AN EXAMINATION OF LEADING INDICATORS IN THE APARTMENT AND OFFICE MARKETS

by

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ABSTRACT

It has long been recognized that the real estate industry exhibits cyclical behavior, but there has been little systematic research into identifying leading indicators of those cycles. Moreover, real estate is not a homogeneous product: the performance of real estate varies greatly between property types and across regions. This thesis explores leading indicators of returns in the residential and office markets over a nine year period. The research focuses on Boston and Denver - two cities with very different economic bases.

Four of the variables that were tested as potential leading indicators of returns in the residential market are regional income and demographic variables: total personal income by metropolitan area, per capita personal income by metropolitan area, total population by metropolitan area and employment by metropolitan area. Two of the variables measure the delinquency and foreclosure rate. The other four variables - the average effective interest rate for all conventional home mortgages and the number, amount and weighted average interest rate of commitments of $100,000 and more made by twenty insurance companies - are measures of the cost and availability of capital.

The variables that were tested for the office market are employment by metropolitan area, vacancy, and the number, amount and weighted average interest rate of commitments of $100,000 and more made by twenty insurance companies.

The return estimates were regressed against the leading indicator variables, lagged one year. Each test variable was ranked according to the percentage of significant results, mean coefficient of determination and mean ranking in relation to the other indicator variables by coefficient of determination, for each of the four categories: Boston

Apartment, Denver Apartment, Boston Office and Denver Office.

The important leading indicators varied considerably both between the two property types and between the two cities. Some of the significant indicator variables were common to a single property type in both cities. Others were important in one city and not in the other. A couple of the variables were significant across both property types and cities.

Per capita personal income, the Composite Index of 12 Leading Indicators, total personal income, total employment and total population were the five highest ranked leading indicators in the Boston Office category. The Composite Index of 12 Leading Indicators, total personal income, the total delinquency rate on all home mortgages, the amount of commitments of $100,000 and more and the average interest rate for all conventional home mortgages were the five highest ranked indicators of returns in the Denver Apartment category.

In the Boston Office category, total employment was the highest ranked indicator variable, followed by vacancy and the amount of commitments of $100,000 and more. In the Denver Office category, vacancy was the highest ranked variable, followed by the weighted average interest rate and amount of commitments of $100,000 and more, total employment and the number of commitments of $100,000 and more made by twenty insurance companies.

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1. INTRODUCTION

It has long been recognized that the real estate industry exhibits cyclical behavior, but there has been little systematic research into identifying leading indicators of those cycles. Moreover, real estate is not a homogeneous product: the performance of real estate varies greatly between property types and across regions. This thesis explores leading indicators of returns in the residential and office markets over a nine year period. The research focuses on Boston and Denver - two cities with very different economic bases.

Hartzell, Shulman and Wurtzebach, in their article entitled "Refining the Analysis of Regional Diversification for Income-Producing Real Estate" [9], segmented the United States into eight regions based on underlying economic fundamentals. The New England region is characterized as having an employment base which has shifted from heavy manufacturing to high technology production and business, financial and educational services. Defense spending is also an important contributor to the region's economy. According to Hartzell, Shulman and Wurtzebach, the high education level of the region, as well as the tendency of its large

college student population to settle in the area after graduation, has created the basis for a post-industrial economy. The combination of a built-up infrastructure and the strong regulatory policy make additions to supply difficult.

In Hartzell, Shulman and Wurtzebach's typology, Denver is part of the Mineral Extraction Area, which covers the area from Louisiana to Montana, and also includes Alaska. This region achieved an unprecedented level of prosperity in the 1970's with the rise in the price of oil, only to see it dissipate in the 1980's. The boom left the largest amount of overbuilding in the history of the United States, but it did enable many of the larger cities in the region to develop a critical mass in finance, business services and, to some extent, high technology production.

Indicators of What?

There are two components to real estate returns: income and appreciation. The income component is determined by rents, operating expenses and vacancy rates. The vacancy rate, which is a function of the relationship between supply and demand, impacts returns in two ways: directly, through its effect on collected rents and indirectly, through its impact on rent levels.

This thesis explores the relationships between return measures and determinants of returns - rent, vacancy and NOI - and the leading indicator variables. The consideration of non-market factors, such as taxes, rent control and other policy issues, which also have an impact on returns, is beyond the scope of this paper.

Appreciation was considered only in the context of the analysis of the FRC Property Index. The Index, which was jointly developed by the Frank Russell Company and the National Council of Real Estate Investment Fiduciaries (NCREIF) in 1977, measures the historical performance of over 1000 income producing properties owned by pension funds and managed by voting members of NCREIF. The data is broken down into four property types and four regions and returns are presented by income and appreciation components.

The focus of this research is more practical than theoretical. No attempt was made to build structural models of supply and demand, rather the goal was to identify key leading indicators of movements in income and overall returns. One of the questions which this thesis raises is whether it's possible to predict movements in returns to real estate without doing a structural analysis of supply and

demand and the relationship between the two.

Some of the variables that were tested are measures of demand and others affect supply. Some of the variables are measures of real activity, such as GNP, and some are financial measures, such as interest rates and the supply of money. Some of the variables are local variables and others are macroeconomic variables.

One of the central questions of this thesis is to what extent returns are determined by macroeconomic variables and to what extent they are determined by local factors. To the extent that movements in real estate returns vary with movements in aggregate economic activity, one can look to leading indicators of aggregate economic activity to predict cycical movements in real estate returns. To the extent that real estate returns do not vary with overall economic activity, it may be possible to identify real estate-specific or property type-specific variables which are better leading indicators of returns to real estate.

In the first part of the analysis, each of the dependent variables was tested against Gross National Product to determine to what extent movements in real estate returns varied with movements in aggregate economic activity. In the

second part of the analysis, each of the leading indicator variables was tested against the dependent variables, with a one year lag. Four of the leading indicator variables that were tested for the residential market are regional income and demographic variables: total personal income by metropolitan area, per capita personal income by metropolitan area, total population by metropolitan area and employment by metropolitan area. Two of the variables measure the delinquency and forclosure rates. The other four variables - the average effective interest rate for all conventional home mortgages, the number of commitments of $100,000 or more made by twenty insurance companies, the amount of commitments of $100,000 or more made by twenty insurance companies, and the weighted average interest rate of commitments of $100,000 or more made by twenty insurance companies - are measures of the cost and availability of debt.

The leading indicator variables that were tested for the office market are employment by metropolitan area, vacancy, the number of commitments of $100,000 and more made by twenty insurance companies, the amount of commitments of $100,000 and more made by twenty insurance companies and the weighted average interest rate of commitments of $100,000 and more made by twenty insurance companies.

The second chapter is a review of the research on variations in performance between property types and an analysis of the Frank Russell Index by property type. The third chapter contains a review of the theory and performance of leading indicators of aggregate economic activity. The fourth chapter includes a discussion of the literature on the dynamics of the office and residential markets. Chapter Five describes the data and methodology, and Chapter Six presents the results and evaluates the leading indicator variables in terms of their indicative power. The final chapter summarizes the results and draws conclusions.

2. VARIATIONS IN PERFORMANCE BETWEEN PROPERTY TYPES

RETURNS

Table 1 is a summary of several researchers' estimates of returns and standard deviations by property type. Both the Ibbotson and Sinquefield data (Ibbotson) and Finnegan's Financial Green Sheet Rates of Return (Finnegan) cover the period 1960 through 1986 and were taken from Webb [23].

Ibbotson estimated the total return to residential and business properties both to be 8.44%, although the standard deviation of the business properties (5.67) was higher than that of the residential properties (4.64). In the case of the residential properties, the appreciation component made up a larger portion of the total return (4.90%) than the income component (3.54). In the case of the business properties, the income component was larger than the appreciation component: 5.49% compared to 2.95%. The standard deviation for the residential income component (0.52) was much lower than that of the residential appreciation component (4.12). The standard deviation for the income component of the business properties (2.30) was also smaller than that of the appreciation component (3.37).

TABLE 1.
RETURNS BY PROPERTY TYPE

		Mean	Standard Deviation
Ibbotson and Others from Webb 1960-1986	Residential Income	3.54	0.52
	Residential Apprec.	4.90	4.12
	Residential Total	8.44	4.64
	Business Income	5.49	2.30
	Business Apprec.	2.95	3.37
	Business Total	8.44	5.67
Finnegan's Green Sheet from Webb 1960-1986	Residential Income	2.61	1.62
	Residential Apprec.	3.98	4.65
	Residential Total	6.59	6.27
	Business Income	3.96	2.22
	Business Apprec.	2.25	2.89
	Business Total	6.21	5.11
Miles and McCue Cash yields 1973-1978	Residential	9.62	1.40
	Office	8.62	0.84
	Retail	8.44	0.80
	Other	7.76	1.15
Firstenberg, Ross and Zisler Total Return 1978-1985	Hotels	18.25	12.08
	Office	15.38	4.72
	Apartments	15.29	3.97
	Industrial	13.63	2.27
	Retail	11.56	2.19
FRC Index 1977-1987	Office Income	7.46	0.75
	Office Apprec.	5.68	7.33
	Office Total	13.48	8.27

Retail Income	8.15	0.69
Retail Apprec.	3.56	2.35
Retail Total	11.92	2.40
R&D/Office Income	8.35	0.67
R&D/Office Apprec.	5.50	5.54
R&D/Office Total	14.19	6.16
Warehouse Income	8.07	0.34
Warehouse Apprec.	4.72	3.04
Warehouse Total	13.08	3.52

Finnegan's return results follow roughly the same pattern as Ibbotson's, except the estimates are lower: 6.59% total return for residential and 6.21% total return for business. Finnegan's estimate of the standard deviation of total residential returns is higher than that of total office returns, the opposite of Ibbotson's results.

Miles and McCue [15] compared unlevered cash yields of a sample of equity REIT portfolios from 1972-1978 by property size, type and location and achieved very different results than Ibbotson and Finnegan. They compared four categories of property type - office, residential, retail and "other". They did not "unbundle" the returns into income and appeciation components. According to their estimates, the rate of return to residential properties (9.62) was higher than the rate of return to office properties (8.62). The standard deviation of residential returns was also higher than that of office returns.

Miles and McCue found substantial variation between property types. Residential properties showed the greatest absolute increase over the period while retail properties showed the largest percentage increase. They also found that the yields did not move together. Residential yields moved down first, followed one period later by the estimated yields on retail

properties which in turn were followed two periods later by a severe drop in the returns from office properties. Residential yields were also the first to move back up.

Firstenberg, Ross and Zisler's [7] return estimates cover roughly the same time period as the FRC Index. Of the five categories that they compared, the hotel properties achieved the highest rate of return, with office and apartments tied for second place and industrial and retail lagging behind.

Analysis of the FRC Index by property type presents a slightly different picture. R&D/Office led with a total return of 14.19%, followed by office with a total return of 13.48%, warehouse with a total return of 13.08%, and retail with a total return of 11.92%.

CORRELATIONS IN RETURNS BETWEEN PROPERTY TYPES

Table 2 compares three estimates of correlations between property types. There was substantial variation in results between the three studies cited. Firstenberg, Ross and Zisler [7] analyzed the correlation between returns to five property types: apartments, hotels, office buildings, retail properties and industrial properties over the period

TABLE 2.
PROPERTY TYPE CORRELATION MATRIX

Firstenberg, Ross and Zisler

	Apartments	Hotels	Industrial	Office	Retail
Apartments	1				
Hotels	0.56	1			
Industrial	0.41	0.17	1		
Office	0.21	0.11	0.65	1	
Retail	0.13	-0.01	0.59	0.21	1

Miles and McCue

	Office	Retail	Residential
Office	1		
Retail	0.48	1	
Residential	-0.49	0.08	1

Frank Russell Index

	Office	Retail	R&D/Office	Warehouse
Office	1			
Retail	0.01	1		
R&D/Office	0.43	0.04	1	
Warehouse	0.51	0.04	0.09	1

1978-1985. The coefficients of correlation ranged from .01 for office and retail to .51 for office and warehouse. The correlations between Retail and R&D/Office, Retail and Warehouse and Warehouse and R&D/Office were all positive but very low.

They constructed efficient portfolio mixes by property type for a range of risk and return levels and found that at all levels of risk, some diversification is appropriate, but the efficient portfolios can have as few as two property types in them. For high levels of return, hotels and office properties dominated, while apartments, industrial properties and retail properties dominated the low risk alternatives.

According to Miles and McCue's analysis, residential was the least correlated with the other property types. The coefficient of correlation between office and retail (.48) was the highest of any two property types, followed by residential and retail with a correlation coefficient of .08 and office and residential with a correlation coefficient of -.49.

HEDGE AGAINST INFLATION

Real estate is renowned for its alleged ability to provide a strong hedge against inflation. Hartzell, Hekman and Miles [8] examined the ability of a well-diversified real estate portfolio to hedge against anticipated and unanticipated inflation using quarterly holding-period returns from over 300 properties comprising the assets of a large CREF. They divided the sample into portfolios by three property types: industrial, office and retail, and compared the degree to which revenues responded to inflation on a quarterly basis, for 40-quarter and 20-quarter samples.

Industrial properties provided the strongest inflation protection. Both industrial and office properties provided complete protection from expected inflation while retail properties were much weaker. The retail properties appeared to provide a better hedge against unexpected inflation, presumably due to the prevalence of pass-through and percentage rents in retail leases. The results for the 20-quarter sample were much stronger. Industrial and office properties showed complete protection from both expected and unexpected inflation, with correlation coefficients of .48 and .28, respectively, compared to .07 and .27 for the 40-quarter sample.

The structure of the leases is one of the underlying reasons why we would expect different responses between property types. Residential leases tend to be short-term while office and retail leases are typically longer term. Retail properties could be expected to exhibit relatively greater return variability than other property types because owners typically receive a percentage of sales. The cyclical nature of retail sales could be expected to induce rental income cyclicality. But offsetting this is the fact that cost increases are generally passed through on retail properties, which would tend to stabilize property income flows. It's unclear what effect the current trend toward shorter retail leases with no renewal options will have on the variability of retail returns. If a tenant is underperforming than the lease would probably not be renewed which could lead to more stable returns. On the other hand, shorter leases could mean higher turnover, which could lead to greater volatility in returns.

There is a second dimension to the relationship between real estate and inflation. During periods of high inflation capital tends to flee from monetary assets to real assets, such as real estate and precious metals, as investors try to protect their wealth from the affects of inflation. These

non-monetary goods serve as stores of wealth and become repriced in nominal terms - they become monetized.

3. LEADING INDICATORS

Cyclical indicators, as defined by the Bureau of Economic Analysis of the U.S. Department of Commerce, are economic time series which have been singled out as leaders, coinciders or laggers based on their general conformity to cyclical movements in aggregate economic activity. They are classified both by economic process and by their average timing at business cycle peaks, troughs, and at peaks and troughs combined. In addition, the NBER publishes composite leading, lagging and coincident series, which are made up of the best of the cycical indicators in each category.

The selection of leading indicators was begun by Wesley Mitchell and Arthur Burns at the National Bureau of Economic Research in the 1930's. Over the past fifty years, the value of each of the individual series as predictors of general economic performance has been periodically reviewed, and the composition and weights of the composite series have been adjusted accordingly. Each individual series is evaluated with respect to the following criteria:

economic significance
statistical adequacy in describing the economic process

in question

timing at recoveries and recessions

conformity to historical business cycles

smoothness

currency or timeliness (how promptly the statistics are available)

The series are given overall scores and the top scoring series are weighted by their scores in computing the overall index. Sometimes series from outside the top scorers are included in order to achieve economic diversity. The NBER performs certain statistical techniques in order to standardize the index.

The index of leading indicators was most recently revised in 1979. The twelve components of the index and their weights are listed below.

Components of Composite Leading Economic Indicator

Change in Total Liquid Assets, Smoothed	9.1%
Layoff Rate, Manufacturing (Inverted)	8.9%
Stock Prices, 500 Common Stocks	8.9%
Money Supply, M2, in 1972 dollars	8.9%

Average Workweek, Production Workers, Manufacturing	8.6%
Net Change in Inventories on Hand and on Order, 1972 Dollars, Smoothed	8.6%
New Orders for Consumer Goods and Materials, 1972 Dollars	8.3%
New Business Formation	8.0%
New Building Permits, Private Housing Units	7.9%
Contracts and Orders for Plant and Equipment	7.8%
Vendor Performance, Percent of Companies Receiving Slower Deliveries	7.6%
Change in Sensitive Crude Materials Prices, Smoothed	7.4%

The highest weighted indicator in the series is the four-month moving average of the change in total liquid assets. The second series, the layoff rate for manufacturing, is inversely related to overall economic activity. In the typical cycle, the number of employees laid off from manufacturing jobs begins to rise before the onset of the recession and slows down before the recovery begins. Stock prices, the third-ranked leading indicator, reflect

investors' expectations of the state of business. The fourth of the leading indicators, money supply, M2, in 1972 dollars, is closely related to the first series, change in total liquid assets. M2 is one of the components whose change is measured in the the first series. M2 is composed of currency in the hands of the public plus public demand deposits and personal time deposits in commercial banks. Together these two series measure the level of liquidity in real terms and the change in the level of liquid assets in nominal terms. Their leads tend to be long and variable. Their movements indicate that as an expansion matures, the rate of growth in liquid assets begins to decline before the decline in the general level of business activity, and as the economy approaches a peak, the rate of inflation begins to exceed the expansion of the money supply so that the real value of M2 begins to fall. Both of these indicators are fairly volatile and give a number of false signals, but the figures are available promptly with a minimum of revision. [2]

The average workweek for production workers in manufacturing tends to lead the business cycle, suggesting that businesses adjust the length of the workweek before hiring or firing people. Conversely, during an expansion, the workweek tends to lengthen before employment rises. The tendency of the net change in inventories on hand and on order and new orders for

consumer goods and materials, the sixth component of the index, to lead the business cycle indicates that as a peak approaches, the rate of increase in the price level begins to exceed the rate of increase in orders for both inventory and consumer goods, resulting in a decrease in the rate of new orders, in real terms. Similarly, a recovery from a recession is signalled in advance by the rate of new orders rising in real terms. New business formation, the rate of change in the number of business firms, tends to lead the level of business activity, presumably because as the economy approaches a peak, bankruptcies begin to exceed new incorporations and as the economy begins to recover, the situation is reversed. New building permits, private housing units and contracts and orders for plant and equipment, 1972 dollars, both represent commitments to undertake large expenditures. The fact that vendor performance, the percent of companies receiving slower deliveries, is a consistent leading indicator, suggests that deliveries become much more prompt as production catches up with orders before a recession begins and slow down as producers' orders exceed their expectations as a recovery begins. The fact that the rate of change in sensitive crude materials prices, smoothed, tends to move in advance of the business cycle primarily reflects price movements in the industrial commodities markets such as copper, scrap iron, plywood, etc. Changes in

commodity prices are important because they can either choke off a business expansion or help to fuel a recovery. With materials prices increasing in advance of the business cycle and labor cost lagging, profit margins rise in the early stages of recovery and fuel the upward movement. Conversely, before the peak, these prices break and begin to fall, but labor costs continue to rise, squeezing profits and leading to cutbacks in production. [2]

The behavior of prices over the cycle is itself an important factor in the cycle. With the exception of sensitive commodity prices, the prices of factors of production, including labor, lag the prices of final goods and services. As the economy begins its recovery from a recession, the prices of final goods and services rise relative to the cost of the factors of production, which increases profit margins and encourages increased production and the required capital investment. Hiring increases, unemployment falls and orders for plant and equipment increase. As the expansion matures, interest rates, labor costs and other factor prices eventually rise to match the general increase in prices, squeezing profit margins and curtailing investment in new plant and equipment. As a recession begins and markets for final goods become weak, interest rates, wages and other factor costs continue to rise and the profit squeeze causes

cutbacks in production and employment.

