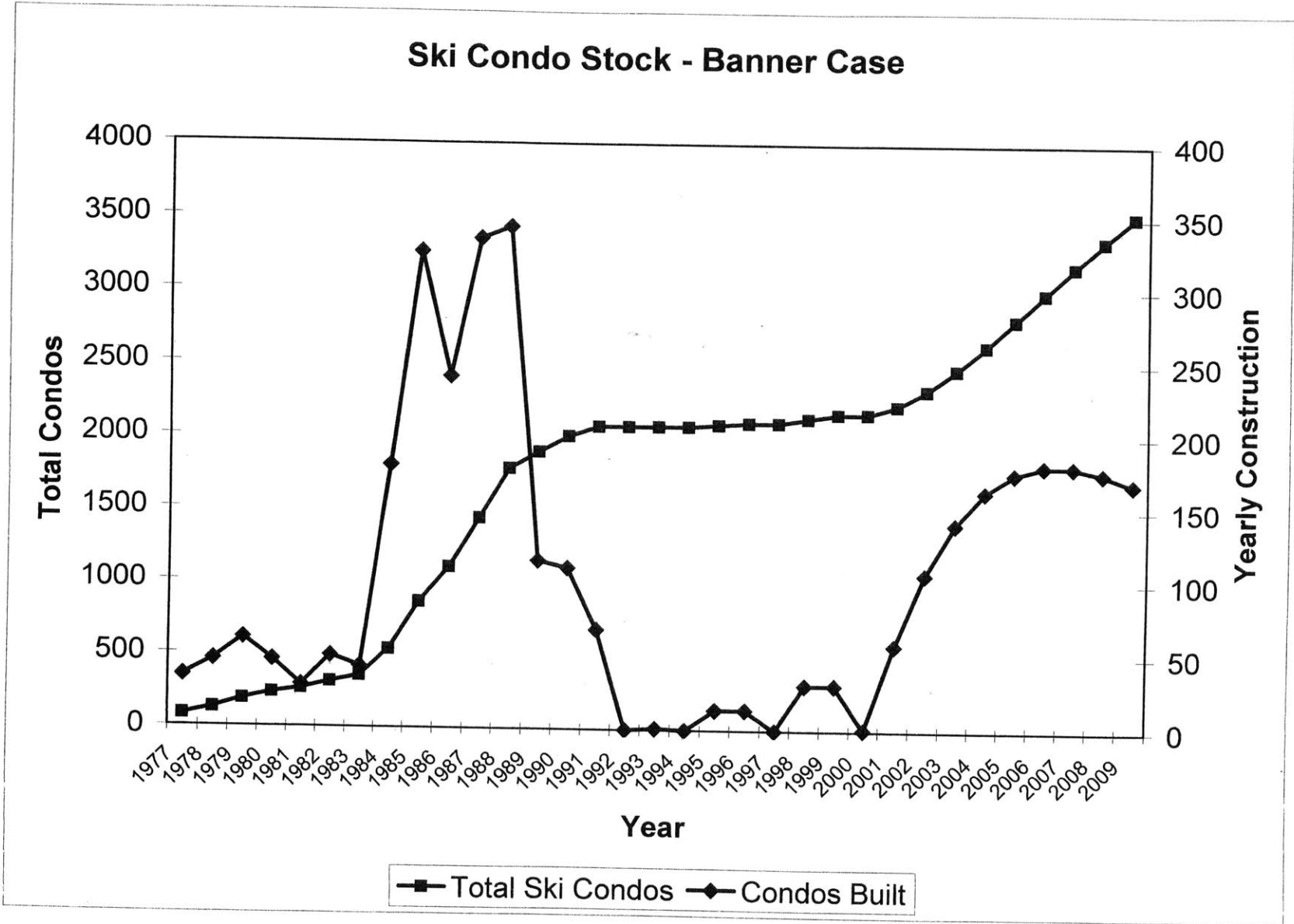


EXHIBIT S.11



**EXHIBIT S.12**

**Real Price Index Forecast (Year 2000 \$'s) - Banner Case**



senses the overbuilding phenomenon and reacts with falling stock and falling prices after the initial boom.

#### Case 5 – Declining Linear Snowfall with Better Economy

The final case projects a declining linear trend with regards to snowfall, but doubles the employment growth in the Eastern Massachusetts region (Exhibits S.13-S.15). It is best to look at this final example keeping in mind the second scenario that ran the model also at the linear snowfall trend. By doubling the economic growth in Boston, the number of skier visits responds positively. Instead of a jump in the first year of 3.7% (as in case #2), the employment effect produces an immediate 9.0% jump and wanes to a final 2.1% growth in 2009. Condo construction reacts extremely positively with 31 new condos built in 2001 and reaching a highpoint of 144 new condos in the final year of the analysis. But this construction boom affects prices differently than with the slower economy. Here, the model shows the prices stabilizing at 2000 prices for many years. The boom is less susceptible to oversupply as the stronger economy produces a faster skier visit growth rate (2.1% vs. 1.2%), keeps demand for condos high, and causes prices to stabilize.