Several authors have evaluated the historical performance of both the individual leading indicators and the composite index. In general, a series is judged to be a good leading indicator if it usually experienced a turning point before the general business cycle but rarely experienced one if no business cycle turning point were imminent. Auerbach [1] points out that it's desirable to examine the relationship between leading series and series representing the general business cycle at all points, not just turning points.

Neftci [17] tested eleven of the twelve individual components of the composite index for the period 1948 to 1971 using the unemployment rate and the Federal Reserve Board index of industrial production as the dependent variables and found that only six of the eleven series were significant. Auerbach [1] evaluated the composite index over the period 1949 to 1977 using the same two dependent variables and found the composite index useful in forecasting changes in both variables, although he found that the index is essentially indistinguishable from one with equally weighted variables. He also found that the exclusion from the index of those series which do not individually help explain business cycle variables worsens the overall performance of the BEA

indicator. Auerbach concluded that if there is a single index underlying cyclical fluctuations, its identity in relation to the twelve component series of the BEA index is unstable over time, thus, the composite index tends to smooth out such shifts, and is a better indicator than any one individual series.

The index has met with increasing criticism recently. Since the early 1980's it has predicted far greater economic growth than occurred, many believe because several of its components have lost their predictive behaviour as the economy has changed [22]. It has been criticized for being too heavily manufacturing oriented and not reflective of the increasing importance of the service sector of the economy. An article in the Wall Street Journal on May 31, 1988 summed up the criticism: "too antiquated, too many revisions, too manufacturing-oriented." Donald Fine, chief market analyst at Chase Manhattan Bank expressed his enthusiasm for the index: "Fine . . . next number? The index is a number I can't get excited about." The Commerce Department has plans to upgrade the index eventually. [22]

4. THE RESIDENTIAL AND OFFICE MARKETS

THE RESIDENTIAL MARKET

According to Rosen and Smith [18], the rental housing market is typically analyzed using a stock-flow model. At any one time there is a stock of rental housing units providing rental services. Although the size of the rental housing stock in any period is increased by newly completed or converted rental units and decreased by removals, demolitions and depreciation, the annual change in the stock is relatively small and is considered to be fixed in the short run.

They state that the demand for rental stock is usually assumed to depend on a variety of variables including demographic variables, such as the number of families, the rate of household formation, the age composition of the population, disposable income, rent, the cost of owner-occupied housing, the price of alternative goods and services, the cost and availability of mortgage credit, and consumer preferences. These supply and demand functions interact to determine the level of rents and the stock of vacant rental units.

Traditional analysis of the housing market assumed a close relationship between vacancy and rents. Conventional theory held that the difference between some long-run "normal" or "optimal" vacancy rate and the actual vacancy rate varied inversely with changes in rent.

Ray Fair [6] presented what has become a classic description of the rent adjustment process. He argued that there are frictions and inefficiencies in the market, such as high transaction and search costs, slow supply responses, imperfections in the credit market and the existence of long-term contracts, that impede the rapid adjustment of rents, so that the rent level may not completely clear the market - actual vacancies may not equal the normal or optimal vacancy rate. The natural vacancy rate is determined by market factors such as the cost of holding inventory, search costs, the variability of demand and the costs of recontracting. According to this theory, if rents are such that the housing stock demanded is greater than the difference between available supply and the normal vacancy rate, then vacancies will be less than normal and rents will tend to rise, which will encourage new construction and also reduce demand from existing renters. Conversely, if rents are such that the housing stock demanded is less than the

difference between the available supply and the normal level of vacancies, vacancies will be higher than normal, downward pressure will be exerted on rents, and new construction will be lower than in the market-clearing case. The speed at which the market moves toward equilibrium depends upon the the speed of the supply-side response and the adjustment of rents. This theory implies that the rate of change of rents depends upon the vacancy rate and that variations in supply or demand will be reflected initially in the vacancy rate, although they may also exert some direct effect on the rate of change in rents over the long term.

This relationship between rents and vacancy rates has proven difficult to demonstrate empirically, however. Studies by De Leeuw and Ekanew [4], Eubank and Sirmans [5] and Lowry [14] all failed to find evidence of a significant relationship between rents and vacancy. De Leeuw and Ekanew hypothesized that their failure to find a significant relationship between rents and vacancy rates was due to that fact that the variation in vacancy rates among metropolitan areas reflected differences in the normal vacancy rates between cities, rather than different degrees of market tightness.

Rosen and Smith's research confirmed DeLeeuw and Ekanew's hypothesis that variations in the vacancy rate around some

natural vacancy rate have a significant effect on the rate of change of the price of rental housing, but that there are differences in natural vacancy rates between cities and that variations in the actual vacancy rate from the normal rate is the appropriate variable for explaining the price-ajdustment mechanism for rental housing markets. They explained the variation in natural vacancy rates between cities by a search model, relating the search behavior of landlords for tenants and tenants for housing units, and by the turnover and growth rates in each city. They found large variation between cities, with Cleveland and New York having the lowest natural vacancy rates of 5.5% and 6.0% and Dallas, Denver and Houston having the highest natural rates at 16.7%, 14.6%, and 14.3%, respectively. They estimated the natural vacancy rate for Boston to be 9.2%. The large difference between the estimated natural vacancy rates for Denver and Boston might be partially explained by the different economic bases and regulatory policies of the two cities and the availability of land.

Leading Indicator Variables

Most of the leading indicator variables were selected from those variables which are generally held to be important determinants of apartment rents and returns in the literature

on the subject. In addition to their theoretical significance, the test variables were selected for their ease of collection and timeliness. Again, this research is intended to be pragmatic. Data on household formation, age of the population and other demographic variables which might be important indicators of apartment rents and returns either are not available on a regular basis or are not reliable, and therefore were not tested.

Population by metropolitan area: Rents could be expected to increase with population growth.

Income: Rents could be expected to increase with income. As income increases, household formation and the demand for housing services could also be expected to increase.

Mortgage delinquency and foreclosure rates: Mortgage delinquency and forclosure rates are indicators of the overall health of the economy. Mortgage delinquency and foreclosure rates could be expected to increase during a downturn, as unemployment increases. As the overall state of the economy deteriorates, people tend to defer large investments, which would lead to a decrease in the demand for single family homes and an increase in the demand for rental housing. At the same time, however, as unemployment is

increasing, so, too probably are uncollected rents. The effect of these two variables on the vacancy rate would depend on whether or not uncollected rents are included as vacancies. If uncollected rents are included in vacancies, vacancies could be expected to be positively related to mortgage delinquency and foreclosure rates. If uncollected rents are not included in vacancies, vacancies could be expected to be negatively correlated with delinquency and foreclosure rates.

Average interest rate for conventional home mortgages: As mortgage rates increase and the cost of homeownership increases, the demand for apartments could also be expected to increase, which would result in upward pressure on rents.

Number, amount and weighted averaged interest rate of commitments of $100,000 and over on multifamily and nonresidential mortgages made by 20 life insurance companies: These three variables represent the cost and availability of borrowed capital to developers. These commitments are made up to two years in advance and represent lenders' expectations about the future. They should tell us how accurately these particular lenders predicted the performance of real estate. If it turned out that lenders shut off the

flow of funds before a downturn in returns then it might suggest that investors should stop investing in real estate when these lenders stop lending.

Vacancy: Rents and returns could be expected to be inversely related to vacancy rates. Actual vacancy rates were tested. Deviation from the normal rate remains a matter for further research.

Hudson-Wilson [11] has made the observation that, in a "sick" residential market, landlords offer "deals" - free rent, payment of utility bills, etc. - rather than lowering nominal rents, until the market has bottomed out, at which point landlords stop offering deals and begin lowering nominal rents. If her observation is correct, the gap between nominal and effective rents peaks when the market bottoms out. This suggests that a drop in nominal rents might actually signal an upturn in the market rather than a downturn and that the gap between nominal and effective rents, if it were available, might be a good indicator of returns in the apartment market.

Shilling, Sirmans and Corgel [19] applied a similar price adjustment analysis to the rental office market in 17 cities over the time period 1960 to 1975. According to their analysis, landlords react to fluctuations in demand either by adding to or drawing from inventories of unlet office space or by adjusting rents. As with the analogous price adjustment theory for the residential market, they assumed the existence of "normal" vacancy rates, which vary across cities, and hypothesized that rent adjustments should be strongest when the gap between the normal, long-run vacancy rate and the actual vacancy rate is largest, and weakest when vacancies exceed the normal rate. According to this theory, there is a desired inventory of vacant office space that landlords are willing to hold, which gives landlords flexibility in dealing with fluctuations in demand and normal turnover of tenants. Due to the relatively long terms of office leases, landlords hold vacant office space in inventory to take advantage of opportunities to supply units at higher rents during periods of increasing demand.

They tested the relationship between rental rates and vacancies and found that variations in the vacancy rate

around some desired vacancy rate were significant in determining price and output responses to changes in demand. The vacancy variable was significant at or above the 90% level in explaining changes in net rents for 11 of the 17 cities. From these results, they calculated "normal" vacancy rates for the 17 cities. The normal vacancy rates varied from a low of 1.00% for New York to a high of 20.90% for Kansas City. Denver's normal vacancy rate was calculated to be 12.33%. They attempted to explain variations in the normal vacancy rate across cities by differences in expected growth in demand and supply of office space and by the marginal costs of holding inventories. The results suggest that reactions of output and prices to changes in demand are strongest when the gap between desired and actual inventory holdings is largest and that inventories are largest when the marginal costs of carrying inventories is lowest.

Leading Indicator Variables

The following variables were tested as potential leading indicators of returns in the office market:

Total Employment: The demand for office space could be expected to increase as employment increases, exerting upward pressure on rents. The change in total employment was tested

rather than the change in nonmanufacturing employment, under the assumption that total employment is a better indicator of the demand for office space than is the change in nonmanufacturing employment. Cowan [3] demonstrated that for the period 1951 through 1962, office employment growth accounted for 75% of total national employment growth.

Louargand [12], in his analysis of office employment growth by occupational category, found that two of the eight categories - Professional, Technical and Kindred Workers; and Clerical and Kindred Workers - accounted for 55% of the growth in the labor force between 1950 and 1960 and 74% of the total labor force growth between 1960 and 1970. The two components, which made up 20.4% of the labor force in 1950, had grown to 32.4% in 1970. Since a large percentage of the workers in these two categories occupy office space, it's logical to assume that their growth has been accompanied by a parallel growth in the relative share of office space. This suggests that the growth in employment in these two occupational categories might be a proxy for growth in office employment. This is an area for future research.

Number of ACLI commitments of $100,000 or more; Amount of ACLI commitments of $100,000 or more; Weighted average interest rate of ACLI commitments of $100,000 or more: The

office market could be expected to respond to these variables in a similar fashion to the residential market.

Vacancy: Actual vacancy rates were tested rather than deviation from the normal vacancy rate, since the determination of normal rates is beyond the scope of this research.

5. THE DATA

SOURCES

The Frank Russell Index

The Frank Russell Index measures the historical performance of income-producing properties owned by commingled funds on behalf of pension funds and profit-sharing trusts, or owned directly by these trusts. The rates of return have two components: net operating income and the change in property market value (appreciation), determined by appraisal. There has been much debate about whether the appraisal based nature of the FRC Index causes it to move more sluggishly and smoothly than actual market value.

Apart from the question of smoothing, there's the question of the composition of the properties which make up the Index. Pension funds tend to invest in high grade properties with very stable tenancies. One needs to consider the unique nature of the FRC properties before generalizing to other types of real estate.

Institute of Real Estate Management (IREM) Data

The Institute of Real Estate Management collects income and expense data annually on suburban and downtown office properties, conventional apartments, and condominiums and cooperatives, through a survey of the Institute's Certified Property Manager members and other real estate professionals. A time series of NOI per square foot was constructed for the four categories of apartment buildings - elevator, low-rise 12-24 units, low rise 25+ units and garden apartments - and suburban office buildings for the two cities. The apartment data covers the period 1978-1987. The office data only goes as far back as 1979.

All of the income and expense figures are reported as medians, which insures that exceptionally high or low figures do not skew the results. The median values are calculated by building rather than by square foot, which means that each building is weighted equally, regardless of its size. It is important to note that there are variations in the sample base from year to year due to the voluntary nature of the contributions. Reported fluctuations must be interpreted with this in mind. There may also be an unspecified bias in the data due to the self-selection of respondents. It is also important to consider the sample size and the relative size of the properties in the sample. The mean sample size

in numbers of buildings and units for the residential data for the ten year period are as follows: Boston Elevator - 46.5 buildings, 6,450 units; Boston Lowrise 12-24 units - 13.1 buildings, 3,054 units; Boston Lowrise 25+ units - 25.2 buildings, 2,007 units; Boston Garden - 26.6 buildings, 4,602 units; Denver Elevator - 24.4 buildings, 3,212 units; Denver Lowrise 12-24 units - 15.9 buildings, 1,905 units; Denver Lowrise 25+ units - 24.7 buildings, 2,521 units; Denver Garden - 38.7 buildings, 5,067 units. The mean sample size for the Boston suburban office survey is 5.63, casting doubt on the reliability of this series. The mean sample size for the Denver suburban office survey is 19, with the sample size being less than 10 in only two of the nine years. Gross rentable office area was used, rather than net, under the assumption that the definition of gross square footage would be more stable than the definition of net rentable office area which would tend to vary with market conditions.

The Spaulding and Slye Report

The Spaulding and Slye Corporation has been compiling data on estimated office rents and vacancies in downtown and suburban Boston since 1979. The estimated rents are an amalgam of quoted rents for currently available space from owners or agents, where available, and Spaulding and Slye's own

estimates of the "probable price of space". The estimated rates don't take into account subventions, which will impact effective rents, but the assumption has been made that the trends in estimated rents will be similar to the trends in effective rents, only less pronounced.

The suburban survey, which included 106 buildings in 1979, has grown to more than 500 buildings. The geographic area covered by the suburban survey has also increased. The original survey included eight cities and towns: Brookline, Burlington, Dedham, Lexington, Newton, Waltham, Wellesley and Woburn. The current survey includes forty-eight cities and towns and extends as far west as Westboro (28 miles from Boston), as far north as Methuen (23 miles from Boston), and as far south as Randolph (12 miles from Boston).

The square feet of space added, square feet of space absorbed and the vacancy rate were compiled for the entire survey over the ten year period. The mean rent was tracked, by building, for the 92 buildings in the original suburban survey which are still extant in 1988.

BOMA Experience Exchange Report

The Building Owners and Managers Association (BOMA)

Experience Exchange Report publishes income and expense data for office buildings, based on a voluntary survey of building owners and managers. The sample and sample size vary from year to year. In the case of Boston, although the average sample size for the suburban survey is 23.75, the sample size is less than 10 in each of the first three years. This calls into question the reliability of the Boston data, particularly in the early years of the study period. The smallest sample in the Denver data is 28 buildings and the average sample size is 45, making it less dubious than the Boston data. The averages are reported by square foot rather than by building, the result being that larger buildings affect the average values more than small buildings. There may also be an unspecified bias present in the data due to the self-selection of respondents.

Leading Indicator Variables

The source of the interest rate, consumer price index for rent and office permit data is The Construction Review, U.S. Department of Commerce.

The source of the mortgage delinquency and foreclosure data is the Mortgage Bankers Association, National Delinquency Survey.

The employment data is taken from the Employment and Earnings series, Bureau of Labor Statistics.

The residential permit data is taken from the C-40 series, U.S. Department of Commerce, Bureau of the Census

The source of the data on the number, amount and weighted average interest rate of commitments of $100,000 and over on multifamily and nonresidential mortgages made by 20 life insurance companies is the American Council of Life Insurance. The reporting companies account for 67% of all nonfarm mortgages held by life insurance companies.

PROBLEMS/LIMITATIONS

Sample Size: As pointed out above, the average sample size for the IREM Boston Office survey is 5.63, which makes its reliability very questionable, particularly in the early part of the study period. The BOMA Boston office survey also was based on less than 10 buildings in the first three years.

Changes in the definition of metropolitan statistical areas: The title and definition of the Boston Standard Metropolitan

Statistical Area was changed in 1984 to the Boston Primary Metropolitan Statistical Area. 27 towns were added to the area and 13 towns previously included were henceforth excluded from the area. This obviously creates problems of comparability of the data prior to 1984 with the post 1984 data.

BOMA Data: Boston suburban office data was not available for all of the ten years studied. In the cases where the suburban data was not available, regional suburban data was substituted.

Comparability of IREM and BOMA data: The IREM data are reported as medians by building whereas the BOMA data are reported as means per square foot. The IREM data will be less affected by outliers than the BOMA data. In addition, each building carries equal weight in the IREM series whereas larger buildings have a greater impact on the BOMA data than smaller buildings, since the means are weighted.

Vacancy: The IREM vacancy data includes uncollected rents while the Spaulding and Slye data does not.

Unavailability of quarterly return data: With the exception of the FRC Index, none of the return data is available on a

quarterly basis. According to the Commerce Department's definition, leading indicators are supposed to predict performance six to nine months in the future. If we expect to find the same lead period for real estate-specific leading indicators than the lack of availability of quarterly data is a serious problem.

TRENDS/COMPARISONS BETWEEN DATA SOURCES

THE FRC INDEX

Both the income and appreciation components of the FRC Index increased steadily for all four property types over the ten year period. (Figures 1-6) The increase in the indexes was very smooth, with R&D/Office increasing the most and office the least, although the differences between the four categories were small. The appreciation indexes were much more variable both within and between property types than the income components. The office appreciation index increased faster than the appreciation indexes for the other three property types. It levelled off or declined for all property types except R&D/Office during the 1982 recession. The appreciation value of the R&D/Office continued to rise during this period. The appreciation value of the office category

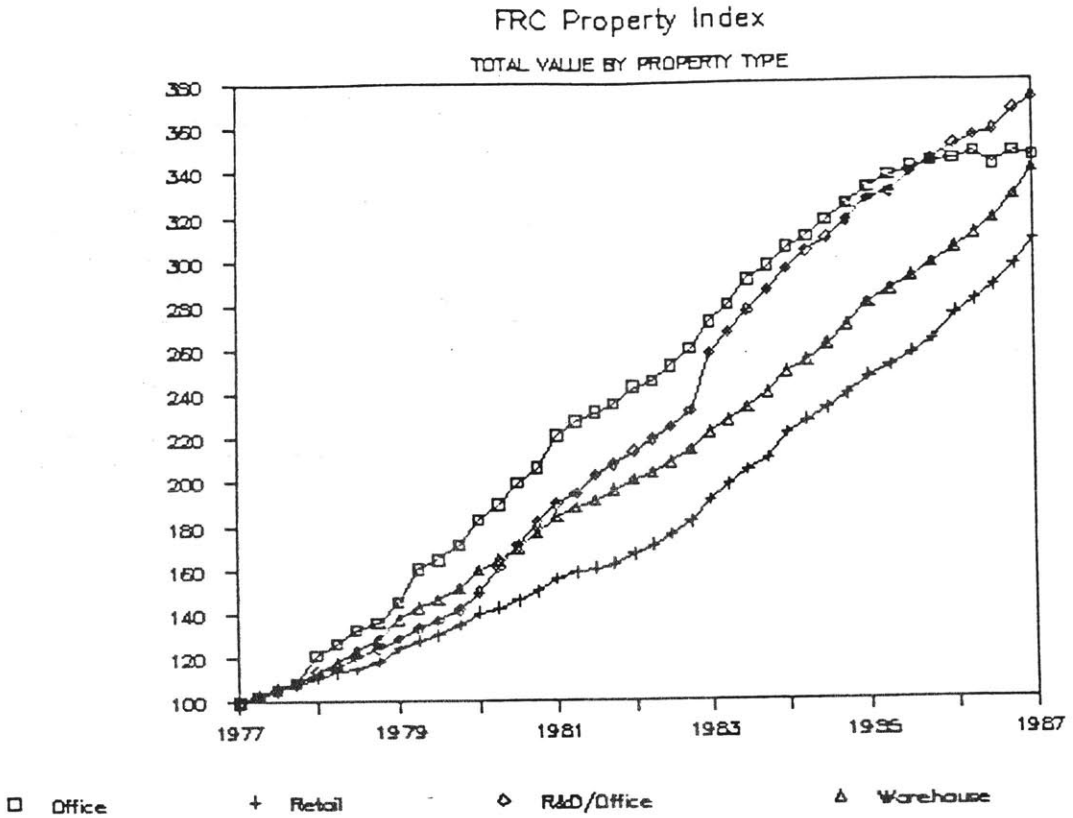

FIGURE 1.

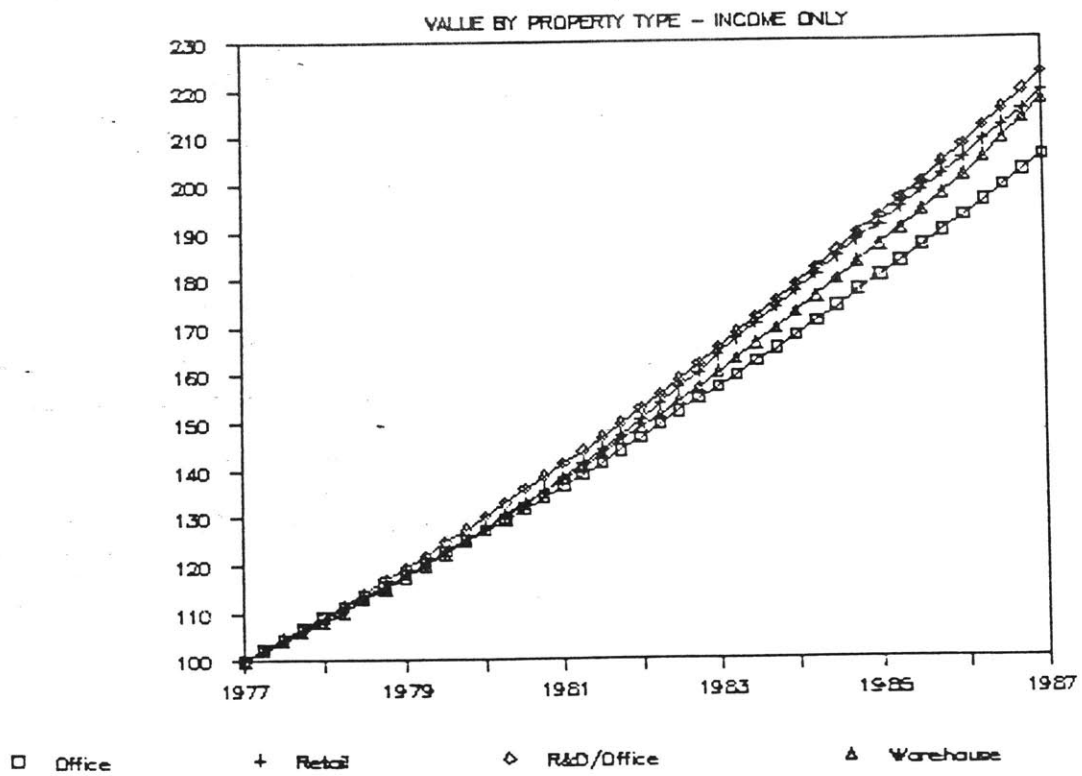

FIGURE 2.

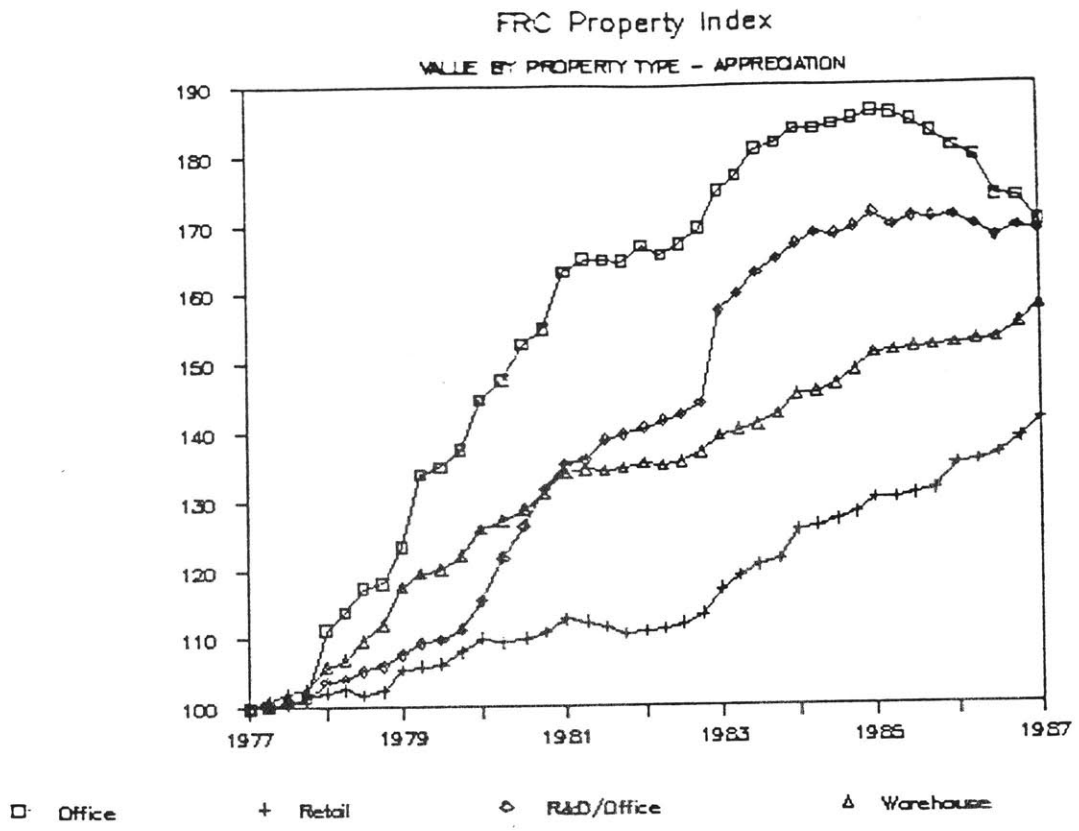

FIGURE 3.

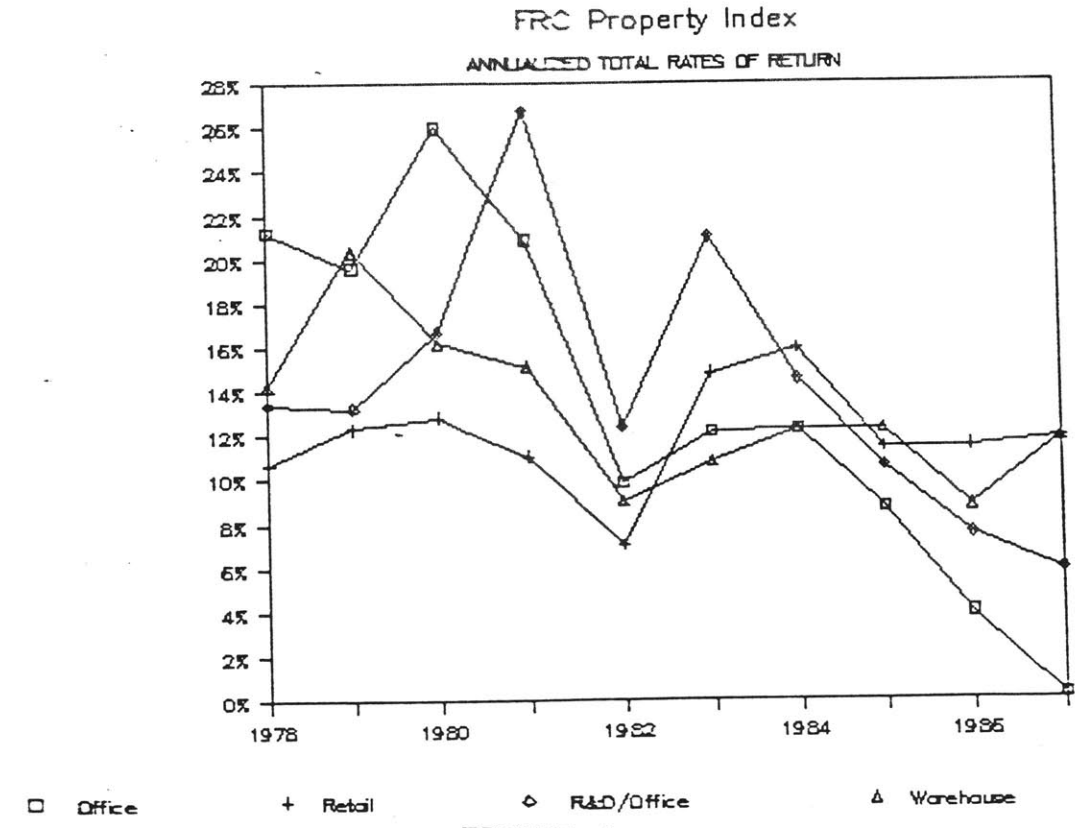

FIGURE 4.

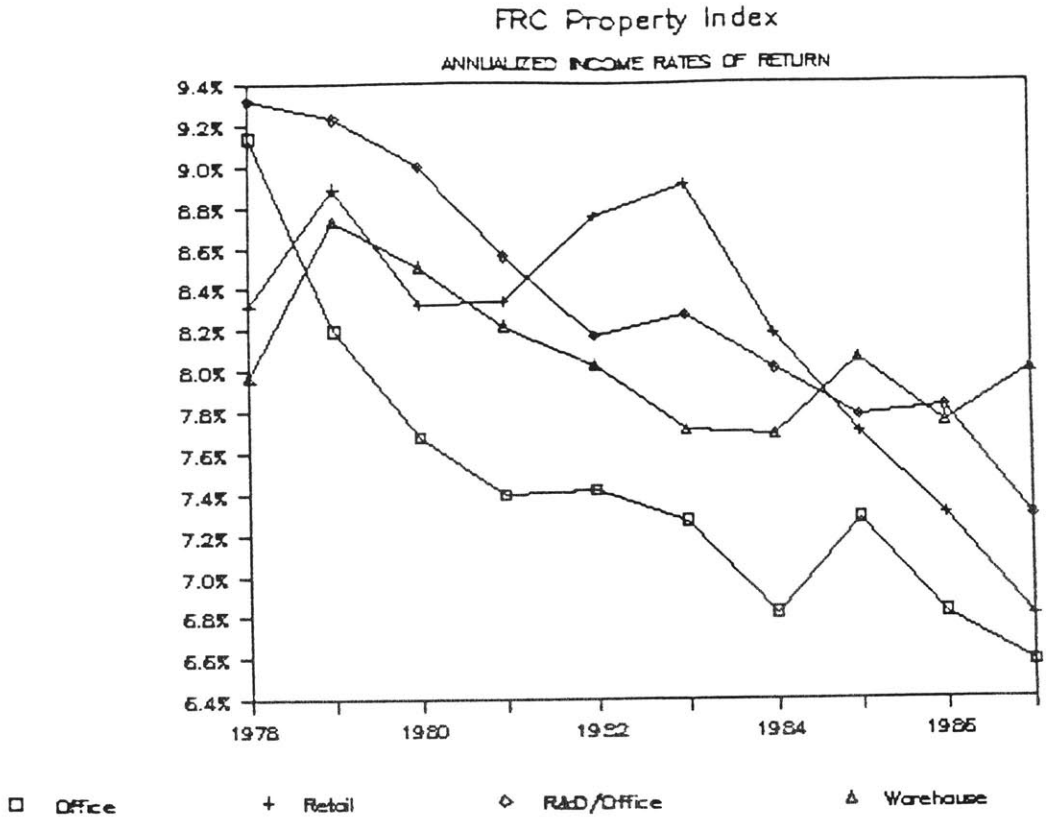

FIGURE 5.

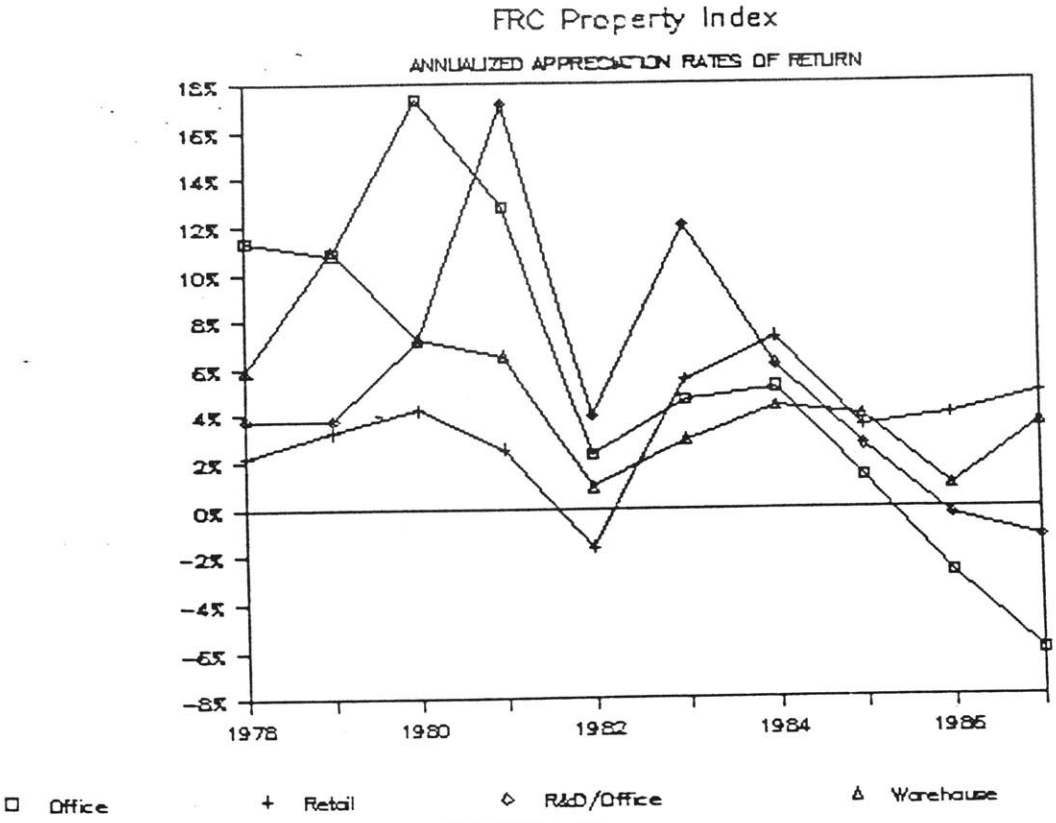

FIGURE 6.

peaked in the fourth quarter of 1985 and declined in each of the following eight periods.