EXHIBIT S.13

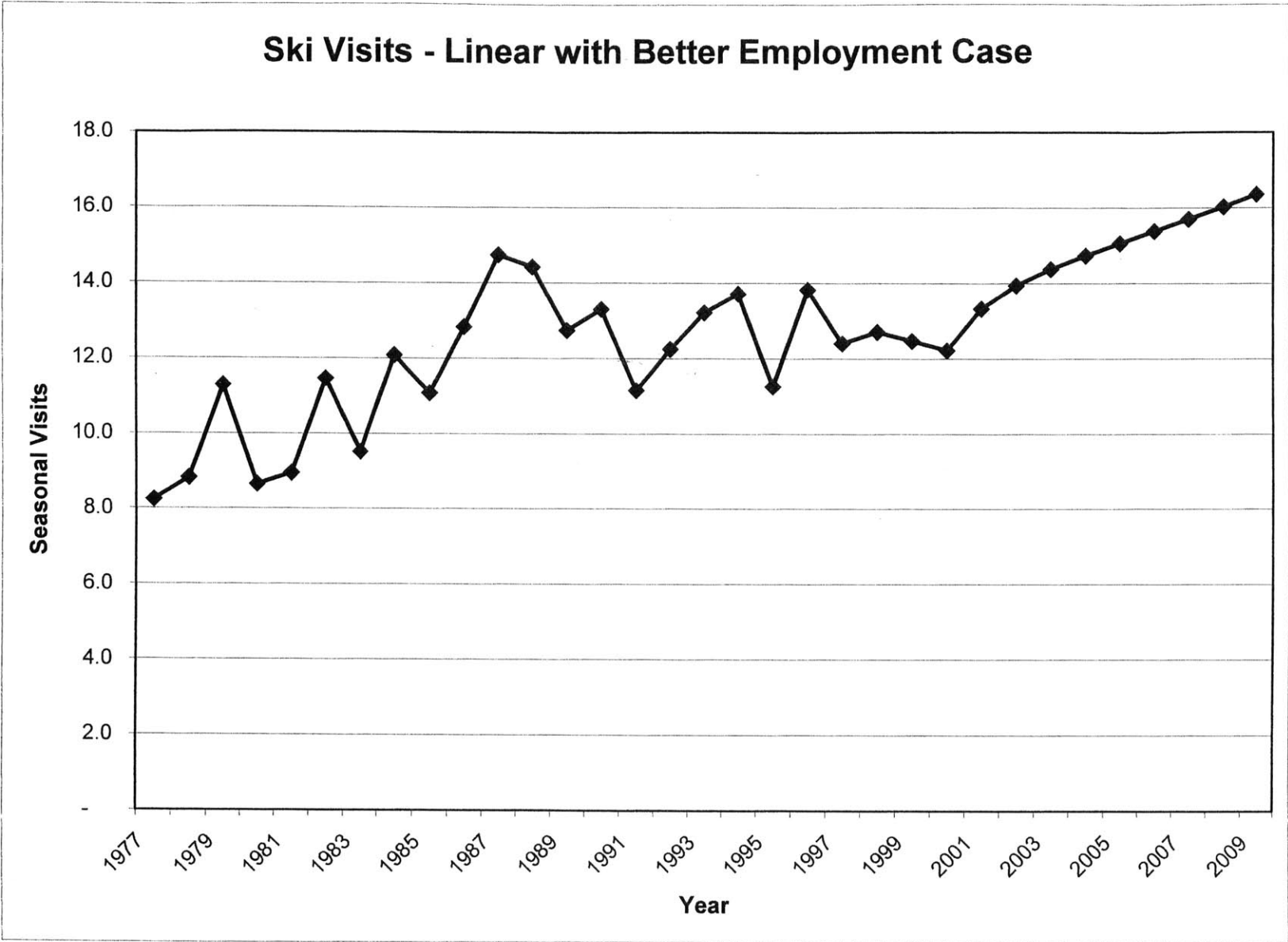
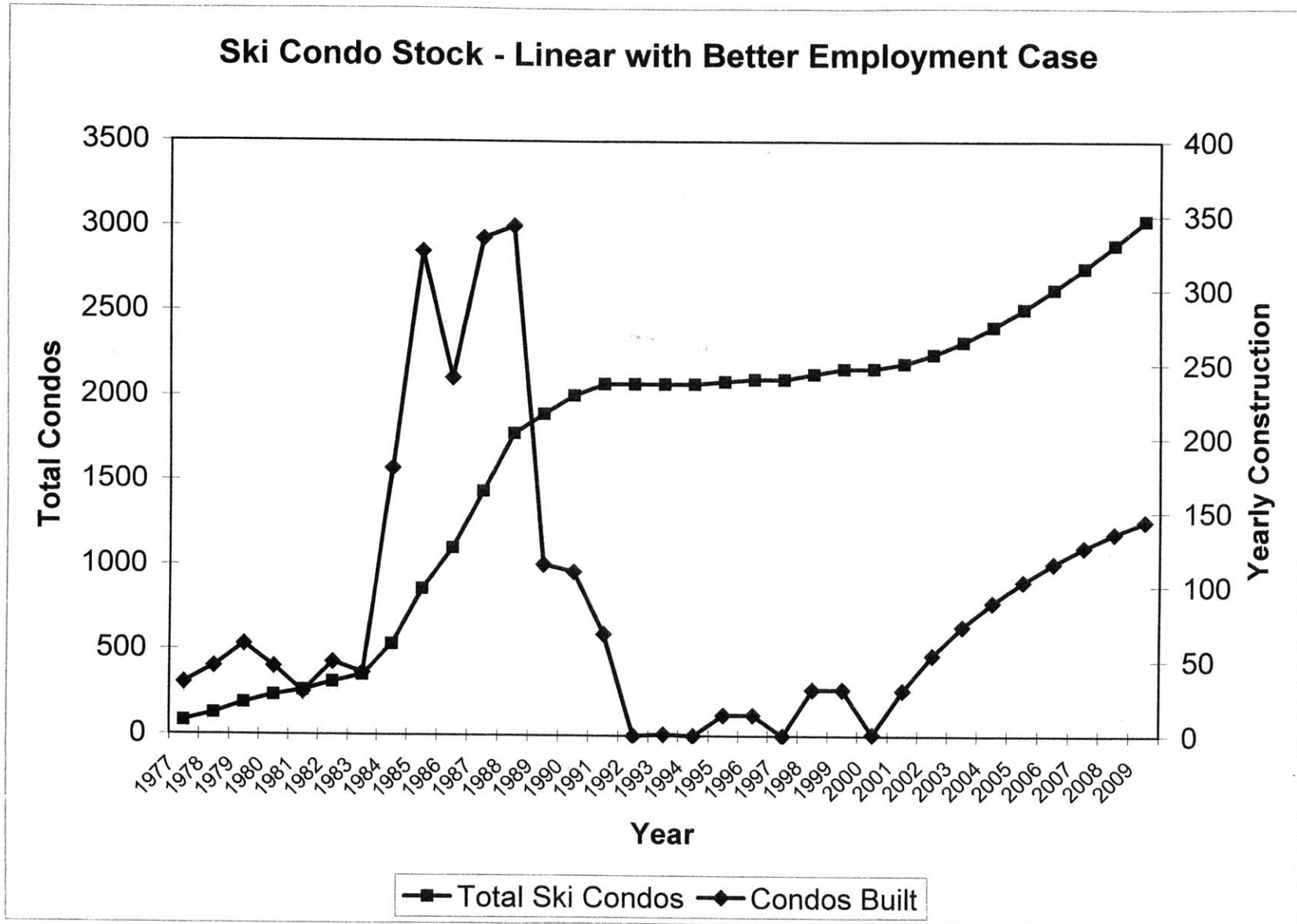


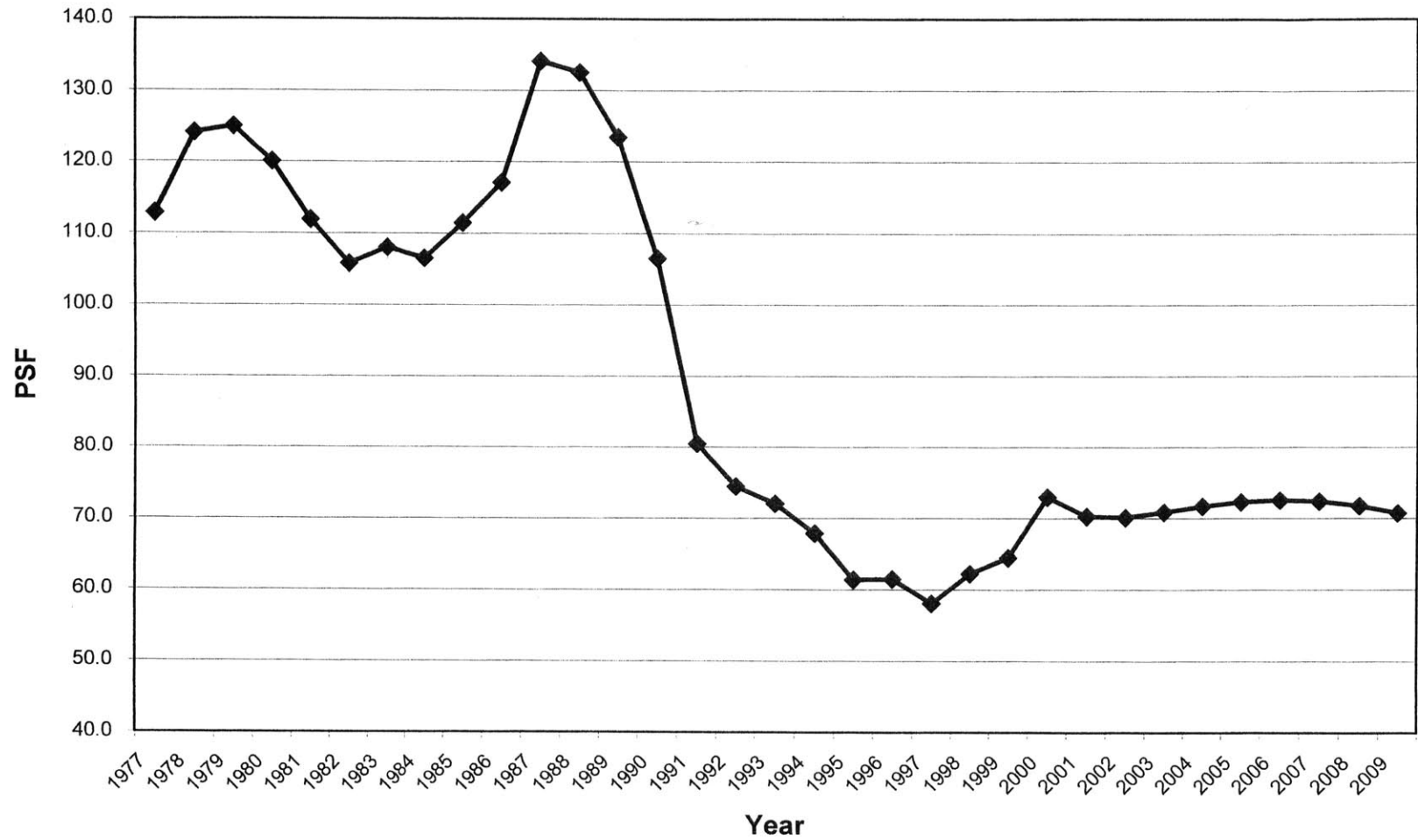
EXHIBIT S.14

67



**EXHIBIT S.15**

**Real Price Index Forecast (Year 2000 \$'s) - Linear with Better Employment Case**





## Chapter 7: Conclusion

By studying historical economic, demographic and atmospheric relating to the New England ski industry, this thesis constructed an econometric model that was used to forecast ski condo prices and ski condo construction. The econometric model is constructed using three equations: Skier Visits, Change in Stock, and Price. Through regression analysis, it was found that these three equations could be driven with as little as three inputs, employment, snowfall, and real interest rates, in order to forecast future real estate demand.

In the five simulations run with the econometric model, there is one major underlying theme: ski condo prices are not going up. Even in the most robust case (Case 4) where the economy is stable and the natural snowfall is outstanding, the real prices of ski condos fail to achieve any upward momentum. Sure, there is upward movement for a few years, but due to an immediate building boom, these prices eventually plateau and then retreat to pre-boom prices. The models built in this analysis from historical data, will always predict the creation of new supply the moment there is a real price jump in ski condos. On the other hand, when the demand is low, prices stagnate and new condo supply is nonexistent. In Case 1, the demand is so low, that condo prices depress further and new supply is nonexistent. In short, through the quick response in condo construction, the upside is extremely limited in ski condo investing.

The projection models were all formed using historical results. Ski condos for the past 24 years have turned out to be poor investments. Sure there were some peaks in prices, especially during the boom years in the mid-1980's, but the longer term trend is

all downhill. Going forward, the econometric model predicts future stagnation even in strong economic growth and abundant natural snowfall. If the economy does not fare so well, ski condo prices will also suffer. It seems that ski condo purchases should be limited to the owner/user as they are looking more for enjoyment from the condo and not strictly as investment return.

In order to keep the analysis manageable, only the Loon Mountain ski area was studied. This does not mean that conclusions about similar ski areas in New England cannot be drawn. For example, Waterville Valley, located just south of Loon, will experience the same price stagnation in regards to it's our condo stock. Again, land is plentiful, skiing is dependent on snow, and Boston is the driving economy. Other ski areas on the Interstate-93 corridor could use this same econometric model.

The model can be adjusted to predict condo prices in other New England states. If a study on a Vermont ski area was needed, the same model could be used, but employment inputs for Connecticut, New York and New Jersey would be substituted for the Eastern Massachusetts ones used in this analysis. Regardless of which economic data one uses to predict prices, the equations will predict immediate condo construction with any hint of price increases.

**APPENDIX A**

**Village of Loon Mountain Sales Data**

<u>Date</u>	<u>Unit</u>	<u>Style</u>	<u>Phase</u>	<u>Price</u>	<u>SF</u>
2/7/77	7E	Aspen	Village	58,000	1584
8/18/77		Aspen or Burke	Village	44,500	1550
9/20/77	51E	Burke	Village	60,000	1516
10/26/77		Aspen or Burke	Village	50,000	1550
11/15/77		Aspen or Burke	Village	55,000	1550
12/2/77		Aspen or Burke	Village	45,000	1550
12/12/77		Aspen or Burke	Village	53,000	1550
12/15/77	56W	Aspen	Village	38,500	1584
3/21/78	28N	Dartmouth	Village	54,800	2088
6/16/78		Aspen or Burke	Village	42,500	1550
7/28/78	20NW	Aspen	Village	40,000	1584
9/14/78		Aspen or Burke	Village	60,000	1550
9/18/78	76M	Aspen	Village	55,000	1584
10/3/78		Aspen or Burke	Village	62,000	1550
10/6/78		Aspen or Burke	Village	100,000	1550
11/13/78	10W	Burke	Village	59,000	1516
12/15/78		Aspen or Burke	Village	78,000	1550
1/17/79	38W	Burke	Village	63,000	1516
7/31/79	35MS	Burke	Village	75,000	1516
8/2/79		Aspen or Burke	Village	50,000	1550
8/20/79		Aspen or Burke	Village	75,000	1550
10/9/79		Aspen or Burke	Village	58,500	1550
11/19/79	23SE	Burke	Village	70,000	1516
11/29/79	10M	Burke	Village	67,000	1516
12/3/79		Aspen or Burke	Village	70,000	1550
12/7/79		Aspen or Burke	Village	87,500	1550
12/12/79		Aspen or Burke	Village	70,000	1550
12/14/79		Aspen or Burke	Village	58,500	1550
2/1/80	72M	Burke	Village	62,000	1516
2/29/80	34W	Aspen	Village	68,000	1584
4/18/80	27MW	Burke	Village	64,000	1516
5/9/80		Aspen or Burke	Village	75,000	1550
5/13/80		Aspen or Burke	Village	64,000	1550
5/14/80		Aspen or Burke	Village	74,500	1550
8/28/80		Aspen or Burke	Village	68,000	1550

10/7/80	10E	Cannon	Village	65,000	1118
10/9/80	36E	Cannon	Village	58,000	1118
10/22/80		Aspen or Burke	Village	105,000	1550
10/30/80	15W	Dartmouth	Village	90,000	2088
11/5/80	51M	Aspen	Village	73,000	1584
11/13/80	43E	Burke	Village	72,000	1516
11/18/80	19NE	Cannon	Village	71,000	1118
12/29/80	70W	Burke	Village	80,000	1516
12/29/80	26NE	Aspen	Village	83,000	1584
1/5/81	14W	Dartmouth	Village	89,000	2088
2/3/81		Aspen or Burke	Village	80,000	1550
3/2/81		Aspen or Burke	Village	54,000	1550
3/21/81		Aspen or Burke	Village	80,000	1550
8/11/81		Aspen or Burke	Village	95,000	1550
8/31/81		Aspen or Burke	Village	70,500	1550
11/6/81		Aspen or Burke	Village	83,000	1550
11/16/81	40M	Burke	Village	82,500	1516
12/1/81	84E	Aspen	Village	81,000	1584
12/18/81	39E	Dartmouth	Village	100,000	2088
1/19/82		Aspen or Burke	Village	105,000	1550
1/19/82		Aspen or Burke	Village	83,000	1550
1/22/82	7M	Burke	Village	72,000	1516
3/18/82		Aspen or Burke	Village	74,000	1550
4/13/82		Columbia II	Clearbrook I	71,000	1784
5/20/82		Aspen or Burke	Village	67,000	1550
6/2/82	57W	Burke	Village	81,000	1516
6/8/82		Aspen or Burke	Village	83,000	1550
6/29/82	50W	Aspen	Village	110,800	1584
7/7/82	11W	Aspen	Village	79,500	1584
7/26/82	9NW	Burke	Village	80,000	1516
8/4/82	43W	Burke	Village	70,000	1516
9/14/82	63W	Dartmouth	Village	88,000	2088
9/28/82	76W	Dartmouth	Village	97,500	2088
9/28/82	76M	Aspen	Village	80,000	1584
10/22/82	53W	Dartmouth Deluxe	Village	104,000	2088
11/5/82	21NW	Aspen	Village	75,000	1584
11/22/82	31S	Dartmouth Deluxe	Village	110,000	2088
12/2/82		Aspen or Burke	Village	83,500	1550
12/9/82		Aspen or Burke	Village	93,000	1550
1/4/83		Columbia II	Clearbrook I	115,000	1784
1/26/83		Aspen or Burke	Village	102,000	1550
4/4/83	47E	Aspen	Village	90,500	1584

4/26/83		Aspen or Burke	Village	72,000	1550
5/3/83	41W	Burke	Village	74,500	1516
5/24/83		Aspen or Burke	Village	73,000	1550
7/7/83		Aspen or Burke	Village	60,000	1550
10/6/83		Aspen or Burke	Village	84,000	1550
10/11/83	62W	Aspen	Village	102,500	1584
10/28/83	21NW	Aspen	Village	105,000	1584
12/22/83	21SE	Dartmouth	Village	100,000	2088
12/22/83		Aspen or Burke	Village	80,000	1550
12/23/83	49W	Aspen	Village	93,500	1584
12/27/83		Aspen or Burke	Village	88,800	1550
12/27/83	42E	Aspen	Village	87,500	1584
12/28/83		Aspen or Burke	Village	105,000	1550
1/12/84		Columbia II	Clearbrook I	102,500	1784
1/27/84		Columbia II	Clearbrook I	100,500	1784
2/7/84		Aspen or Burke	Village	103,500	1550
2/17/84	38E	Cannon	Village	55,000	1118
3/20/84	49W	Aspen	Village	93,500	1584
5/22/84	18N	Columbia II	Clearbrook I	120,000	1784
6/15/84	111	Columbia II	Clearbrook I	105,000	1784
6/15/84		Aspen or Burke	Village	106,000	1550
7/3/84	14E	Aspen	Village	111,000	1584
7/8/84	43M	Burke	Village	79,000	1516
7/18/84	27ME	Aspen	Village	72,500	1584
8/16/84	29E	Columbia II	Clearbrook I	99,000	1784
8/21/84		Columbia II	Clearbrook I	99,000	1784
9/8/84	3E	Dartmouth	Village	112,000	2088
9/11/84	3W	Dartmouth	Village	112,000	2088
9/13/84	74S	Burke	Village	90,000	1516
9/14/84	79E	Cannon Deluxe	Village	76,000	1134
9/15/84	51W	Columbia II	Clearbrook I	103,500	1784
9/17/84		Aspen or Burke	Village	76,000	1550
9/19/84	119	Columbia II	Clearbrook I	122,500	1784
9/19/84	74S	Burke	Village	90,000	1516
9/25/84		Columbia II	Clearbrook I	122,500	1784
10/7/84	45ME	Burke	Village	84,000	1516
10/8/84	77E	Aspen	Village	93,000	1584
10/9/84	65E	Burke	Village	89,500	1516
10/11/84	80E	Aspen	Village	112,000	1584
10/11/84	77E	Aspen	Village	93,000	1584
10/12/84	45ME	Burke	Village	84,000	1516
10/16/84	60W	Aspen	Village	67,600	1584
10/16/84	80E	Aspen	Village	112,000	1584