Given the nature of the properties included in the index and the method of calculating the index values, it is not surprising that the income indexes are much smoother than the appreciation indexes. Pension funds tend to invest in high quality properties with very stable tenancies. The leases tend to be multiyear with escalator clauses based on CPI or PPI, so it is to be expected that the income index should grow very smoothly and steadily. The nature of the leases tends to produce the smoothness. The appreciation component of the index, on the other hand, is based on appraisals which are performed in-house on a quarterly basis and by an independent appraiser on an annual basis. Appreciation is affected by replacement costs, expectations of changes in the rental stream and changes in the cap rate. Adjustments in the cap rate will have the single biggest impact on appraised value and, thus, on appreciation. The cap rate is determined by the risk free rate of return and the market risk premium. As the cap rate is adjusted to account for changes in expected inflation it can have a dramatic impact on appraised values. One could expect the cap rate to move inversely with the ACLI weighted average interest rate and the average interest rate for all conventional home mortgages.

APARTMENTS

Rents

The median rent in each of the four Boston apartment categories rose fairly steadily over the ten year period, with a few exceptions. (Figures 7-14) The Lowrise 12-24 category rose very steeply from 1980 to 1983 and then dropped in 1984, coinciding with a sharp increase in vacancy in 1983. The median rents for Denver also increased fairly steadily, but were lower and increased at a lower rate than median Boston apartment rents. The one noticeable exception is the Denver Garden category which peaked in 1985 and than declined over the next two years.

Vacancy

The median vacancy rate in each of the four Boston apartment categories was lower in 1987 than it was in 1978 although the trends varied considerably between categories. In the Elevator and Lowrise 25+ categories, median vacancy experienced a peak in 1982, while vacancy in the other two categories actually decreased in 1982. The Lowrise 12-24 category reached its highest level for the period in 1983. Three of the four categories - Elevator, Lowrise 12-24 and Garden - experienced a low point in 1985, while the median

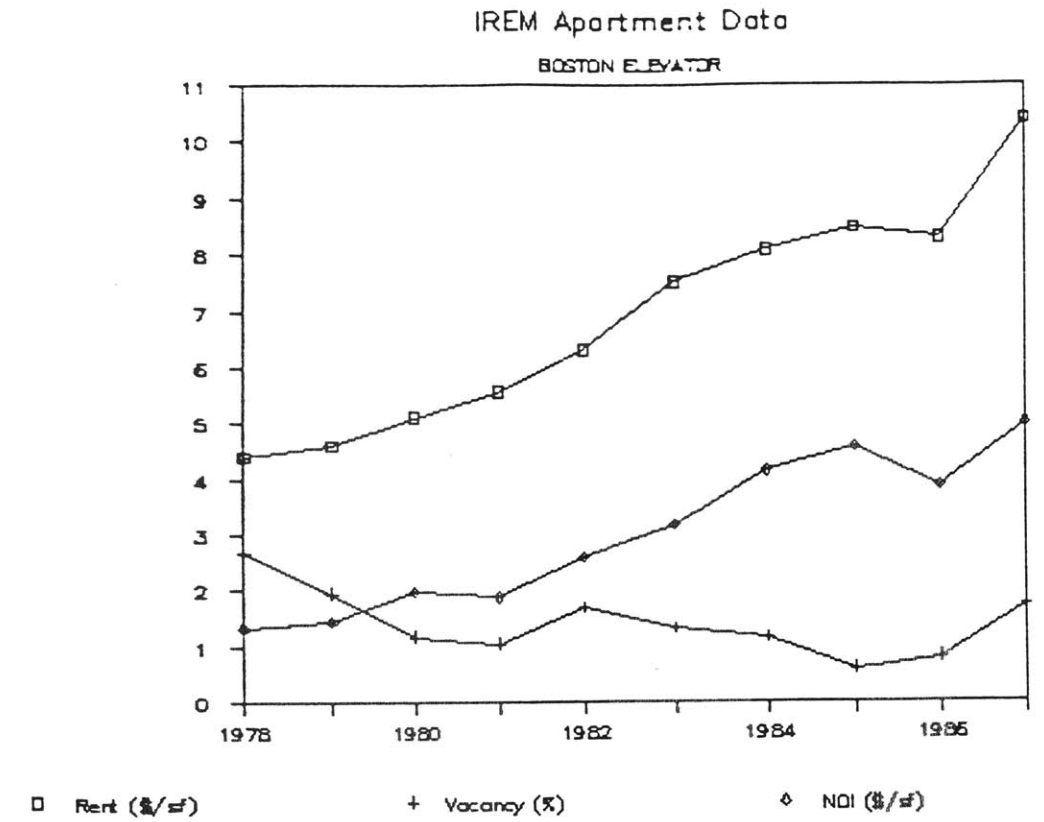

FIGURE 7.

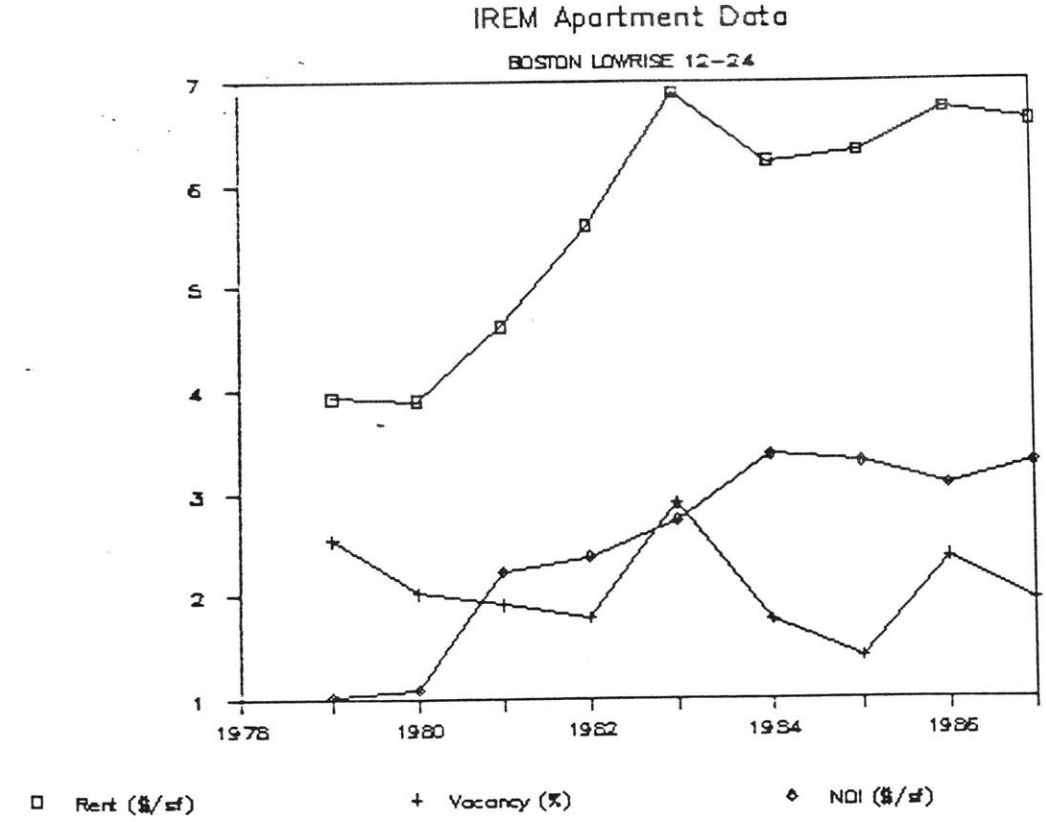

FIGURE 8.

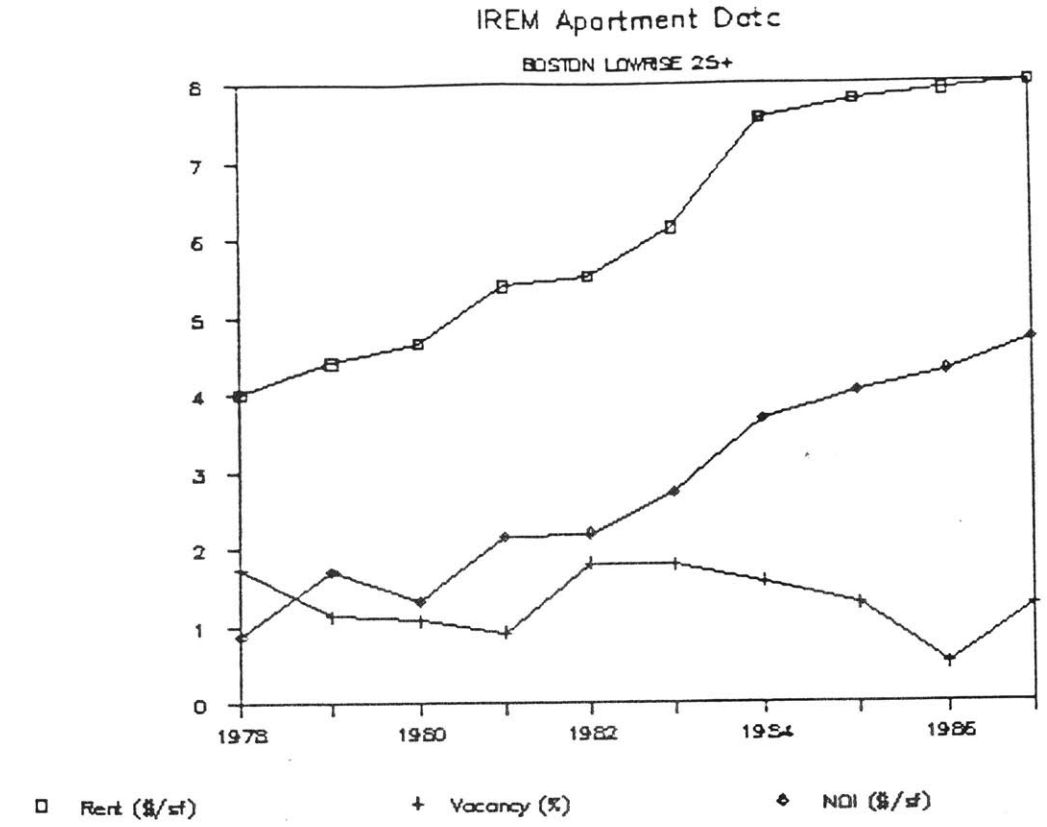

FIGURE 9.

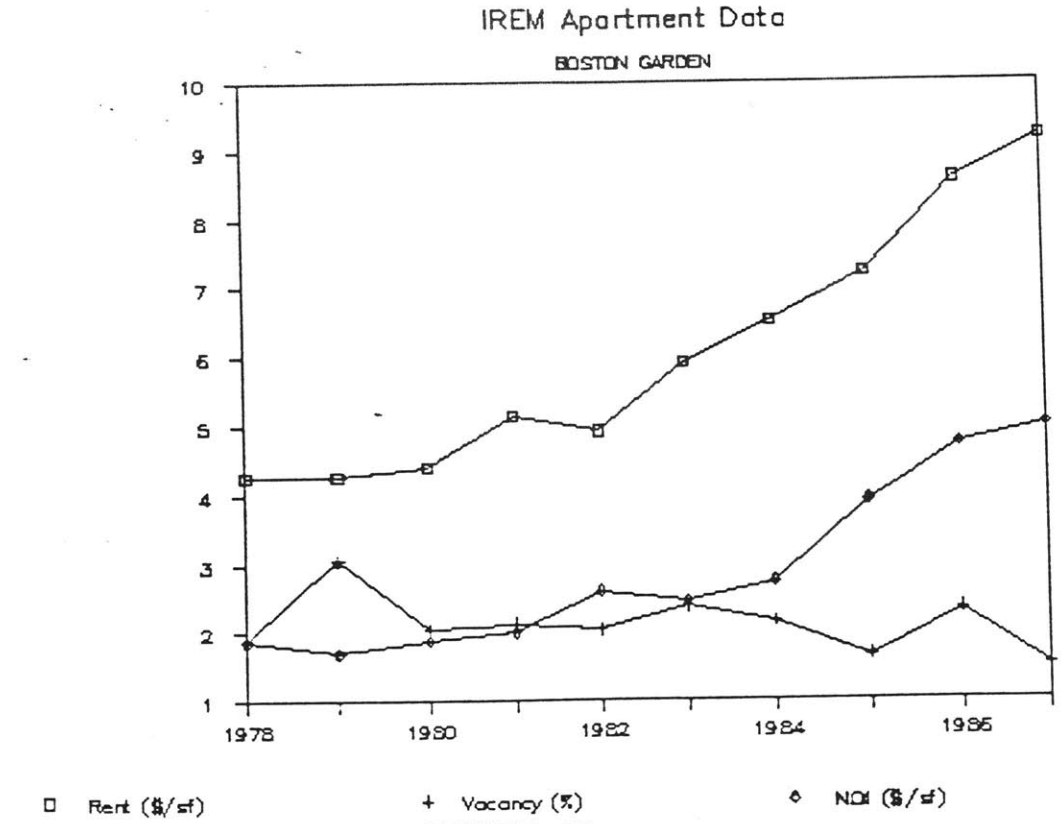

FIGURE 10.

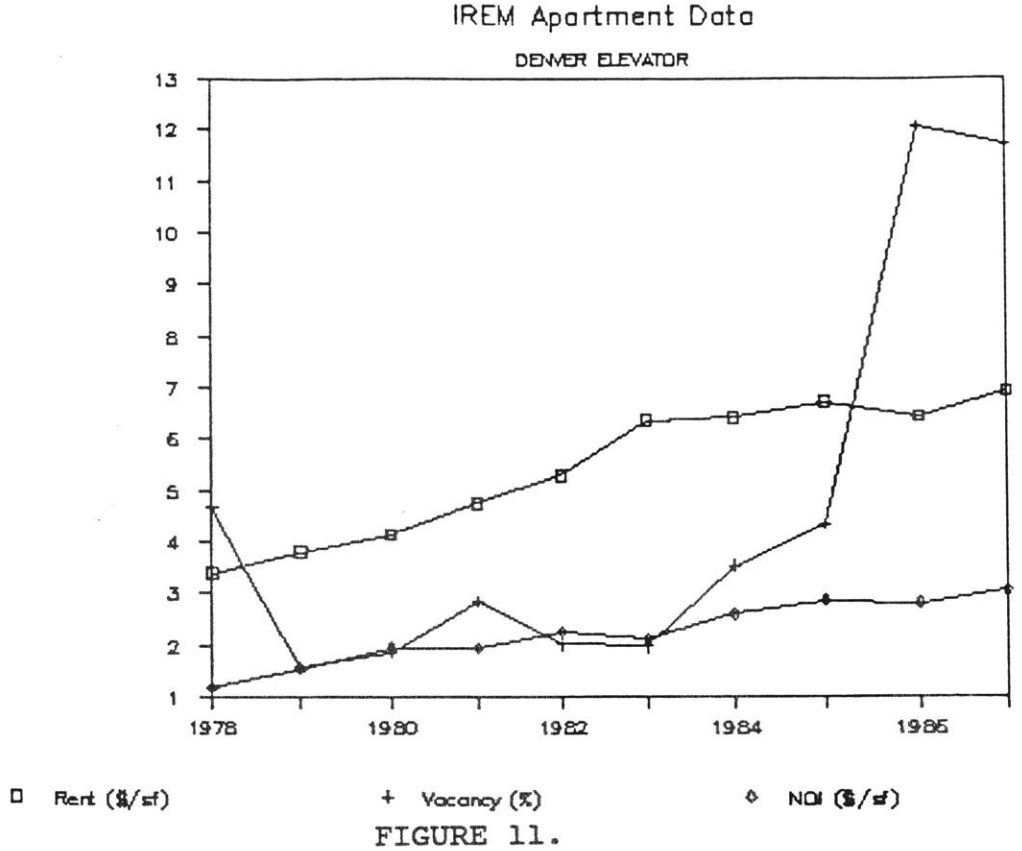

FIGURE 11.

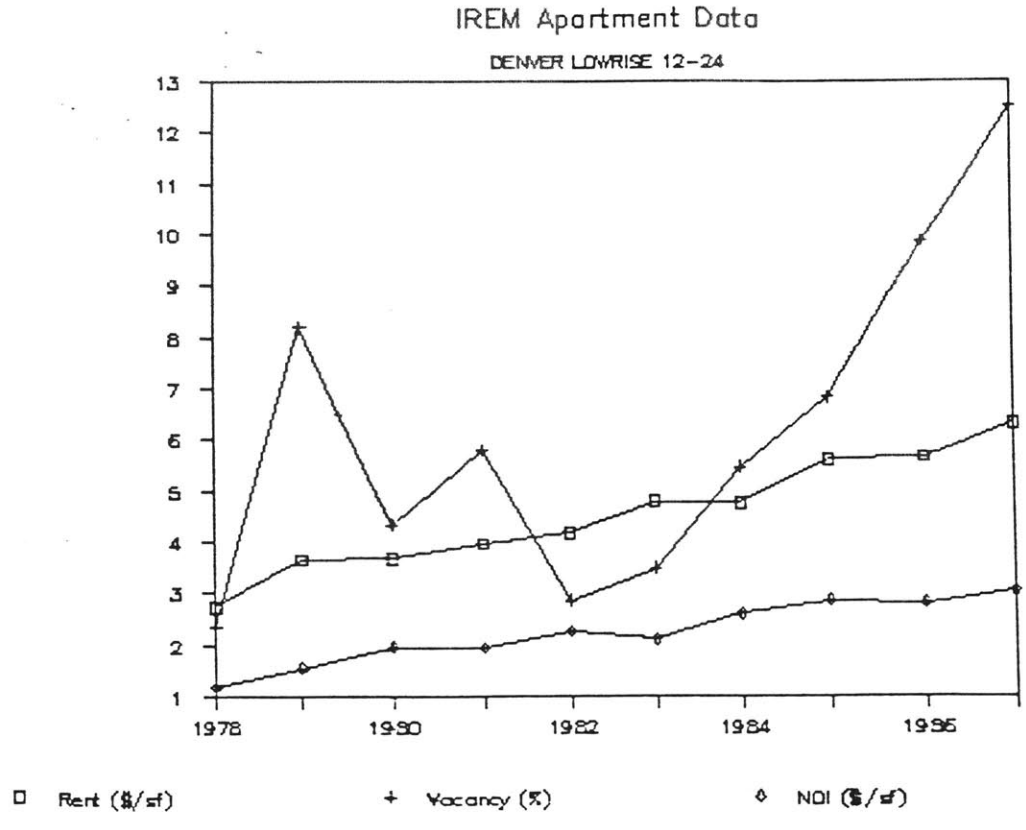

FIGURE 12.