10/19/84		Aspen or Burke	Village	89,500	1550
10/30/84	12E	Burke	Village	82,000	1516
11/2/84		Aspen or Burke	Village	82,000	1550
11/16/84	9E	Columbia	Clearbrook I	100,500	1714
11/17/84	19M	Burke	Village	82,000	1516
11/20/84	47E	Aspen	Village	116,600	1584
11/21/84		Columbia II	Clearbrook I	100,500	1784
11/21/84	19M	Burke	Village	82,000	1516
11/27/84	30S	Aspen	Village	101,000	1584
12/10/84	5ME	Burke	Village	79,000	1516
12/11/84		Aspen or Burke	Village	79,000	1550
12/18/84	35S	Dartmouth	Village	102,000	2088
12/27/84	54E	Dartmouth Deluxe	Village	123,000	2088
1/2/85	66M	Burke	Village	94,000	1516
1/26/85	71E	Aspen	Village	103,000	1584
2/2/85	72E	Dartmouth Deluxe	Village	127,000	2088
2/27/85	34E	Columbia	Clearbrook I	112,500	1714
3/8/85	54W	Aspen	Village	105,000	1584
3/31/85	64W	Columbia II	Clearbrook II	107,800	1784
4/7/85	64E	Aspen	Village	101,000	1584
4/11/85	63E	Aspen	Village	110,000	1584
5/13/85	60E	Dartmouth Deluxe	Village	117,000	2088
5/21/85	45W	Dartmouth Deluxe	Village	120,000	2088
6/5/85	40E	Columbia	Clearbrook I	118,500	1714
7/8/85	45MW	Burke	Village	96,500	1516
7/31/85	22M	Burke	Village	93,000	1516
8/9/85	25SE	Aspen	Village	110,000	1584
8/10/85	70ME	Burke	Village	80,000	1516
8/14/85	71W	Aspen	Village	99,000	1584
9/13/85	15M	Burke	Village	91,500	1516
9/25/85	103	Pedestal	Clearbrook I	105,000	2200
10/18/85	56W	Columbia II	Clearbrook II	120,000	1784
10/21/85	3A	Super Dartmouth	Clearbrook I	136,000	2810
11/11/85	81E	Columbia II	Clearbrook II	122,533	1784
11/26/85	18S	Columbia II	Clearbrook I	115,000	1784
11/30/85	76M	Columbia II	Clearbrook II	103,200	1784
12/2/85	54MW	Burke	Village	87,000	1516
12/3/85	59W	Aspen	Village	110,000	1584
12/4/85	85E	Aspen	Village	100,000	1584
12/7/85	92W	Columbia II	Clearbrook II	120,000	1784
12/11/85	31M	Cannon	Village	69,000	1118
12/14/85	24N	Dartmouth Deluxe	Village	118,800	2088
12/16/85	43M	Burke	Village	89,900	1516

12/17/85	63E	Columbia II	Clearbrook II	127,000	1784
12/18/85	47W	Columbia II	Clearbrook II	120,000	1784
12/18/85	49E	Dartmouth Deluxe	Village	137,000	2088
12/20/85	82M	Aspen	Village	100,000	1584
12/20/85	40M	Burke	Village	102,000	1516
12/24/85	79E	Cannon Deluxe	Village	89,000	1134
1/2/86	78NW	Aspen	Village	120,400	1584
1/6/86	65W	Burke	Village	100,000	1516
1/14/86	36W	Aspen	Village	97,000	1584
1/15/86	57E	Aspen	Village	100,000	1584
2/18/86	7M	Columbia	Clearbrook I	100,000	1714
2/21/86	8W	Aspen	Village	123,000	1584
3/15/86	46M	Burke	Village	98,650	1516
3/17/86	94E	Columbia II	Clearbrook II	111,000	1784
4/5/86	39M	Columbia	Clearbrook I	109,000	1714
4/7/86	93M	Columbia II	Clearbrook II	101,000	1784
5/15/86	51E	Columbia II	Clearbrook I	120,000	1784
5/16/86	17N	Columbia II	Clearbrook I	117,000	1784
6/2/86	78E	Columbia II	Clearbrook II	117,000	1784
6/2/86	5MW	Burke	Village	107,000	1516
6/26/86	67E	Dartmouth Deluxe	Village	150,000	2088
6/30/86	67M	Super Cannon	Clearbrook II	82,500	1628
7/7/86	72M	Burke	Village	92,125	1516
7/12/86	19E	Burke	Village	97,000	1516
7/14/86	28S	Dartmouth Deluxe	Village	140,000	2088
7/14/86	66W	Dartmouth Deluxe	Village	125,000	2088
7/15/86	40M	Burke	Village	122,000	1516
7/23/86	38E	Cannon Deluxe	Village	75,000	1134
7/28/86	41W	Burke	Village	97,000	1516
8/1/86	19N	Columbia II	Clearbrook I	132,000	1784
8/1/86	12ME	Burke	Village	92,000	1516
8/6/86	21N	Columbia II	Clearbrook I	138,000	1784
8/15/86	50W	Super Cannon	Clearbrook II	106,500	1628
8/16/86	15W	Dartmouth Deluxe	Village	130,000	2088
8/25/86	14E	Aspen	Village	112,000	1584
8/25/86	10M	Burke	Village	93,000	1516
8/29/86	34ME	Burke	Village	105,000	1516
9/11/86	31M	Cannon	Village	86,000	1118
9/21/86	126	Columbia II	Clearbrook I	136,000	1784
9/24/86	64M	Columbia II	Clearbrook II	112,000	1784
9/24/86	9W	Burke	Village	108,500	1516
9/27/86	61M	Burke	Village	125,000	1516
9/30/86	29W	Super Dartmouth	Clearbrook I	137,000	2810

10/10/86	85W	Aspen	Village	115,000	1584
10/15/86	13M	Cannon	Clearbrook I	94,500	1118
10/24/86	86W	Columbia II	Clearbrook II	135,000	1784
10/29/86	55W	Dartmouth Deluxe	Village	156,000	2088
10/30/86	43W	Burke	Village	116,000	1516
11/11/86	84W	Columbia II	Clearbrook II	132,000	1784
11/12/86	76W	Super Dartmouth	Clearbrook II	159,000	2810
11/14/86	86E	Columbia II	Clearbrook II	132,000	1784
11/17/86	82W	Columbia II	Clearbrook II	132,000	1784
11/22/86	86M	Columbia II	Clearbrook II	122,000	1784
11/22/86	34W	Burke	Village	95,520	1516
11/24/86	87W	Super Cannon	Clearbrook II	118,000	1628
12/1/86	4W	Columbia	Clearbrook I	127,000	1714
12/1/86	1M	Columbia II	Clearbrook I	113,000	1784
12/2/86	24E	Columbia II	Clearbrook I	124,700	1784
12/6/86	95W	Columbia II	Clearbrook II	140,000	1784
12/10/86	10E	Cannon Deluxe	Village	99,200	1134
12/11/86	42M	Columbia II	Clearbrook II	118,000	1784
12/12/86	1E	Columbia II	Clearbrook I	123,000	1784
12/12/86	85W	Columbia II	Clearbrook II	132,800	1784
12/12/86	48W	Aspen	Clearbrook II	140,000	1584
12/12/86	73E	Dartmouth Deluxe	Village	150,000	2088
12/15/86	75S	Super Dartmouth	Village	177,000	2810
12/18/86	42W	Dartmouth	Village	142,000	2088
12/19/86	23MW	Burke	Village	128,500	1516
12/27/86	55ME	Burke	Village	116,000	1516
12/30/86	23W	Dartmouth Deluxe	Village	160,000	2088
12/31/86	87M	Burke	Village	125,000	1516
1/12/87	1W	Columbia II	Clearbrook I	126,000	1784
2/21/87	34W	Columbia	Clearbrook I	146,500	1714
3/20/87	39M	Cannon	Village	95,500	1118
4/3/87	71M	Burke	Village	130,000	1516
4/7/87	46W	Burke	Village	138,000	1516
12/24/87	28E	1500 Deluxe	Coolidge	178,500	1844
1/5/88	40W	Aspen	Village	140,000	1584
4/8/88	6W	Aspen	Village	126,000	1584
4/15/88	62W	Burke	Village	154,900	1516
6/13/88	20S	Cannon Deluxe	Village	110,000	1134
7/7/88	65E	Columbia II	Clearbrook II	142,500	1784
7/13/88	77W	Columbia II	Clearbrook II	84,950	1784
7/14/88	10E	Cannon Deluxe	Village	119,400	1134
7/22/88	19N	Columbia II	Clearbrook I	80,000	1784
7/26/88	57W	Columbia II	Clearbrook II	139,500	1784