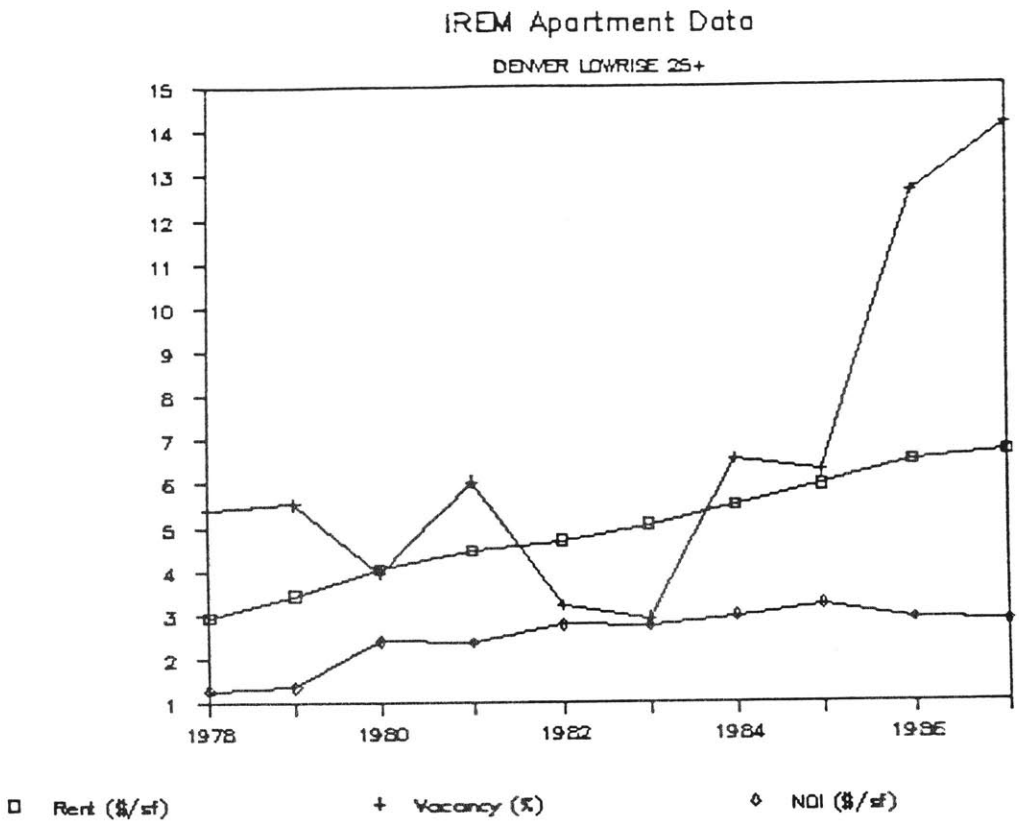

FIGURE 13.

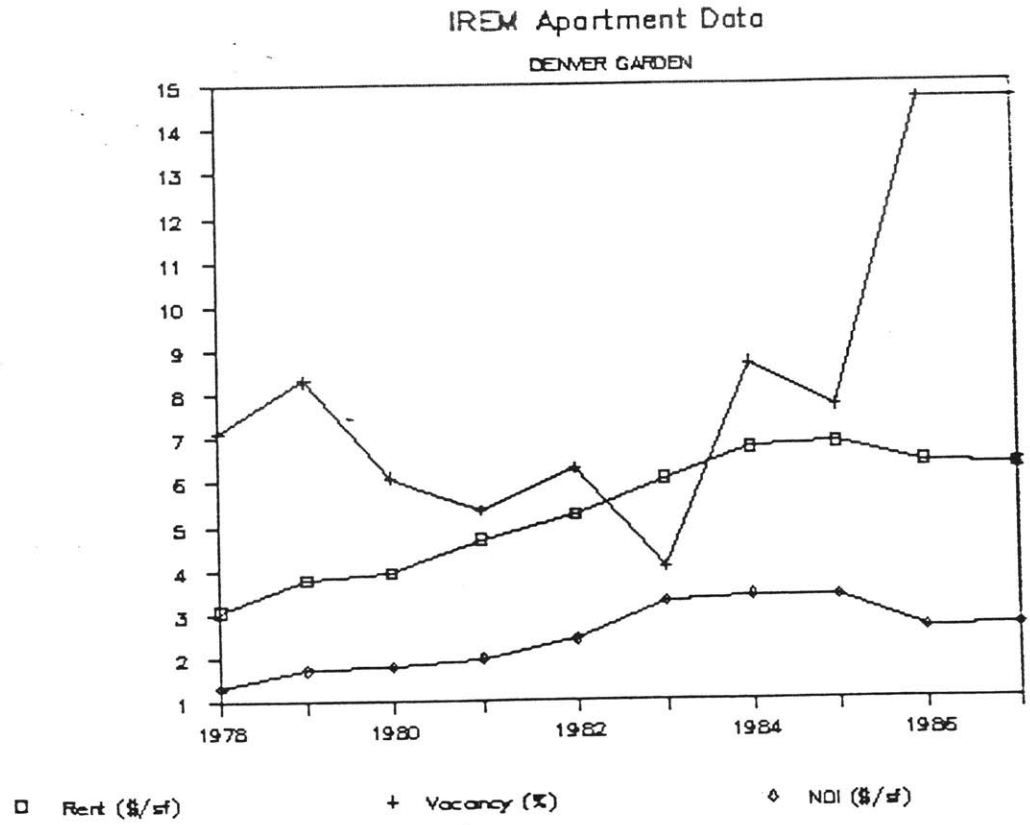

FIGURE 14.

rent for the Lowrise 25+ category continued to fall until 1986. Two of the categories - Elevator and Lowrise 25+ - increased from 1986 to 1987, while the other two categories decreased.

The median vacancy rates for the Denver apartment samples were much more variable than those for Boston. Whereas the Boston vacancy rates fluctuated between .5% and 3%, Denver's vacancy rates varied between .5% and 14%. (Vacancies in this data series include uncollected rents.) The median vacancy rate for all four categories was considerably higher at the end of the study period than where it started out. Three of the four categories - Elevator, Lowrise 12-24 and Lowrise 25+ - experienced a peak in 1981 and decreased in 1982. The same three categories bottomed out in 1983 and all four categories rose sharply from 1983 to 1987, corresponding to the precipitous drop in Denver's total employment in 1983.

NOI

The trend of median NOI over the ten year period closely parallelled the trend of median rents in each of the categories, with a few exceptions. In Boston's case, the sharp increase in median rent in the Lowrise 12-24 category from 1981 to 1983 was not reflected in median NOI, which

increased at a lower rate and continued to increase from 1983 to 1984, when rent decreased. The median NOI for the Lowrise 12-24 category decreased slightly from 1984 to 1986 while median rent increased slightly during that time period. This may be partially explained by the relatively sharp increase in vacancy from 1985 to 1986.

In the case of Denver, the median NOIs at the beginning of the period were very similar to those of Boston but they increased much more slowly than Boston's. In general, as vacancy increased during the second half of the period, the gap between rent and NOI increased. The median NOI for the Denver Garden category decreased from 1985 to 1986 and essentially remained flat from 1986 to 1987, mirrorring very closely the trend of median rents over the same period.

OFFICE

IREM Series

Rents

Median office rents appear to have exhibited much greater variation over the period than residential rents. (Figures

15 and 16) The median office rents for the two cities were very close at the beginning of the period. Boston's median rent fluctuated between 1980 and 1983 while Denver's increased in each of the three years. The median office rent for both cities reached their peak for the period in 1985, the median rent for Denver being slightly higher than that of Boston. The median rent for Denver declined more sharply than Boston's and continued to decline from 1986 to 1987, while Boston's increased from 1986 to 1987.

Vacancy

The median vacancy rate for the IREM series sample for Boston varied between 0 and 12%. It reached a high in 1981, decreased from 1981 to 1983 and then increased again to reach a high for the period of 12% in 1985. The median vacancy rate for the Denver series varied between .5% and 16%. It reached a high of 10.5% in 1980, decreased sharply in 1981 and climbed again to a period high of 16% in 1984. It dropped sharply in 1985 and continued to drop more slowly in 1986 and 1987.

NOI

The median office NOI for each of the two cities roughly parallelled median rent over the period.

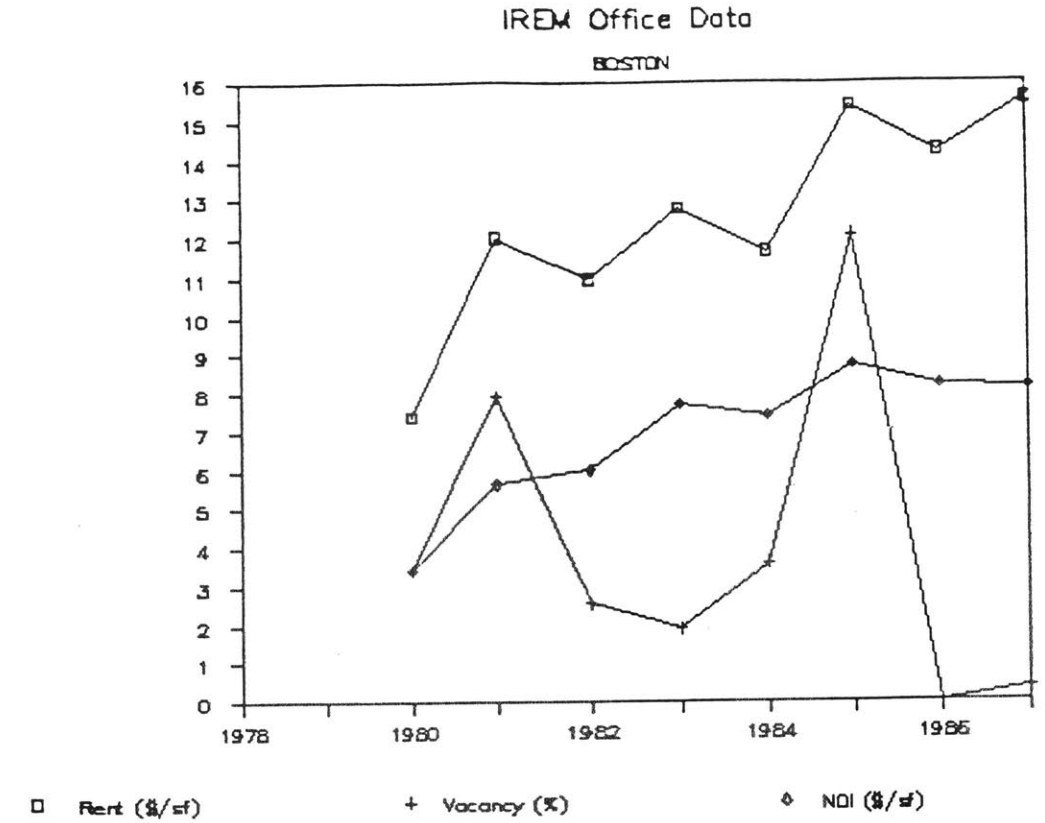

FIGURE 15.

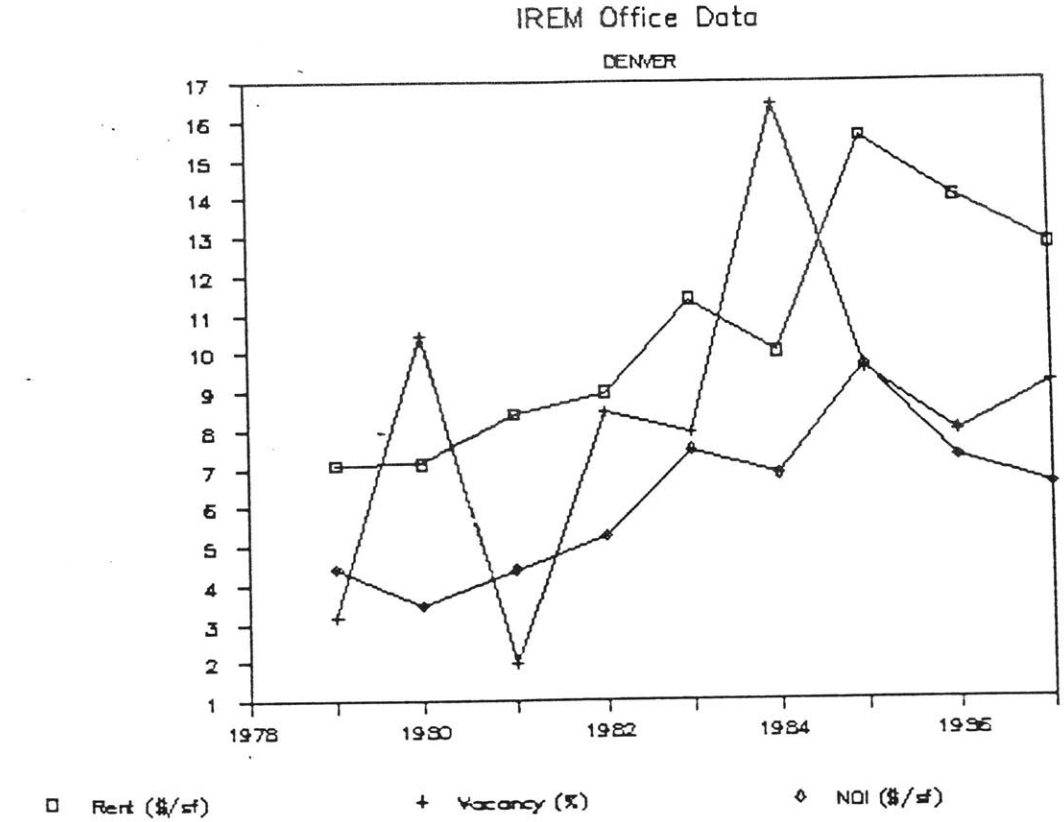

FIGURE 16.

BOMA Series

The mean Boston office NOI is almost the mirror image of the IREM median NOI. (Figure 17) It peaked in 1980, declined very sharply from 1980 to 1983, and increased very sharply from 1983 to 1985. In contrast, the IREM median NOI rose from 1980 to 1983 and declined in 1984. Both series reached their all period high in 1985 and declined again in 1986. The mean office NOI for Denver did not vary as radically from its IREM counterpart. It dipped in 1979, increased from 1979 to 1981, stayed level from 1981 to 1982, increased in 1983, dipped again in 1984 and reached its all period peak in 1985. The BOMA series for Denver parallelled its IREM counterpart quite closely from 1982 to 1987. In general, the BOMA mean NOI appears to lag a year behind the IREM median NOI for both cities in the early part of the study period.

Spaulding and Slye Reports

Rents

The curve of average estimated rent for the 92 building sample is much smoother than that of the IREM Boston median rent, as would be expected given the fact that the Spaulding and Slye rents are nominal and the IREM series measures

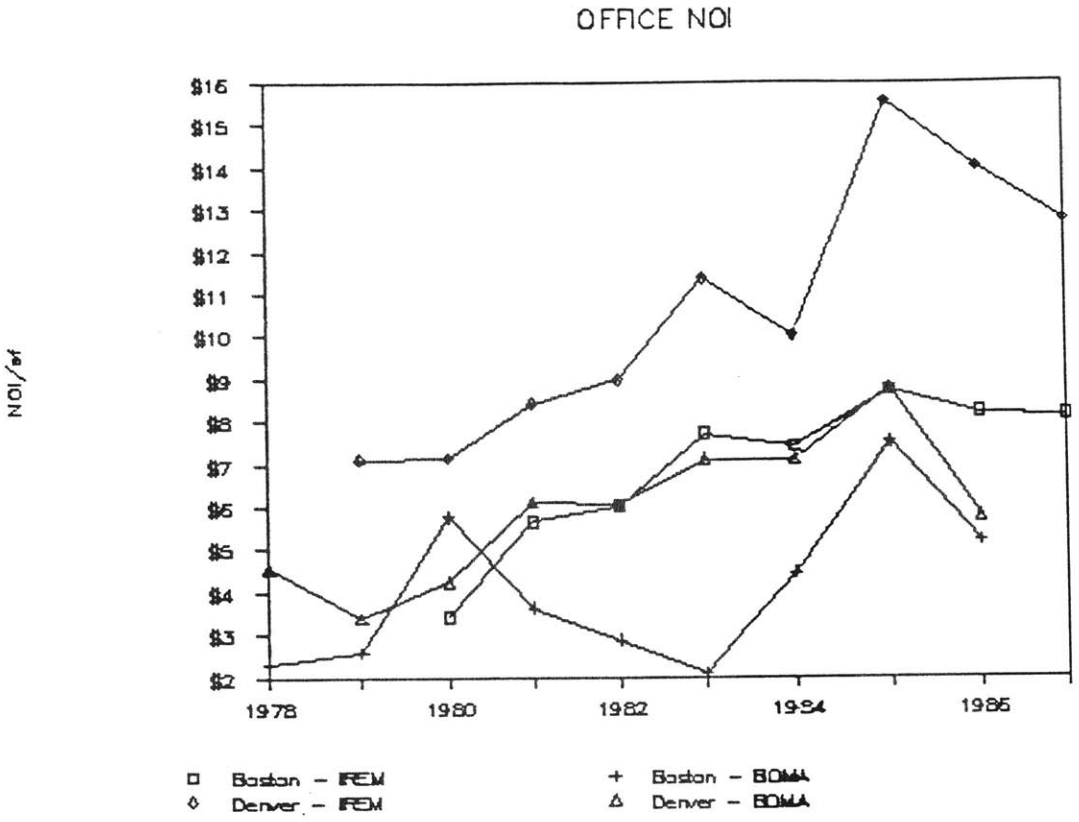
OFFICE NOI
NOI/sf
$16
$15
$14
$13
$12
$11
$10
$9
$8
$7
$6
$5
$4
$3
$2
1978
1980
1982
1984
1986
Boston – IREM
Denver – IREM
Boston – BOMA
Denver – BOMA

FIGURE 17.

effective rents. (Figure 18) The average building rent declined in only one of the twenty-five periods between 1979:2 and 1985:3. As with the IREM series, the Spaulding and Slye average rent peaked in 1985, and declined from 1985 through 1987. The Spaulding and Slye average estimated rent increased fairly steeply and steadily from the third quarter of 1979 through the first quarter of 1982. It was essentially level through the second quarter of 1983, actually declining slightly in the first quarter of 1983, and then rose through the third quarter of 1985, when it began to decline. It declined in eight of the next ten periods, ending in the second quarter of 1988 at $20.07, just slightly below the all period high of $20.46.