7/27/88	71W	Columbia II	Clearbrook II	152,500	1784
8/16/88	80E	Aspen	Village	150,000	1584
9/9/88	30S	Aspen	Village	140,000	1584
9/16/88	47ME	Burke	Village	131,000	1516
9/26/88	12M	Cannon	Clearbrook I	117,500	1118
9/26/88	61W	Columbia II	Clearbrook II	160,000	1784
9/26/88	45MW	Burke	Village	125,000	1516
10/3/88	76M	Burke	Village	125,000	1516
10/26/88	16W	Aspen	Village	138,000	1584
11/7/88	83E	Columbia II	Clearbrook II	158,000	1784
12/2/88	66M	Columbia II	Clearbrook II	154,000	1784
12/12/88	40E	Columbia	Clearbrook I	157,500	1714
12/15/88	5ME	Burke	Village	131,000	1516
12/20/88	21S	Super Dartmouth	Clearbrook I	185,000	2810
12/22/88	120	Columbia II	Clearbrook I	205,000	1784
1/3/89	6M	Cannon	Village	120,000	1118
1/4/89	24M	Burke	Village	130,000	1516
1/9/89	44E	Columbia II	Clearbrook II	150,000	1784
1/13/89	79M	Super Cannon	Clearbrook II	117,000	1628
1/13/89	44W	Cannon Deluxe	Village	114,000	1134
3/17/89	65W	Burke	Village	136,000	1516
3/23/89	75W	Super Cannon	Clearbrook II	126,000	1628
3/31/89	47MW	Cannon	Village	108,500	1118
4/21/89	45W	Columbia II	Clearbrook II	173,000	1784
7/10/89	32W	Burke	Village	134,950	1516
9/5/89	41E	Aspen	Village	125,053	1584
9/13/89	54W	Aspen	Village	125,052	1584
9/19/89	57E	Columbia II	Clearbrook II	150,000	1784
9/27/89	63E	Aspen	Village	140,000	1584
10/9/89	53W	Columbia II	Clearbrook I	141,578	1784
10/10/89	56E	Aspen	Village	118,736	1584
10/16/89	12W	Columbia	Clearbrook I	130,000	1714
11/1/89	37E	Columbia II	Clearbrook I	144,000	1784
11/20/89	54E	Dartmouth Deluxe	Village	164,000	2088
11/29/89	34M	1700 Deluxe	Coolidge	134,000	1980
12/5/89	32W	Columbia II	Clearbrook I	149,894	1784
12/7/89	80E	Aspen	Village	124,947	1584
12/14/89	42W	Columbia II	Clearbrook II	144,000	1784
12/22/89	7W	Columbia	Clearbrook I	145,052	1714
12/26/89	86E	Dartmouth Deluxe	Village	137,000	2088
1/30/90	47ME	Burke	Village	128,000	1516
6/14/90	93M	Columbia II	Clearbrook II	126,000	1784
6/26/90	48E	Cannon Deluxe	Village	97,000	1134

7/16/90	45W	Dartmouth Deluxe	Village	180,000	2088
8/24/90	27ME	Burke	Village	107,523	1516
8/27/90	43W	Columbia II	Clearbrook II	127,523	1784
8/29/90	43W	Burke	Village	135,000	1516
9/17/90	41E	2300 Deluxe	Coolidge	172,476	2768
10/1/90	29E	Columbia II	Clearbrook I	130,000	1784
10/19/90	23E	1800 Standard	Coolidge	130,000	2210
12/14/90	21S	Super Dartmouth	Clearbrook I	187,000	2810
1/28/91	5E	Columbia II	Clearbrook I	100,000	1784
2/8/91	28N	Columbia II	Village	100,000	1784
3/7/91	67M	Super Cannon	Clearbrook II	85,050	1628
3/11/91	23M	1600 Deluxe	Coolidge	124,000	1566
3/29/91	67E	Dartmouth Deluxe	Village	91,500	2088
4/2/91	19N	Columbia II	Clearbrook I	122,000	1784
5/7/91	1M	Columbia II	Clearbrook I	115,050	1784
5/8/91	35S	Dartmouth Deluxe	Village	140,000	2088
5/13/91	88W	Columbia II	Clearbrook II	110,000	1784
5/13/91	88W	Columbia II	Clearbrook II	110,000	1784
5/15/91	78E	Columbia II	Clearbrook II	105,000	1784
5/31/91	77E	Columbia II	Clearbrook II	106,000	1784
6/7/91	91W	Super Dartmouth	Clearbrook II	125,000	2810
6/12/91	56E	Super Cannon	Clearbrook II	94,000	1628
6/12/91	56E	Super Cannon	Clearbrook II	94,000	1151
6/19/91	34E	Columbia	Clearbrook I	85,047	1714
6/22/91	86E	Columbia II	Clearbrook II	115,000	1784
6/24/91	21S	Super Dartmouth	Clearbrook I	116,000	2810
7/6/91	91W	Super Dartmouth	Clearbrook II	125,050	2810
7/11/91	94M	Columbia II	Clearbrook II	100,000	1784
7/16/91	33E	Columbia II	Clearbrook I	118,000	1784
7/16/91	33E	Columbia II	Clearbrook I	118,000	1784
7/22/91	50E	Cannon Deluxe	Village	82,000	1134
9/6/91	24N	Dartmouth Deluxe	Village	64,000	2088
9/6/91	86E	Dartmouth Deluxe	Village	95,000	2088
10/4/91	45W	1800 Deluxe	Coolidge	145,000	2210
10/5/91	19S	Columbia II	Clearbrook I	118,000	1784
10/7/91	93W	Columbia II	Clearbrook II	110,000	1784
10/7/91	70E	Columbia II	Clearbrook II	107,000	1784
10/7/91	93W	Columbia II	Clearbrook II	110,000	1784
10/8/91	19S	Columbia II	Clearbrook I	118,000	1784
10/9/91	72E	Super Dartmouth	Clearbrook II	119,500	2810
10/14/91	45W	1800 Deluxe	Coolidge	145,000	2081
10/28/91	20E	1800 Deluxe	Coolidge	115,000	2081
12/10/91	16W	Columbia II	Clearbrook I	115,000	1784