Vacancy

The vacancy rate had three sharp spikes over the ten year period, occurring in the first quarter of 1981, the first quarter of 1983 and the second quarter of 1986. Each of the peaks corresponded to a sharp spike in the added supply curve. In each case, the vacancy rate declined after the peak, but never to the level of the previous trough, resulting in an overall increase in the vacancy rate over the period. The increase in the vacancy rate from 81:4 to 83:1 and from 84:2 to 86:2 was accompanied by a slowing in the rate of growth of the average building rent. As the vacancy

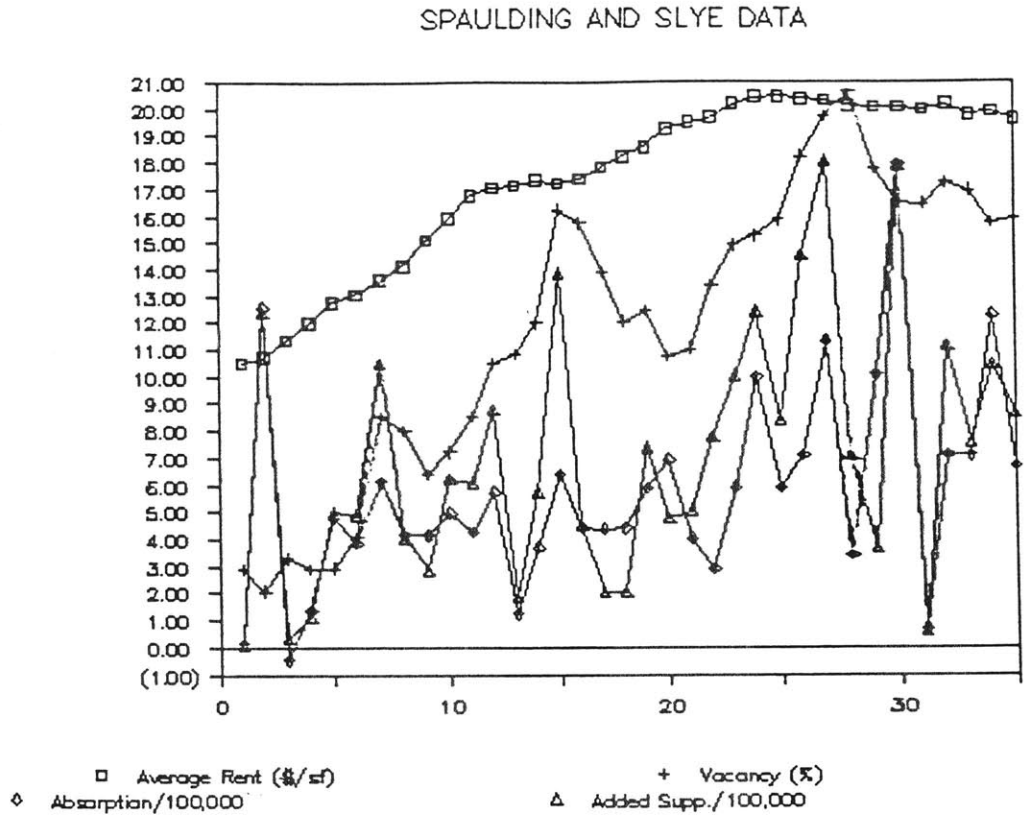

FIGURE 18.

Note: Period 1 = second quarter 1979

rate declined between 83:1 and 84:2, the average building rent rose. The same did not occur after the peak in vacancy rates in 1986:2, however: the average building rent continued to decline even as vacancy rates subsided.

Comparison Between IREM Data and Denver Office Market Reports

The IREM Denver office rent series experienced two peaks over the nine year period, the first occurring in 1983 and the second and higher peak occurring in 1985. A comparison with two Denver market reports presents a very different picture. According to the Frederick Ross Market Report, quoted rents for the Denver CBD peaked in 1982 at about $25 per square foot, declined from 1981 to 1986 and recovered very slightly in 1987. They do not publish data on suburban rents.

The Fuller Company publishes quoted rents for the Denver CBD and seven suburban areas. According to their data, the quoted rent for the Denver CBD peaked in 1981, declined from 1981 to 1983, increased slightly in 1984 and declined from 1985 to 1987. Quoted rents for two of the suburban areas peaked in 1981, three peaked in 1982, one in 1983 and one in 1985. Four of the seven categories had a second, lower peak in quoted rents, one occurring in 1983, another in 1984, and

two in 1986.

Comparison of IREM and BOMA Series with FRC Index

In order to compare the IREM and BOMA series with the FRC Index, indexes were constructed for each of the two series. The value of the first year for each series was set equal to the value of the FRC Office Index for that same year. As is evident in Figure 19, the FRC Office Income Index is very smooth compared to the other four series.

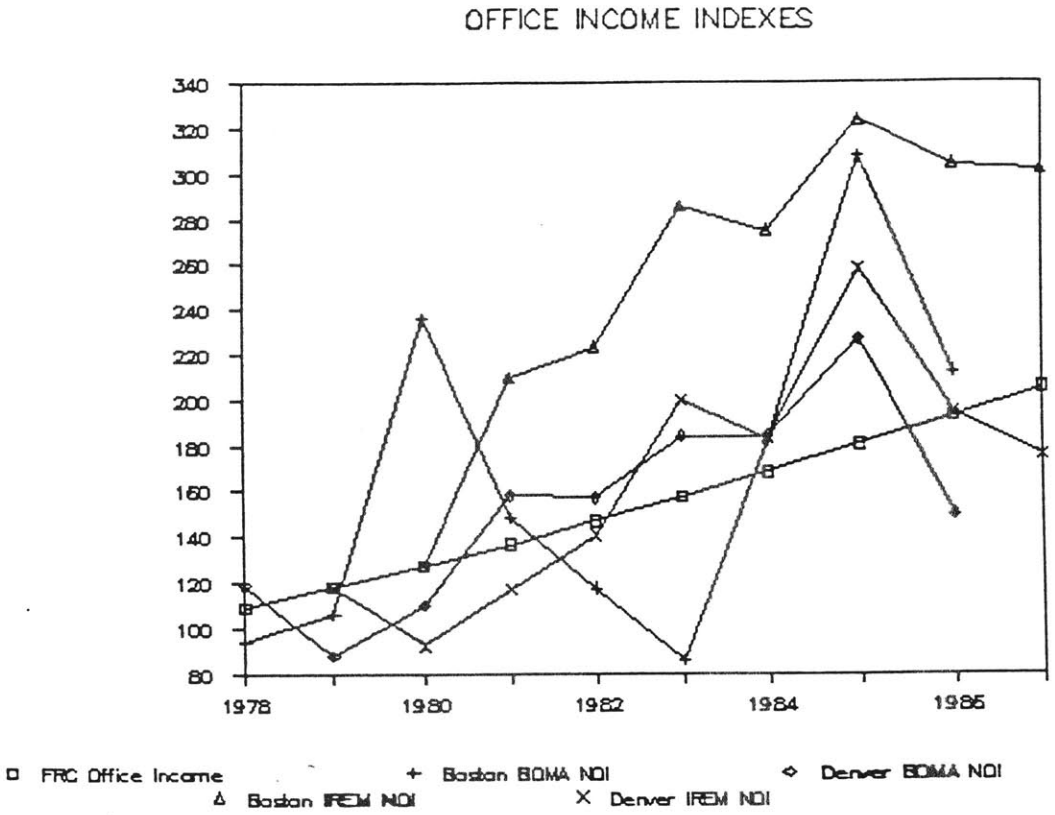
OFFICE INCOME INDEXES
340
320
300
280
260
240
220
200
180
160
140
120
100
80
1978
1980
1982
1984
1986
FRC Office Income
Boston BOMA NOI
Denver BOMA NOI
Boston IREM NOI
Denver IREM NOI

FIGURE 19.

6. THE RESULTS

COMPARISON OF RETURN DATA WITH GNP

Percentage change in GNP in Current Dollars

Each of the forty-eight dependent variables, unadjusted, were regressed against the change in current dollars, unlagged, in order to determine to what extent the dependent variables could be explained by changes in overall economic growth. In nineteen of the forty-eight cases (48%) the results were statistically significant (T statistic greater than 2 or less than -2). Although the mean coefficients of correlation for the Boston and Denver apartment data were very similar - .37 and .38 respectively - the percentage of significant results for the Denver apartment data (54%) was higher than that of the Boston data (37%). (Table 3) All of the significant dependent apartment variables were rent and NOI variables. None of the apartment vacancy variables were significant in either city.

None of the five Denver office dependent variables and only two of the nine (22%) Boston dependent office variables were significantly related to the change in GNP in current dollars, whereas all six of the FRC variables tested were

TABLE 3.
REGRESSION RESULTS
COMPARISON OF RETURN DATA WITH GNP

	% Change in GNP Current Dollars		GNP 1982 Dollars	
Boston Apartment				
Percentage of significant results	(5/13)	0.38	(8/13)	0.62
Mean coefficient of correlation		0.37		0.75
Denver Apartment				
Percentage of significant results	(7/13)	0.54	(9/13)	0.69
Mean coefficient of correlation		0.38		0.67
Boston Office				
Percentage of significant results	(2/9)	0.22	(4/8)	0.5
Mean coefficient of correlation		0.45		0.58
Denver Office				
Percentage of significant results	(0/5)	0.00	(2/5)	0.40
Mean coefficient of correlation				0.42
FRC Office				
Percentage of significant results	(6/6)	1.00	(2/6)	0.33
Mean coefficient of correlation		0.46		0.82

significant. The two significant Boston variables were both Spaulding and Slye variables. The signs of the coefficients of all of the significant variables, with the exception of the three FRC rate of return variables, are the opposite of what was expected: the rent, NOI and return variables are negative and the vacancy variables are positive.

GNP in 1982 Dollars

In order to take out the effects of inflation, those dependent variables which are affected by inflation were adjusted to 1982 dollars and each of the 49 dependent variables was regressed against GNP in 1982 dollars. Twenty-five of the forty-eight dependent variables were significantly related to GNP in 1982 dollars. Again, the percentage of significant results for the Denver apartment variables (69%) was slightly higher than that of the Boston apartment variables (62%), although, in this case, the mean coefficient of correlation for Boston (.75) was slightly higher than that of Denver (.67). Three of the four Boston apartment rent variables, four of the NOI variables and none of the vacancy variables were significant, compared to four of the four Denver rent variables, one of the four NOI variables and all four of the vacancy variables.

All four of the Spaulding and Slye variables were significantly related to the independent variable, however, none of the IREM or BOMA office variables were significant. Two of the five Denver Office dependent variables - IREM Rent and Office Permits - were significantly related to GNP in 1982 dollars. The coefficient of correlation was slightly higher for the Boston data (.58) than for the Denver office data (.42). The signs of the coefficients were as expected with the exception of the five vacancy variables and Denver Office Permits.

The results indicate that apartment returns were more significantly related to GNP than were office returns in both cities. It appears that the relationship between apartment returns in Denver and GNP may have been slightly stronger than the relationship between Boston apartment returns and GNP. Rents and NOI were significantly related to GNP in the Boston apartment market while vacancies were not. In the Denver apartment market, rents and vacancies were significantly related to GNP while NOI was less significantly related. The Spaulding and Slye variables were significantly related to GNP while the relationships between the IREM and BOMA variables for both cities and GNP in 1982 dollars were very weak.

LEADING INDICATOR VARIABLES

For each dependent variable, the independent variables were ranked according to their coefficients of determination, with 1 representing the highest value. The percentage of significant results (significant variables/tested variables), mean ranking for all dependent variables, and mean coefficient of determination for all dependent variables were calculated for each independent variable in order to come up with an overall ranking. The overall ranking is the sum of a variable's scores in each of the three categories. The results are presented for each of the two cities and also in the aggregate. A complete listing of the regression results (coefficients of correlation and T statistics) is included in Appendix A.

Apartment Results

All twelve IREM variables and the permit variable were regressed against Total Personal Income, Per Capita Personal Income, Total Population, Total Employment and Vacancy, for the two metropolitan areas, lagged one year. For the other independent variables - the Composite Index of 12 Leading Indicators, Average Interest Rate for All Loans, Total Delinquency Rate Total, Foreclosures Started, ACLI # of Loans Committed, ACLI Amount of Loans Committed and ACLI Weighted

Average Interest Rate - the three dependent variables in the Garden category - Rent, Vacancy and NOI - and the permit variable, for each of the two cities, were regressed, with a one year lag, against each of the independent variables.

In the case of Boston, the four local variables accounted for four of the five highest ranked indicator variables. (Tables 4 and 5) Per Capita Personal Income was the highest ranked indicator of returns in the Boston apartment category, followed by the Composite Index of 12 Leading Indicators and Total Personal Income, which were tied for second place, Total Employment, Total Population, ACLI Amount Committed, Foreclosures Started, Total Delinquency Rate and Vacancy. Average Interest Rate for All Loans, the ACLI Weighted Average Interest Rate and the ACLI # of Loans Committed were not significantly related to any of the dependent variables which they were tested against.

In Denver's case, the Composite Index of 12 Leading Indicators was tied with Total Personal Income for first place, followed by the Total Delinquency Rate, ACLI Amount Committed, the Average Interest Rate for All Loans and Per Capita Personal Income tied for fifth place, Total Employment and Total Population tied for seventh place, ACLI Weighted Average Interest Rate and Vacancy. The Foreclosure Rate and

TABLE 4.
RANKING OF LEADING INDICATOR VARIABLES - APARTMENT DATA

Dependent Variable	Comp. Index of Leading Inds.	Total Pers. Income	Per Capita Pers. Income	Total Population	Total Employment	Vacancy	Avge Int. Rate All Loans	ACLI Wtd. Avg. Int. Rate	Delinquincy Rate Total	Foreclosures Started	ACLI # of Loans Cmtd.	ACLI Amount Committed
IREM Boston Elevator Rent		1	2		3							
IREM Boston Elevator Vacancy												
IREM Boston Elevator NOI		1	2	4	3	5						
IREM Boston Lowrise 12-24 Rent												
IREM Boston Lowrise 12-24 Vacancy												
IREM Boston Lowrise 12-24 NOI		1	3		2							
IREM Boston Lowrise 25+ Rent		1	2	3	2							
IREM Boston Lowrise 25+ Vacancy												
IREM Boston Lowrise 25+ NOI		1	2	4	3							
IREM Boston Garden Rent	2	3	1	4	2				7	5		6
IREM Boston Garden Vacancy		2	2		1							
IREM Boston Garden NOI	5	4	1	3	2				8	6		7
Boston Multifamily Permits (units)	2	6	4	1	5					7		3
Significant Variables/Tested Variables	(3/4) 0.75	(9/13) 0.69	(9/13) 0.69	(6/13) 0.46	(9/13) 0.69	(1/8) 0.13	(0/4) 0.00	(0/4) 0.00	(2/4) 0.50	(3/4) 0.75	(0/4) 0.00	(3/4) 0.75
Mean Ranking	3.00	2.22	2.11	3.17	2.56	5.00	-	-	7.50	6.00	-	5.33
Mean Coefficient of Determination	0.83	0.72	0.72	0.71	0.70	0.38	-	-	0.51	0.62	-	0.66
IREM Denver Elevator Rent		2	3	1	4							
IREM Denver Elevator Vacancy		1	1	3	2							
IREM Denver Elevator NOI												
IREM Denver Lowrise 12-24 Rent		2	1	3	4							
IREM Denver Lowrise 12-24 Vacancy		1	1		2							
IREM Denver Lowrise 12-24 NOI		2	3	5	1	4						
IREM Denver Lowrise 25+ Rent		1	2	3	4							
IREM Denver Lowrise 25+ Vacancy		1	1		2							
IREM Denver Lowrise 25+ NOI												
IREM Denver Garden Rent		4		2	5				1	3		
IREM Denver Garden Vacancy	1	3	4	6	5					7		2
IREM Denver Garden NOI												
Denver Multifamily Permits (units)							1	2				
Significant Variables/Tested Variables	(1/4) 0.25	(9/13) 0.69	(8/13) 0.62	(7/13) 0.54	(9/13) 0.69	(1/8) 0.13	(1/4) 0.25	(1/4) 0.25	(1/4) 0.25	(2/4) 0.50	(0/4) 0.00	(1/4) 0.25
Mean Ranking	1.00	1.89	2.00	3.29	3.22	4.00	1.00	2.00	1.00	5.00	-	2.00
Mean Coefficient of Determination	0.80	0.62	0.56	0.61	0.54	0.47	0.57	0.56	0.73	0.49	-	0.77
TOTAL												
Significant Variables/Tested Variables	(4/8) 0.50	(18/26) 0.69	(17/26) 0.65	(13/26) 0.50	(18/26) 0.69	(2/16) 0.13	(1/8) 0.13	(1/8) 0.13	(3/8) 0.39	(5/8) 0.63	(0/8) 0.00	(4/8) 0.50
Mean Ranking	2.50	2.06	2.06	3.23	2.89	4.50	1.00	2.00	5.33	5.60	-	4.50
Mean Coefficient of Determination	0.83	0.67	0.64	0.66	0.62	0.43	0.57	0.56	0.58	0.57	-	0.69

TABLE 5.
OVERALL RANKING OF LEADING INDICATOR VARIABLES
APARTMENT DATA

Boston Apartment	Comp. Index of Leading Inds.	Total Pers. Income	Per Capita Pers. Income	Total Population	Total Employment	Vacancy	Avge Int. Rate All Loans	ACLI Wtd. Avg. Int. Rate	Delinquincy Rate Total	Foreclosures Started	ACLI # of Loans Cmtd.	ACLI Amount Committed
Ranking by Perc. of Significant Results	1	2	2	4	2	5	-	-	3	1	-	1
Ranking by Mean Ranking	4	2	1	5	3	6	-	-	9	8	-	7
Ranking by Mean Coeff. of Determination	1	2	2	3	4	8	-	-	7	6	-	5
Total	6	6	5	12	9	19	-	-	19	15	-	13
Overall Ranking	2	2	1	5	4	8	-	-	8	7	-	6

Denver Apartment	Comp. Index of 12 Leading Ind	Total Personal Income	Per Capita Personal Incom	Total Population	Total Employment	Vacancy	Avge Int. Rate All Loans	ACLI Wted. Avg Interest Rate	Delinquincy Rate Total	Foreclosures Started	ACLI # of Loan Committed	ACLI Amount Committed
Ranking by Perc. of Significant Results	5	1	2	3	1	6	5	5	5	4	-	5
Ranking by Mean Ranking	1	2	3	5	4	6	1	3	1	7	-	3
Ranking by Mean Coeff. of Determination	1	4	7	5	8	10	6	7	3	9	-	2
Total	7	7	12	13	13	22	12	15	9	20	-	10
Overall Ranking	1	1	5	7	7	11	5	9	3	10	-	4

Total Apartment	Comp. Index of 12 Leading Ind	Total Personal Income	Per Capita Personal Incom	Total Population	Total Employment	Vacancy	Avge Int. Rate All Loans	ACLI Wted. Avg Interest Rate	Delinquincy Rate Total	Foreclosures Started	ACLI # of Loan Committed	ACLI Amount Committed
Ranking by Perc. of Significant Results	4	1	2	4	1	6	6	6	5	3	-	4
Ranking by Mean Ranking	4	3	3	6	5	7	1	2	8	9	-	7
Ranking by Mean Coeff. of Determination	1	3	5	4	6	10	8	9	7	8	-	3
Total	9	7	10	14	12	23	15	17	20	20	-	13
Overall Ranking	2	1	3	6	4	11	7	8	9	9	-	5

the ACLI Number of Loans Committed were not significantly related to any of the variables which they were tested against. The four local variables are not as highly concentrated in the higher ranking positions as in Boston's case: they occupy the first, fifth, and the two seventh place positions. Another striking difference between the two cities is in the ranking of the Delinquency Rate. It was ranked eighth in importance in Boston and third in Denver. Per Capita Personal Income ranked first in Boston and fifth in Denver.

In addition to the differences in the overall ranking of the variables, there were some other differences in the patterns between the two cities. In the Boston data, the rent and NOI variables were more strongly related to the indicator variables than were the vacancy variables, and in the Denver case, the opposite was true. For example, seven of the eight Boston rent and NOI variables and only one of the four vacancy variables were significantly related to Total Personal Income. In contrast, all four of the Denver vacancy variables and only five of the eight rent and NOI variables were significantly related to Total Personal Income. The same is true of the other local variables. Seven of the Boston rent and NOI variables and one of the Boston vacancy variables were significantly related to Per Capita Personal

Income, compared to four of the Denver rent and NOI variables and three of the Denver vacancy variables. Five of the Boston rent and NOI variables and none of the Boston vacancy variables were significantly related to Total Population, compared to five of the Denver rent and NOI variables and two of the Denver vacancy variables. Seven of the Boston rent and NOI variables and one of the Boston vacancy variables were significantly related to Total Employment, compared to five of the Denver rent and NOI variables and four of the Denver vacancy variables.

When the Boston and Denver data are aggregated the leading indicator variables, in order of significance, are: Total Personal Income, the Composite Index of Leading Indicators, Per Capita Personal Income, Total Employment, ACLI Amount Committed, Total Population, Average Interest Rate All Loans, ACLI Average Weighted Interest Rate, Delinquency Rate, Foreclosures Started, and Vacancy. The local variables occupy four of the top six positions.

Office Results

In the Boston Office category, Total Employment was the highest ranked indicator variable, followed by Vacancy and ACLI Amount Committed. (Tables 6 and 7) The other two

TABLE 5.
RANKING OF LEADING INDICATOR VARIABLES - OFFICE DATA

Dependent Variable	Comp. Index of 12 Leading Inds.	Total Employment	Vacancy	ACLI Wted. Interest Rate	Avge.ACLI Rate	# of Loans Committed
IREM Boston Office Rent		1				
IREM Boston Office Vacancy						
IREM Boston Office NOI						
BOMA Boston NOI						
Spaulding and Slye Rent		2	1			
Spaulding and Slye Vacancy		1				
Spaulding and Slye Space Added		1				
Spaulding and Slye Absorption		1				
Boston Office Permits (Valuation)						
Significant Variables/Tested Variables		(5/9) 0.56	(1/3) 0.33	(0/9) 0.00	(0/9) 0.00	
Mean Ranking		1.2	1	-	-	
Mean Coefficient of Determination		0.62	0.56	-	-	
IREM Denver Office Vacancy		1				
IREM Denver Office NOI		2	1			
BOMA Denver Office NOI				1		2
Denver Office Permits (Valuation)		2				
Significant Variables/Tested Variables		(4/5) 0.8	(2/2) 1.00	(1/5) 0.20	(1/5) 0.20	
Mean Ranking		1.75	1.00	1.00	2.00	
Mean Coefficient of Determination		0.45	0.60	0.60	0.56	
FRC Total Value Office						
FRC Income Value Office						
FRC Appreciation Value Office				2		
FRC Total Rate of Return Office						
FRC Income Rate of Return Office						
FRC Appreciation Rate of Return Office						
Significant Variables/Tested Variables				(1/6) 0.17	(0/6) 0.00	
Mean Ranking				2	-	
Mean Coefficient of Determination				0.46	-	
TOTAL						
Significant Variables/Tested Variables	0.64	0.6	0.1	0.05		
Mean Ranking	1.44	1.00	1.50	2.00		
Mean Coefficient of Determination	0.54	0.59	0.53	0.56		

TABLE 7.
OVERALL RANKING OF LEADING INDICATOR VARIABLES - OFFICE DATA

Boston Office	Comp. Index of 12 Leading Inds.	Total Employment	Vacancy	ACLI Wted. Avge. Interest Rate	ACLI # of Loans Committed	ACLI Amount Committed
Ranking by Percentage of Significant Results		1	2	-	-	3
Ranking by Mean Ranking		2	1	-	-	1
Ranking by Mean Coefficient of Determination		1	2	-	-	3
Total		4	5	-	-	7
Overall Ranking		1	2	-	-	3

Denver Office	Comp. Index of 12 Leading Inds.	Total Employment	Vacancy	ACLI Wted. Avge. Interest Rate	ACLI # of Loans Committed	ACLI Amount Committed
Ranking by Percentage of Significant Results		2	1	3	3	3
Ranking by Mean Ranking		2	1	1	3	1
Ranking by Mean Coefficient of Determination		4	1	1	2	3
Total		8	3	5	8	7
Overall Ranking		4	1	2	4	3

FRC Office	Comp. Index of 12 Leading Inds.	Total Employment	Vacancy	ACLI Wted. Avge. Interest Rate	ACLI # of Loans Committed	ACLI Amount Committed
Ranking by Percentage of Significant Results				1	-	1
Ranking by Mean Ranking				2	-	1
Ranking by Mean Coefficient of Determination				2	-	1
Total				5	-	3
Overall Ranking				2	-	1

Total Office	Comp. Index of 12 Leading Inds.	Total Employment	Vacancy	ACLI Wted. Avge. Interest Rate	ACLI # of Loans Committed	ACLI Amount Committed
Ranking by Percentage of Significant Results		1	2	4	5	3
Ranking by Mean Ranking		2	1	3	4	1
Ranking by Mean Coefficient of Determination		3	1	4	2	5
Total		6	4	11	11	9
Overall Ranking		2	1	4	4	3

variables - ACLI Weighted Average Interest Rate and the ACLI Number of Loans Committed - were not significant.

In the Denver Office category, all five of the test variables were significantly related to at least one of the dependent variables. Vacancy was the highest ranked variable, followed by ACLI Weighted Average Interest Rate, ACLI Amount Committed, and Total Employment and ACLI Number of Loans Committed tied for fifth place.

The six FRC variables were tested against the three macro indicator variables - ACLI Weighted Average Interest Rate, ACLI Number of Loans Committed and ACLI Amount of Loans Committed, and two were found to be significant. ACLI Amount of Loans Committed was ranked first followed by the ACLI Weighted Average Interest Rate.

7. CONCLUSIONS

As stated before, the significance of the results is very questionable, given the small sample sizes, the number of observations and the discrepancies between data sources. Although it's impossible to draw any hard and fast conclusions from the results, several observations can be made.

As expected, the return estimates varied considerably both between property types and between cities. Not surprisingly, so, too, did the significant indicator variables. Some of the important indicator variables were common to a single property type in both cities. Total Personal Income and the Composite Index of Leading Indicators were strong indicators of apartment returns in both Boston and Denver. Vacancy was a significant indicator of office returns in both cities, albeit much more significant in Denver than in Boston. Some of the variables were important in one city and not in the other. The Delinquency Rate was an important indicator of apartment returns in Denver but not in Boston. The ACLI Weighted Average Interest Rate was an important predictor of returns in the Denver office market but not in Boston. A couple of the variables were significant across both property

types and cities. Employment was significant, to some degree, in all four markets, as was the ACLI Amount of Loans Committed.

In general, the vacancy variables in the Denver apartment category were more significantly related to the indicator variables than were the Denver rent and NOI variables, and the opposite was true of the Boston apartment data. It may be that the built up infrastructure combined with strong regulatory policies governing permitting and rents have constrained the supply of apartments in Boston and kept the vacancy rate below "normal". Thus, changes in demand are translated first into changes in rent. In Denver, where supply is less constrained, changes in demand may be felt first in changes in the vacancy rate.

The local variables were much better predictors of returns in the Boston apartment market than were the macro variables. The results were more mixed for the Denver apartment market. Three of the top four and four of the top eight variables were macro variables. The same is true of the office market. The highest ranked indicator in the Boston category was a local variable - Employment - and only one of the three macro variables was significant. In the case of Denver, Employment is tied for fourth place and three of the top four variables

are macro variables. One possible interpretation of the results is that Denver's economy bears greater similarity to the national economy than does Boston's and is therefore more affected by its cycles.

The results suggest that there is no one single variable which investors can look to as a predictor of real estate returns, but rather they should watch the behavior of a number of variables, both local and macro. Assuming that future performance bears some relationship to past performance, and accepting Hartzell, Shulman and Wurtzebach's [9] analysis of geographic regions based on economic base, investors in the apartment market in Boston or in the New England region in general ought to watch per capita personal income, total personal income, employment and population. Investors in the apartment market in Denver or elsewhere in the Mineral Extraction Region would be wise to follow movements in total personal income, the delinquency rate, the ACLI amount of funds committed and the average interest rate for all home mortgages. Investors in the Boston office market should monitor changes in total employment, vacancy and the ACLI amount of funds committed and investors in the Denver office market should be concerned with changes in the vacancy rate, the ACLI weighted average interest rate, the ACLI amount of funds committed and, to a lesser degree, total

employment.

Investors in all four markets should pay close attention to the composite index of leading indicators and other forecasts of aggregate economic activity, since all four markets appear to be related to the macro economy, to a greater or lesser degree.

Additional analysis which might prove fruitful would include varying the lag periods and using different regression forms, such as the log-log form, which simulate non-linear functions. It might also be beneficial to test the changes in the indicator variables, in addition to the absolute values.

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APPENDIX

APPENDIX A

REGRESSION RESULTS

	Independent (x) Variable	Dependent (y) Variable	Coeff. of Determ.	T Stat.
1	% Change in GNP Current Dollars	IREM Boston Elevator Rent	0.39	(2.28)
2	% Change in GNP Current Dollars	IREM Boston Elevator Vacancy	0.16	1.26
3	% Change in GNP Current Dollars	IREM Boston Elevator NOI	0.38	(2.20)
4	% Change in GNP Current Dollars	IREM Boston Lowrise 12-24 Rent	0.34	(1.89)
5	% Change in GNP Current Dollars	IREM Boston Lowrise 12-24 Vacancy	0.03	(1.89)
6	% Change in GNP Current Dollars	IREM Boston Lowrise 12-24 NOI	0.19	(1.30)
7	% Change in GNP Current Dollars	IREM Boston Lowrise 25+ Rent	0.33	(1.99)
8	% Change in GNP Current Dollars	IREM Boston Lowrise 25+ Vacancy	0.00	0.01
9	% Change in GNP Current Dollars	IREM Boston Lowrise 25+ NOI	0.33	(1.99)
10	% Change in GNP Current Dollars	IREM Boston Garden Rent	0.31	(1.88)
11	% Change in GNP Current Dollars	IREM Boston Garden Vacancy	0.11	1.01
12	% Change in GNP Current Dollars	IREM Boston Garden NOI	0.43	(2.47)
13	% Change in GNP Current Dollars	IREM Boston Office Rent	0.12	(0.89)
14	% Change in GNP Current Dollars	IREM Boston Office Vacancy	0.08	0.71
15	% Change in GNP Current Dollars	IREM Boston Office NOI	0.12	(0.89)
16	% Change in GNP Current Dollars	BOMA Boston Rent	0.27	(1.63)
17	% Change in GNP Current Dollars	BOMA Boston NOI	0.11	(0.94)
18	% Change in GNP Current Dollars	Spaulding and Slye Rent	0.36	(1.99)
19	% Change in GNP Current Dollars	Spaulding and Slye Vacancy	0.39	2.14
20	% Change in GNP Current Dollars	Spaulding and Slye Space Added	0.25	(1.53)
21	% Change in GNP Current Dollars	Spaulding and Slye Absorption	0.17	(1.20)
22	% Change in GNP Current Dollars	Boston Multifamily Permits (units)	0.06	(0.68)
23	% Change in GNP Current Dollars	Boston Office Permits (Valuation)	0.05	(0.68)
24	% Change in GNP Current Dollars	IREM Denver Elevator Rent	0.44	(2.48)
25	% Change in GNP Current Dollars	IREM Denver Elevator Vacancy	0.13	(1.08)
26	% Change in GNP Current Dollars	IREM Denver Elevator NOI	0.35	(2.09)
27	% Change in GNP Current Dollars	IREM Denver Lowrise 12-24 Rent	0.46	(2.63)
28	% Change in GNP Current Dollars	IREM Denver Lowrise 12-24 Vacancy	0.07	(0.75)
29	% Change in GNP Current Dollars	IREM Denver Lowrise 12-24 NOI	0.52	(2.92)
30	% Change in GNP Current Dollars	IREM Denver Lowrise 25+ Rent	0.46	(2.64)
31	% Change in GNP Current Dollars	IREM Denver Lowrise 25+ Vacancy	0.07	(0.71)
32	% Change in GNP Current Dollars	IREM Denver Lowrise 25+ NOI	0.52	(3.02)
33	% Change in GNP Current Dollars	IREM Denver Garden Rent	0.39	(2.24)
34	% Change in GNP Current Dollars	IREM Denver Garden Vacancy	0.10	(0.96)
35	% Change in GNP Current Dollars	IREM Denver Garden NOI	0.28	(1.75)
36	% Change in GNP Current Dollars	IREM Denver Office Rent	0.32	(1.82)
37	% Change in GNP Current Dollars	IREM Denver Office Vacancy	0.06	(0.66)
38	% Change in GNP Current Dollars	IREM Denver Office NOI	0.20	(1.30)
39	% Change in GNP Current Dollars	BOMA Denver Office Rent	0.31	(1.77)
40	% Change in GNP Current Dollars	BOMA Denver Office NOI	0.21	(1.38)
41	% Change in GNP Current Dollars	Denver Multifamily Permits (units)	0.02	(0.37)
42	% Change in GNP Current Dollars	Denver Office Permits (Valuation)	0.16	1.26
43	% Change in GNP Current Dollars	FRC Total Value Office	0.46	(2.62)
44	% Change in GNP Current Dollars	FRC Income Value Office	0.45	(2.57)
45	% Change in GNP Current Dollars	FRC Appreciation Value Office	0.41	(2.38)
46	% Change in GNP Current Dollars	FRC Total Rate of Return Office	0.53	3.00