12/31/91	42E	2300 Deluxe	Coolidge	140,000	2683
1/20/92	55E	Aspen	Village	70,000	1584
1/31/92	26W	Dartmouth Deluxe	Village	129,904	2088
2/7/92	85W	Columbia II	Clearbrook II	40,809	1784
2/10/92	87M	Columbia II	Clearbrook II	100,000	1784
2/19/92	16	2200 Standard	Coolidge	165,047	2619
2/19/92	48E	Cannon Deluxe	Village	85,523	1134
2/21/92	33W	1800 Standard	Coolidge	120,000	2081
2/27/92	83W	Columbia II	Clearbrook II	110,000	1784
3/27/92	83W	Columbia II	Clearbrook II	110,000	1784
3/27/92	44E	Columbia II	Clearbrook II	125,000	1784
4/20/92	29W	Super Dartmouth	Clearbrook I	116,571	2810
4/22/92	78W	Columbia II	Clearbrook II	116,000	1784
4/29/92	76W	Super Dartmouth	Clearbrook II	116,000	2810
5/12/92	26E	Columbia II	Clearbrook I	112,000	1784
5/18/92	57M	Columbia II	Clearbrook II	91,047	1784
6/8/92	86E	Columbia II	Clearbrook II	115,047	1784
6/30/92	27SW	Aspen	Village	70,250	1584
7/13/92	24N	Dartmouth Deluxe	Village	51,238	2088
7/29/92	83M	Columbia II	Clearbrook II	92,000	1784
8/11/92	90E	Columbia II	Clearbrook II	113,500	1784
9/1/92	49W	Columbia II	Clearbrook II	114,000	1784
9/1/92	27SW	Aspen	Village	68,000	1584
10/2/92	87M	Columbia II	Clearbrook II	100,000	1784
10/5/92	64E	Columbia II	Clearbrook II	115,047	1784
10/6/92	54W	Columbia II	Clearbrook I	116,571	1784
10/6/92	17W	Columbia II	Village	117,047	1784
10/13/92	23MW	Burke	Village	68,000	1516
10/30/92	58W	Columbia II	Clearbrook II	90,000	1784
11/1/92	64E	Columbia II	Clearbrook II	115,000	1784
11/5/92	58W	Columbia II	Clearbrook II	90,000	1784
11/24/92	76M	Burke	Village	79,904	1516
12/17/92	34E	Columbia	Clearbrook I	81,000	1714
1/11/93	12M	Cannon	Clearbrook I	80,000	1118
2/9/93	38W	Burke	Village	85,048	1516
2/26/93	72M	Burke	Village	78,000	1516
2/27/93	67E	Dartmouth Deluxe	Village	92,476	2088
3/1/93	38W	Burke	Village	85,000	1516
3/2/93	71W	Aspen	Village	85,524	1584
4/7/93	14E	2200 Standard	Coolidge	130,000	2473
5/6/93	50W	Cannon Deluxe	Village	93,524	1134
5/9/93	31E	Columbia II	Clearbrook I	110,000	1784
5/29/93	38W	Columbia	Clearbrook I	87,200	1714

6/9/93	71E	Aspen	Village	81,040	1584
6/25/93	21W	Aspen	Village	87,520	1584
8/3/93	48W	Aspen	Village	85,000	1584
8/20/93	35E	Columbia II	Clearbrook I	100,000	1784
8/20/93	40M	Cannon	Clearbrook I	68,000	1118
10/22/93	41E	Columbia II	Clearbrook I	112,000	1784
10/27/93	44ME	Columbia II	Village	110,000	1784
10/28/93	4W	Columbia	Clearbrook I	63,300	1714
10/30/93	69W	Columbia II	Clearbrook II	105,000	1784
11/5/93	57E	Aspen	Village	96,000	1584
12/4/93	12M	Cannon	Clearbrook I	80,000	1118
12/8/93	82M	Aspen	Village	85,000	1584
12/13/93	39	Special Design	Coolidge	155,000	2344
12/28/93	60E	Dartmouth Deluxe	Village	100,000	2088
1/7/94	4W	Columbia	Clearbrook I	75,000	1714
1/24/94	72W	Columbia II	Clearbrook II	90,000	1784
1/25/94	46E	Columbia II	Clearbrook II	95,000	1784
2/24/94	88E	Columbia II	Clearbrook II	105,000	1784
3/2/94	107	Columbia II	Clearbrook I	135,000	1784
4/11/94	55ME	Burke	Village	78,000	1516
4/29/94	50E	Columbia II	Clearbrook II	83,300	1784
5/16/94	55E	Columbia II	Clearbrook II	92,500	1784
5/25/94	42W	1500 Deluxe	Coolidge	130,000	1696
6/13/94	84W	Aspen	Village	94,200	1584
6/21/94	114	Columbia II	Clearbrook I	137,500	1784
7/13/94	45W	Dartmouth Deluxe	Village	92,500	2088
9/21/94	25NW	Aspen	Village	79,900	1584
9/27/94	54E	Columbia II	Clearbrook I	95,000	1784
10/3/94	38	Special Design	Coolidge	145,000	2020
10/25/94	33W	1800 Standard	Coolidge	120,000	2081
10/26/94	45E	Columbia II	Clearbrook II	85,000	1784
10/27/94	33M	Burke	Village	70,000	1516
11/10/94	26E	Aspen	Village	44,000	1584
11/14/94	95E	Columbia II	Clearbrook II	88,000	1784
11/15/94	24M	Burke	Village	95,000	1516
11/29/94	23E	Burke	Village	70,000	1516
12/13/94	62W	Columbia II	Clearbrook II	96,500	1784
12/18/94	57E	Columbia II	Clearbrook II	89,500	1784
1/19/95	70ME	Burke	Village	67,000	1516
4/24/95	39E	Dartmouth	Village	94,000	2088
4/28/95	14E	Aspen	Village	85,900	1584
5/15/95	52W	Columbia II	Clearbrook I	90,000	1784
7/12/95	22M	Burke	Village	70,000	1516

8/16/95	23ME	Burke	Village	75,000	1516
9/7/95	16E	Aspen	Village	72,000	1584
9/12/95	5E	Columbia II	Clearbrook I	95,000	1784
9/15/95	36W	Aspen	Village	73,000	1584
9/28/95	85M	Burke	Village	70,000	1516
10/25/95	51M	Columbia II	Clearbrook I	87,500	1784
11/21/95	57W	Burke	Village	73,000	1516
12/22/95	68W	Columbia II	Clearbrook II	94,500	1784
1/18/96	37W	Dartmouth Deluxe	Village	88,000	2088
1/18/96	15E	Aspen	Village	67,000	1584
2/15/96	38E	Cannon Deluxe	Village	57,000	1134
3/2/96	85E	Columbia II	Clearbrook II	92,000	1784
3/27/96	53W	Dartmouth Deluxe	Village	144,100	2088
4/6/96	57E	Aspen	Village	88,300	1584
4/24/96	45E	Columbia II	Clearbrook II	96,000	1784
5/3/96	75N	Super Dartmouth	Village	88,000	2810
5/6/96	52W	2300 Deluxe	Coolidge	164,000	2683
5/7/96	53W	Dartmouth Deluxe	Village	80,500	2088
5/10/96	50W	Super Cannon	Clearbrook II	70,000	1151
5/16/96	27E	2300 Deluxe	Coolidge	150,000	2683
6/12/96	28S	Dartmouth Deluxe	Village	88,000	2088
6/27/96	22W	2200 Deluxe	Coolidge	135,000	2473
7/3/96	17S	Columbia II	Clearbrook I	91,500	1784
7/5/96	63W	Columbia II	Clearbrook II	95,000	1784
7/8/96	18W	2200 Deluxe	Coolidge	152,500	2473
7/15/96	58W	Dartmouth Deluxe	Village	99,900	2088
8/28/96	38	Special Design	Coolidge	135,000	2020
9/18/96	34E	2200 Standard	Coolidge	150,000	2473
9/20/96	96W	Columbia II	Clearbrook II	95,000	1784
10/1/96	17	2200 Standard	Coolidge	130,000	2563
10/1/96	58E	2200 Deluxe	Coolidge	180,000	2473
10/2/96	105	Super Dartmouth	Clearbrook I	108,000	2810
10/14/96	23W	Dartmouth Deluxe	Village	80,000	2088
10/16/96	57	Special Design	Coolidge	175,000	2072
10/19/96	44E	Columbia II	Clearbrook II	95,000	1784
10/21/96	42W	Dartmouth	Village	51,800	2088
10/22/96	52E	Columbia II	Clearbrook I	99,300	1784
10/31/96	125	Columbia II Deluxe	Clearbrook I	120,000	2329
11/7/96	74MN	Burke	Village	70,000	1516
11/18/96	37E	Aspen	Village	62,000	1584
12/3/96	10S	Columbia	Clearbrook I	75,000	1714
12/16/96	79M	Super Cannon	Clearbrook II	65,000	1151
12/17/96	107	Columbia II	Clearbrook I	127,000	1784

1/5/97	23S	Columbia II	Clearbrook I	96,000	1784
1/27/97	89	2200 Standard	Coolidge	200,000	2563
1/30/97	42W	Dartmouth	Village	70,000	2088
2/27/97	81W	Columbia II	Village	93,000	1784
3/12/97	39M	Cannon	Village	57,000	1118
3/23/97	13M	Cannon	Clearbrook I	92,000	1118
3/23/97	19S	Columbia II	Clearbrook I	92,000	1784
3/26/97	60W	2200 Deluxe	Coolidge	150,000	2473
4/4/97	66W	Super Cannon	Clearbrook II	75,000	1151
4/5/97	60E	Columbia II	Clearbrook II	94,000	1784
4/16/97	4E	Columbia	Clearbrook I	74,000	1714
4/16/97	11E	1500 Standard	Coolidge	103,500	1696
4/16/97	64E	Aspen	Village	79,500	1584
4/21/97	14E	2200 Standard	Coolidge	126,500	2473
4/28/97	31N	Cannon Deluxe	Village	51,000	1134
5/7/97	42M	Columbia II	Clearbrook II	94,500	1784
5/15/97	48E	Columbia II	Clearbrook II	85,000	1784
5/15/97	12ME	Burke	Village	64,000	1516
5/16/97	15W	Dartmouth Deluxe	Village	100,000	2088
5/23/97	8M	1600 Standard	Coolidge	103,000	1566
6/25/97	6M	Cannon	Village	25,500	1118
9/19/97	24S	Aspen	Village	86,000	1584
9/26/97	54W	Aspen	Village	32,000	1584
9/29/97	40W	Aspen	Village	76,000	1584
10/7/97	70W	Columbia II	Clearbrook II	82,000	1784
10/15/97	22N	Columbia II	Clearbrook I	79,500	1784
10/20/97	27SW	Aspen	Village	76,500	1584
10/24/97	122	Columbia II	Clearbrook I	127,500	1784
10/24/97	30S	Aspen	Village	65,000	1584
10/27/97	78W	Columbia II	Clearbrook II	94,000	1784
10/27/97	11E	Aspen	Village	76,000	1584
10/27/97	59W	Aspen	Village	78,900	1584
10/29/97	81E	Columbia II	Village	105,000	1784
11/5/97	33E	Aspen	Village	81,800	1584
11/6/97	27ME	Burke	Village	79,000	1516
11/6/97	85W	Aspen	Village	79,000	1584
11/13/97	82M	Aspen	Village	73,000	1584
12/1/97	86E	Columbia II	Clearbrook II	88,000	1784
12/23/97	93M	Columbia II	Clearbrook II	88,000	1784
12/24/97	54ME	Burke	Village	72,500	1516
12/30/97	44E	Columbia II	Village	92,500	1784
1/9/98	70W	Burke	Village	68,000	1516
1/14/98	49W	Aspen	Village	82,000	1584

2/14/98	67M	Burke	Village	75,000	1516
2/20/98	93W	Columbia II	Clearbrook II	92,000	1784
3/16/98	6W	Columbia II	Clearbrook I	93,000	1784
3/20/98	58E	Aspen	Village	75,000	1584
3/24/98	20N	Columbia II	Clearbrook I	103,300	1784
4/29/98	4E	Special Design	Coolidge	166,000	2900
5/1/98	6M	Cannon	Village	50,000	1118
5/6/98	87W	Super Cannon	Clearbrook II	75,000	1151
6/1/98	55E	Columbia II	Clearbrook II	95,000	1784
6/3/98	7W	Columbia	Clearbrook I	125,000	1714
6/3/98	11M	1500 Standard	Coolidge	130,000	1696
6/3/98	25SE	Aspen	Village	75,000	1584
6/8/98	65E	Burke	Village	70,000	1516
6/17/98	56W	2300 Deluxe	Coolidge	159,900	2683
6/22/98	57W	Columbia II	Clearbrook II	90,000	1784
6/23/98	11E	Columbia	Clearbrook I	107,000	1714
6/28/98	95W	Columbia II	Clearbrook II	96,500	1784
6/29/98	69E	Aspen	Village	75,800	1584
7/15/98	18E	Aspen	Village	95,000	1584
7/28/98	19M	Burke	Village	68,500	1516
8/7/98	64E	2200 Deluxe	Coolidge	175,000	2473
8/12/98	61E	Columbia II	Clearbrook II	85,000	1784
8/17/98	44E	1800 Deluxe	Coolidge	138,500	2081
9/1/98	22S	Dartmouth Deluxe	Clearbrook I	103,000	2088
9/16/98	14W	1800 Deluxe	Coolidge	130,000	2081
9/22/98	8B	Aspen	Village	80,000	1584
9/24/98	21S	Super Dartmouth	Clearbrook I	112,000	2810
9/28/98	6E	Columbia II	Clearbrook I	93,000	1784
10/15/98	87E	Super Cannon	Clearbrook II	75,500	1151
10/15/98	19E	1800 Deluxe	Coolidge	135,000	2081
10/26/98	34MW	Burke	Village	67,000	1516
10/26/98	60W	Aspen	Village	87,100	1584
11/2/98	94W	Columbia II	Clearbrook II	97,500	1784
11/9/98	7E	Columbia	Clearbrook I	93,000	1714
12/7/98	44E	Columbia II	Clearbrook II	95,000	1784
12/8/98	116	Columbia II	Clearbrook I	126,000	1784
12/9/98	20S	Cannon Deluxe	Village	69,000	1134
12/14/98	21W	2200 Deluxe	Coolidge	172,500	2473
12/14/98	23E	Burke	Village	89,900	1516
12/17/98	86W	Columbia II	Clearbrook II	96,000	1784
12/21/98	43M	Burke	Village	80,500	1516
12/23/98	70E	Columbia II	Clearbrook II	96,500	1784
12/23/98	35W	2300 Deluxe	Coolidge	177,500	2683

12/31/98	95E	Columbia II	Clearbrook II	98,000	1784
1/12/99	13E	Cannon Deluxe	Clearbrook I	78,000	1134
1/19/99	13W	Columbia	Clearbrook I	80,000	1714
1/19/99	44MW	Cannon	Village	68,500	1118
2/1/99	47M	Columbia II	Clearbrook II	95,000	1784
2/3/99	16E	Aspen	Village	90,000	1584
2/10/99	66E	Columbia II	Clearbrook II	92,000	1784
2/19/99	72	Special Design	Coolidge	146,000	2157
3/10/99	7W	1800 Deluxe	Coolidge	125,000	2081
3/11/99	47E	Aspen	Village	73,800	1584
3/18/99	57M	Columbia II	Clearbrook II	91,000	1784
3/23/99	49E	Columbia II	Clearbrook II	93,500	1784
3/26/99	83E	Aspen	Village	85,900	1584
3/31/99	76M	Burke	Village	83,000	1516
4/6/99	9E	Columbia	Clearbrook I	96,800	1714
4/8/99	7M	Columbia	Clearbrook I	75,000	1714
4/20/99	77W	Columbia II	Clearbrook II	110,000	1784
5/20/99	16E	Columbia II	Clearbrook I	95,500	1784
5/22/99	14E	Aspen	Village	99,900	1584
5/24/99	58W	Columbia II	Clearbrook II	99,000	1784
5/24/99	21E	Super Dartmouth	Village	110,000	2810
6/11/99	46E	Columbia II	Clearbrook II	105,000	1784
6/14/99	54M	Columbia II	Clearbrook I	95,000	1784
6/15/99	31M	Cannon	Village	67,500	1118
6/17/99	77W	Burke	Village	89,000	1516
6/19/99	5ME	Burke	Village	76,500	1516
6/22/99	58W	Dartmouth Deluxe	Village	135,000	2088
6/23/99	14W	Dartmouth Deluxe	Village	109,000	2088
7/17/99	49	Special Design	Coolidge	155,000	2072
7/23/99	27ME	Burke	Village	90,000	1516
8/11/99	20N	Aspen	Village	77,000	1584
8/13/99	16	2200 Standard	Coolidge	200,000	2538
8/14/99	27ME	Burke	Village	84,000	1516
8/16/99	22N	Burke	Village	67,533	1516
8/26/99	29N	Aspen	Village	99,933	1584
8/26/99	29S	Dartmouth Deluxe	Village	129,000	2088
9/9/99	57E	Aspen	Village	96,000	1584
10/5/99	35S	Dartmouth Deluxe	Village	130,000	2088
10/15/99	11W	2300 Deluxe	Coolidge	170,000	2683
10/18/99	48M	Burke	Village	85,000	1516
10/20/99	44ME	Columbia II	Village	113,000	1784
10/22/99	13M	Cannon	Clearbrook I	77,000	1118
10/28/99	71W	Columbia II	Clearbrook II	95,000	1784



10/28/99	53E	Aspen	Village	75,000	1584
10/31/99	42E	Aspen	Village	79,000	1584
11/16/99	37W	Columbia II	Clearbrook I	112,500	1784
11/17/99	23E	1800 Standard	Coolidge	133,000	2081
11/24/99	106	Super Dartmouth	Clearbrook I	120,000	2810
12/7/99	21E	1800 Standard	Coolidge	124,950	2081
12/7/99	35MS	Burke	Village	95,000	1516
12/17/99	90W	Columbia II	Clearbrook II	125,000	1784
12/17/99	20E	1800 Deluxe	Coolidge	130,000	2081
12/17/99	8B	Aspen	Village	87,000	1584
12/21/99	103	Pedestal	Clearbrook I	106,000	1428
1/31/00	75S	Super Dartmouth	Village	131,000	2810
2/11/00	28W	1500 Deluxe	Coolidge	127,000	1696
2/14/00	30E	Columbia II	Clearbrook I	115,000	1784
2/17/00	119	Columbia II	Clearbrook I	126,000	1784
2/24/00	22N	Burke	Village	89,000	1516
2/26/00	60M	1700 Deluxe	Coolidge	135,000	1840
2/29/00	31S	Dartmouth Deluxe	Village	118,000	2088
3/21/00	99	Special Design	Coolidge	205,000	1928
3/23/00	43E	Columbia II	Clearbrook II	100,000	1784
4/3/00	24W	Columbia II	Clearbrook I	125,000	1784
4/20/00	56E	2300 Deluxe	Coolidge	201,000	2683
4/21/00	123	Columbia II	Clearbrook I	138,000	1784
4/21/00	15	Special Design	Coolidge	230,000	2404

## APPENDIX B

### Alpine Skier Visits

Season	(1) New Hampshire	(2) Vermont	(3) New England
1977			8.2(4)
1978		3.0	8.8(4)
1979		3.6	11.3
1980		3.2	8.7
1981		2.1	9.0
1982		3.1	11.5
1983		4.0	9.5
1984	1.5	3.0	12.1
1985	1.4	4.2	11.1
1986	1.6	3.9	12.8
1987	2.2	4.4	14.7
1988	2.0	5.2	14.4
1989	1.8	4.9	12.7
1990	2.0	4.5	13.3
1991	1.6	4.6	11.2
1992	1.9	4.1	12.3
1993	2.1	3.8	13.2
1994	2.2	4.2	13.7
1995	1.7	4.3	11.3
1996	1.8	3.7	13.8
1997	1.9	4.1	12.4
1998	2.1	4.0	12.7
1999	1.9	4.2	12.5
2000	1.9	3.9	12.2

(1) According to Ski NH, a state wide association that tracks skier visits by ticket sales estimates cross county skier counts at 100,000.

Starting in 1992, an adjustment of -0.1 (100,000 skiers) in order to make the data comparable through the series.

(2) Data source: National Ski Area Association. Northeast region: CT, MA, ME, NH, NY, VT

(3) Data source: Vermont Ski Area Association.

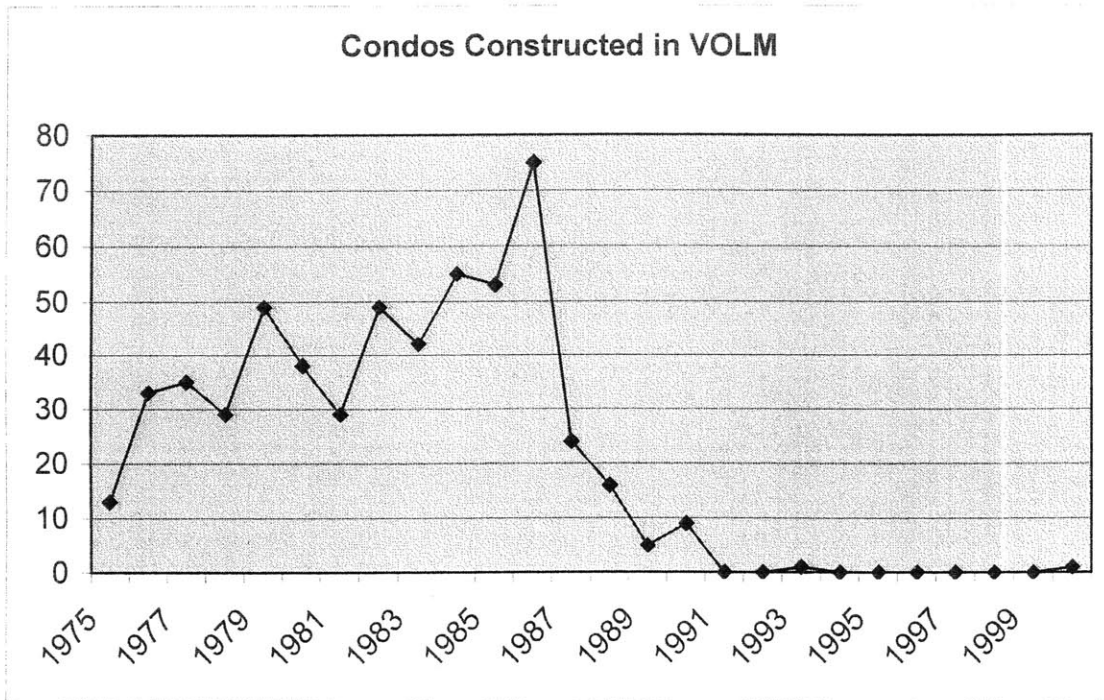
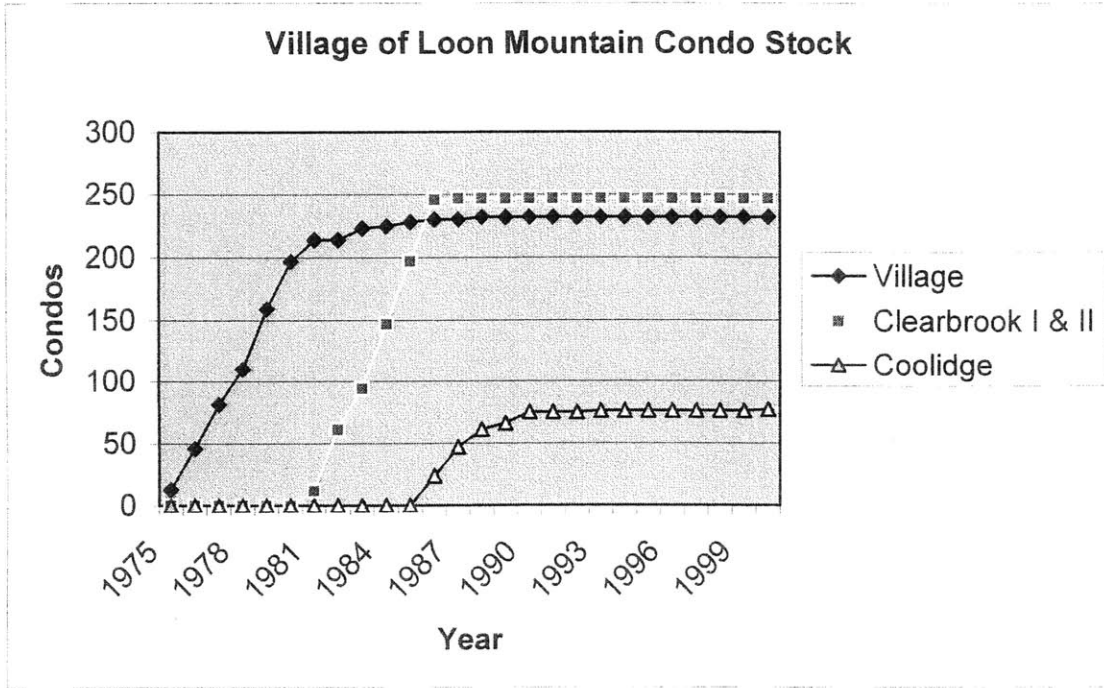
(4) Numbers were estimated from polynomial trend line.

## **APPENDIX C**

### **Condo Developments used in Condo Stock Count**

Alpine Lodge  
Alpine Village  
Black Mountain Condos  
Crossing at Riverplace, The  
Deer Park  
Evan's Way  
Forest Ridge  
Kernwood  
Lincoln Station  
Links  
Lodge at Lincoln Station, The  
Loon Brook  
Mountain Club  
Nordic Inn  
Pollard Brook  
Ramshorn  
Riverfront  
Riverfront Townhouses  
Rivergreen Resort  
Sam's Court  
Village of Loon Mountain

APPENDIX D



## **Bibliography**

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