47 % Change in GNP Current Dollars	FRC Income Rate of Return Office	0.39	2.24
48 % Change in GNP Current Dollars	FRC Appreciation Rate of Return Office	0.51	2.88
49 % Change in GNP Current Dollars	% Change in IREM Boston Elevator Rent	0.06	(0.65)
50 GNP Current Dollars	IREM Boston Elevator Rent 1982$	0.94	10.79
51 GNP Current Dollars	IREM Boston Elevator Vacancy	0.35	(2.09)
52 GNP Current Dollars	IREM Boston Elevator NOI 1982$	0.92	9.74
53 GNP Current Dollars	FRC Total Rate of Return Office 1982$	0.80	(5.71)
55 GNP 1982 Dollars	IREM Boston Garden Rent 1982$	0.85	6.73
56 GNP 1982 Dollars	IREM Boston Elevator Rent 1982$	0.80	5.57
57 GNP 1982 Dollars	IREM Boston Elevator Vacancy	0.23	(1.54)
58 GNP 1982 Dollars	IREM Boston Elevator NOI 1982$	0.78	5.36
59 GNP 1982 Dollars	IREM Boston Lowrise 12-24 Rent 1982$	0.15	1.09
60 GNP 1982 Dollars	IREM Boston Lowrise 12-24 Vacancy	0.06	(0.64)
61 GNP 1982 Dollars	IREM Boston Lowrise 12-24 NOI 1982$	0.45	2.37
62 GNP 1982 Dollars	IREM Boston Lowrise 25+ Rent 1982$	0.84	6.56
63 GNP 1982 Dollars	IREM Boston Lowrise 25+ Vacancy	0.17	(1.29)
64 GNP 1982 Dollars	IREM Boston Lowrise 25+ NOI 1982$	0.90	8.30
65 GNP 1982 Dollars	IREM Boston Garden Vacancy	0.17	(1.29)
66 GNP 1982 Dollars	IREM Boston Garden NOI 1982$	0.81	5.80
67 GNP 1982 Dollars	IREM Boston Office Rent 1982$	0.36	1.82
68 GNP 1982 Dollars	IREM Boston Office Vacancy	0.02	(0.34)
69 GNP 1982 Dollars	IREM Boston Office NOI 1982$	0.37	1.89
70 GNP 1982 Dollars	Spaulding and Slye Rent 1982$	0.39	2.13
71 GNP 1982 Dollars	Spaulding and Slye Vacancy	0.65	3.63
72 GNP 1982 Dollars	Spaulding and Slye Space Added	0.60	3.22
73 GNP 1982 Dollars	Spaulding and Slye Absorption	0.68	3.89
74 GNP 1982 Dollars	Boston Multifamily Permits (units)	0.60	3.47
75 GNP 1982 Dollars	Boston Office Permits (Valuation) 1982$	0.20	1.41
76 GNP 1982 Dollars	IREM Denver Elevator Rent 1982$	0.50	2.81
77 GNP 1982 Dollars	IREM Denver Elevator Vacancy	0.69	4.20
78 GNP 1982 Dollars	IREM Denver Elevator NOI 1982$	0.06	0.74
79 GNP 1982 Dollars	IREM Denver Lowrise 12-24 Rent 1982$	0.76	4.98
80 GNP 1982 Dollars	IREM Denver Lowrise 12-24 Vacancy	0.67	4.00
81 GNP 1982 Dollars	IREM Denver Lowrise 12-24 NOI 1982$	0.68	4.13
82 GNP 1982 Dollars	IREM Denver Lowrise 25+ Rent 1982$	0.90	8.51
83 GNP 1982 Dollars	IREM Denver Lowrise 25+ Vacancy	0.74	4.73
84 GNP 1982 Dollars	IREM Denver Lowrise 25+ NOI 1982$	0.09	0.91
85 GNP 1982 Dollars	IREM Denver Garden Rent 1982$	0.40	2.31
86 GNP 1982 Dollars	IREM Denver Garden Vacancy	0.67	3.99
87 GNP 1982 Dollars	IREM Denver Garden NOI 1982$	0.11	1.00
88 GNP 1982 Dollars	IREM Denver Office Rent 1982$	0.48	2.55
89 GNP 1982 Dollars	IREM Denver Office Vacancy	0.12	0.98
90 GNP 1982 Dollars	IREM Denver Office NOI 1982$	0.21	1.35
91 GNP 1982 Dollars	BOMA Denver Office NOI 1982$	0.06	0.68
92 GNP 1982 Dollars	Denver Multifamily Permits (units)	0.02	(0.44)
93 GNP 1982 Dollars	Denver Office Permits (Valuation) 1982$	0.35	(2.10)
94 GNP 1982 Dollars	FRC Total Value Office 1982$	0.74	4.80
95 GNP 1982 Dollars	FRC Income Value Office 1982$	0.90	8.45
96 GNP 1982 Dollars	FRC Appreciation Value Office 1982$	0.15	(1.18)
97 Boston Total Personal Inc 1982$ 78-86	Boston Elevator Rent 1982$ 79-87	0.85	6.37
98 Boston Total Personal Inc 1982$ 78-86	Boston Elevator Vacancy 1982$ 79-87	0.10	(0.89)
99 Boston Total Personal Inc 1982$ 78-86	Boston Elevator NOI 1982$ 79-87	0.82	5.67

100	Boston Total Personal Inc 1982$ 78-86	Boston Lowrise 12-24 Rent 1982$ 79-87	0.33	1.86
101	Boston Total Personal Inc 1982$ 78-86	Boston Lowrise 12-24 Vacancy 79-87	0.05	(0.59)
102	Boston Total Personal Inc 1982$ 78-86	Boston Lowrise 12-24 NOI 1982$ 79-87	0.62	3.40
103	Boston Total Personal Inc 1982$ 78-86	Boston Lowrise 25+ Rent 1982$ 79-87	0.74	4.48
104	Boston Total Personal Inc 1982$ 78-86	Boston Lowrise 25+ Vacancy 79-87	0.01	(0.32)
105	Boston Total Personal Inc 1982$ 78-86	Boston Lowrise 25+ NOI 1982$ 79-87	0.88	7.29
106	Boston Total Personal Inc 1982$ 78-86	Boston Garden Rent 1982$ 79-87	0.83	5.79
107	Boston Total Personal Inc 1982$ 78-86	Boston Garden Vacancy 79-87	0.38	(2.09)
108	Boston Total Personal Inc 1982$ 78-86	Boston Garden NOI 1982$ 79-87	0.86	6.53
109	Denver Total Personal Inc 1982$ 79-86	Denver Elevator Rent 1982$ 80-87	0.60	3.03
110	Denver Total Personal Inc 1982$ 79-86	Denver Elevator Vacancy 80-87	0.64	3.23
111	Denver Total Personal Inc 1982$ 79-86	Denver Elevator NOI 1982$ 80-87	0.04	0.47
112	Denver Total Personal Inc 1982$ 79-86	Denver Lowrise 12-24 Rent 1982$ 80-87	0.78	4.64
113	Denver Total Personal Inc 1982$ 79-86	Denver Lowrise 12-24 Vacancy 80-87	0.57	2.82
114	Denver Total Personal Inc 1982$ 79-86	Denver Lowrise 12-24 NOI 1982$ 80-87	0.54	2.64
115	Denver Total Personal Inc 1982$ 79-86	Denver Lowrise 25+ Rent 1982$ 80-87	0.85	5.77
116	Denver Total Personal Income 1982$ 79-86	Denver Lowrise 25+ Vacancy 80-87	0.57	2.85
117	Denver Total Personal Income 1982$ 79-86	Denver Lowrise 25+ NOI 1982$ 80-87	0.11	(0.85)
118	Denver Total Personal Income 1982$ 79-86	Denver Garden Rent 1982$ 80=87	0.44	2.18
119	Denver Total Personal Income 1982$ 79-86	Denver Garden Vacancy 80-87	0.61	3.07
120	Denver Total Personal Income 1982$ 79-86	Denver Garden NOI 1982$ 80-87	0.11	0.86
121	Boston Total Personal Income 1982$ 78-86	Boston Multifamily Permits (units) 79-87	0.52	2.76
122	Denver Total Personal Income 1982$ 79-86	Denver Multifamily Permits (units) 80-87	0.00	0.08
123	Boston Total Population 78-85	Boston Elevator Rent 1982$ 79-86	0.38	1.92
124	Boston Total Population 78-85	Boston Elevator Vacancy 1982$ 79-86	0.30	(1.60)
125	Boston Total Population 78-85	Boston Elevator NOI 1982$ 79-86	0.42	2.08
126	Boston Total Population 78-85	Boston Lowrise 12-24 Rent 1982$ 79-86	0.08	0.71
127	Boston Total Population 78-85	Boston Lowrise 12-24 Vacancy 79-86	0.04	(0.48)
128	Boston Total Population 78-85	Boston Lowrise 12-24 NOI 1982$ 79-86	0.16	1.08
129	Boston Total Population 78-85	Boston Lowrise 25+ Rent 1982$ 79-86	0.61	3.07
130	Boston Total Population 78-85	Boston Lowrise 25+ Vacancy 79-86	0.22	(1.32)
131	Boston Total Population 78-85	Boston Lowrise 25+ NOI 1982$ 79-86	0.65	3.33
132	Boston Total Population 78-85	Boston Garden Rent 1982$ 79-86	0.79	4.77
133	Boston Total Population 78-85	Boston Garden Vacancy 79-86	0.02	(0.36)
134	Boston Total Population 78-85	Boston Garden NOI 1982$ 79-86	0.91	7.57
135	Boston Total Population 78-85	Boston Multifamily Permits (units) 79-86	0.87	6.27
136	Denver Total Population 79-85	Denver Elevator Rent 1982$ 80-86	0.64	2.99
137	Denver Total Population 79-85	Denver Elevator Vacancy 80-86	0.48	2.15
138	Denver Total Population 79-85	Denver Elevator NOI 1982$ 80-86	0.27	1.35
139	Denver Total Population 79-85	Denver Lowrise 12-24 Rent 1982$ 80-86	0.72	3.54
140	Denver Total Population 79-85	Denver Lowrise 12-24 Vacancy 80-86	0.41	1.86
141	Denver Total Population 79-85	Denver Lowrise 12-24 NOI 1982$ 80-86	0.45	2.02
142	Denver Total Population 79-85	Denver Lowrise 25+ Rent 1982$ 80-86	0.80	4.44
143	Denver Total Population 79-85	Denver Lowrise 25+ Vacancy 80-86	0.41	1.86
144	Denver Total Population 79-85	Denver Lowrise 25+ NOI 1982$ 80-86	0.00	0.09
145	Denver Total Population 79-85	Denver Garden Rent 1982$ 80-86	0.71	3.54
146	Denver Total Population 79-85	Denver Garden Vacancy 80-86	0.48	2.15
147	Denver Total Population 79-85	Denver Garden NOI 1982$ 80-86	0.35	1.62
148	Denver Total Population 79-85	Denver Multifamily Permits (units) 80-86	0.22	1.19
149	Average Interest Rate All Loans 78-86	Boston Garden Rent 1982$ 79-87	0.13	(1.03)
150	Average Interest Rate All Loans 78-86	Boston Garden Vacancy 79-87	0.01	(0.30)
151	Average Interest Rate All Loans 78-86	Boston Garden NOI 1982$ 79-87	0.06	(0.70)

152	Average Interest Rate All Loans 78-86	Boston Multifamily Permits (units) 79-87	0.29	(1.69)
153	Average Interest Rate All Loans 78-86	Denver Garden Rent 1982$ 79-87	0.18	1.22
154	Average Interest Rate All Loans 78-86	Denver Garden Vacancy 79-87	0.31	(1.76)
155	Average Interest Rate All Loans 78-86	Denver Garden NOI 1982$ 79-87	0.29	1.69
156	Average Interest Rate All Loans 78-86	Denver Multifamily Permits (units) 79-87	0.57	3.04
157	Delinquincy Rate Total 78-86	Boston Garden Rent 1982$ 79-87	0.49	2.59
158	Delinquincy Rate Total 78-86	Boston Garden Vacancy 79-87	0.21	(1.38)
159	Delinquincy Rate Total 78-86	Boston Garden NOI 1982$ 79-87	0.52	2.77
160	Delinquincy Rate Total 78-86	Boston Multifamily Permits (units) 79-87	0.24	1.51
161	Delinquincy Rate Total 78-86	Denver Garden Rent 1982$ 79-87	0.73	4.38
162	Delinquincy Rate Total 78-86	Denver Garden Vacancy 79-87	0.22	1.41
163	Delinquincy Rate Total 78-86	Denver Garden NOI 1982$ 79-87	0.35	1.95
164	Delinquincy Rate Total 78-86	Denver Multifamily Permits (units) 79-87	0.17	1.20
165	Foreclosures Started 78-86	Boston Garden Rent 1982$ 79-87	0.77	4.86
166	Foreclosures Started 78-86	Boston Garden Vacancy 79-87	0.17	(1.18)
167	Foreclosures Started 78-86	Boston Garden NOI 1982$ 79-87	0.66	3.67
168	Foreclosures Started 78-86	Boston Multifamily Permits (units) 79-87	0.42	2.23
169	Foreclosures Started 78-86	Denver Garden Rent 1982$ 79-87	0.51	2.69
170	Foreclosures Started 78-86	Denver Garden Vacancy 79-87	0.47	2.49
171	Foreclosures Started 78-86	Denver Garden NOI 1982$ 79-87	0.23	1.44
172	Foreclosures Started 78-86	Denver Multifamily Permits (units) 79-87	0.03	0.50
173	ACLI # of Loans Committed 78-86	Boston Garden Rent 1982$ 79-87	0.12	0.98
174	ACLI # of Loans Committed 78-86	Boston Garden Vacancy 79-87	0.02	0.38
175	ACLI # of Loans Committed 78-86	Boston Garden NOI 1982$ 79-87	0.08	0.78
176	ACLI # of Loans Committed 78-86	Boston Multifamily Permits (units) 79-87	0.22	1.40
177	ACLI # of Loans Committed 78-86	Denver Garden Rent 1982$ 79-87	0.18	(1.23)
178	ACLI # of Loans Committed 78-86	Denver Garden Vacancy 79-87	0.31	1.76
179	ACLI # of Loans Committed 78-86	Denver Garden NOI 1982$ 79-87	0.24	(1.47)
180	ACLI # of Loans Committed 78-86	Denver Multifamily Permits (units) 79-87	0.28	(1.66)
181	ACLI Amount Committed 1982$ 78-86	Boston Garden Rent 1982$ 79-87	0.68	3.89
182	ACLI Amount Committed 1982$ 78-86	Boston Garden Vacancy 79-87	0.11	(0.91)
183	ACLI Amount Committed 1982$ 78-86	Boston Garden NOI 1982$ 79-87	0.62	3.38
184	ACLI Amount Committed 1982$ 78-86	Boston Multifamily Permits (units) 79-87	0.67	3.77
185	ACLI Amount Committed 1982$ 78-86	Denver Garden Rent 1982$ 79-87	0.00	0.06
186	ACLI Amount Committed 1982$ 78-86	Denver Garden Vacancy 79-87	0.77	4.80
187	ACLI Amount Committed 1982$ 78-86	Denver Garden NOI 1982$ 79-87	0.06	(0.68)
188	ACLI Amount Committed 1982$ 78-86	Denver Multifamily Permits (units) 79-87	0.25	(1.52)
189	ACLI Wted Average Interest Rate 78-86	Boston Garden Rent 1982$ 79-87	0.11	(0.93)
190	ACLI Wted Average Interest Rate 78-86	Boston Garden Vacancy 79-87	0.01	(0.27)
191	ACLI Wted Average Interest Rate 78-86	Boston Garden NOI 1982$ 79-87	0.05	(0.60)
192	ACLI Wted Average Interest Rate 78-86	Boston Multifamily Permits (units) 79-87	0.18	(1.24)
193	ACLI Wted Average Interest Rate 78-86	Denver Garden Rent 1982$ 79-87	0.26	1.56
194	ACLI Wted Average Interest Rate 78-86	Denver Garden Vacancy 79-87	0.29	(1.71)
195	ACLI Wted Average Interest Rate 78-86	Denver Garden NOI 1982$ 79-87	0.34	1.91
196	ACLI Wted Average Interest Rate 78-86	Denver Multifamily Permits (units) 79-87	0.56	3.01
197	Comp. Index of 12 Leading Inds. 78-86	Boston Garden Rent 1982$ 79-87	0.85	6.25
198	Comp. Index of 12 Leading Inds. 78-86	Boston Garden Vacancy 79-87	0.27	(1.59)
199	Comp. Index of 12 Leading Inds. 78-86	Boston Garden NOI 1982$ 79-87	0.85	6.37
200	Comp. Index of 12 Leading Inds. 78-86	Boston Multifamily Permits (units) 79-87	0.80	5.30
201	Comp. Index of 12 Leading Inds. 78-86	Denver Garden Rent 1982$ 79-87	0.15	1.10
202	Comp. Index of 12 Leading Inds. 78-86	Denver Garden Vacancy 79-87	0.80	5.26
203	Comp. Index of 12 Leading Inds. 78-86	Denver Garden NOI 1982$ 79-87	0.00	0.11

204	Comp. Index of 12 Leading Inds. 78-86	Denver Multifamily Permits (units) 79-87	0.11	(1.03)
205	Boston Per Cap. Pers. Income 1982$ 78-86	Boston Garden Rent 1982$ 79-87	0.90	8.04
206	Boston Per Cap. Pers. Income 1982$ 78-86	Boston Garden Vacancy 79-87	0.38	(2.09)
207	Boston Per Cap. Pers. Income 1982$ 78-86	Boston Garden NOI 1982$ 79-87	0.93	9.74
208	Boston Per Cap. Pers. Income 1982$ 78-86	Boston Multifamily Permits (units) 79-87	0.66	3.67
209	Denver Per Cap. Pers. Income 1982$ 79-86	Denver Garden Rent 1982$ 80-87	0.38	1.92
210	Denver Per Cap. Pers. Income 1982$ 79-86	Denver Garden Vacancy 80-87	0.59	2.93
211	Denver Per Cap. Pers. Income 1982$ 79-86	Denver Garden NOI 1982$ 80-87	0.07	0.68
212	Denver Per Cap. Pers. Income 1982$ 79-86	Denver Multifamily Permits (units) 80-87	0.00	(0.05)
213	Boston Total Employment 78-86	Boston Garden Rent 1982$ 79-87	0.85	6.20
214	Boston Total Employment 78-86	Boston Garden Vacancy 79-87	0.45	(2.39)
215	Boston Total Employment 78-86	Boston Garden NOI 1982$ 79-87	0.92	9.09
216	Boston Total Employment 78-86	Boston Multifamily Permits (units) 79-87	0.65	3.62
217	Denver Total Employment 78-86	Denver Garden Rent 1982$ 79-87	0.43	(2.28)
218	Denver Total Employment 78-86	Denver Garden Vacancy 79-87	0.58	(3.10)
219	Denver Total Employment 78-86	Denver Garden NOI 1982$ 79-87	0.10	(0.90)
220	Denver Total Employment 78-86	Denver Multifamily Permits (units) 79-87	0.01	0.27
221	Boston Total Employment 79-86	IREM Boston Office Rent 1982$ 80-87	0.41	2.04
222	Boston Total Employment 79-86	IREM Boston Office Vacancy 80-87	0.01	(0.30)
223	Boston Total Employment 79-86	IREM Boston Office NOI 1982$ 80-87	0.36	1.82
224	Boston Total Employment 78-85	BOMA Boston NOI 1982$ 79-86	0.14	1.00
225	Boston Total Employment 79-86	Spaulding and Slye Rent 1982$ 79-87	0.51	2.71
226	Boston Total Employment 79-86	Spaulding and Slye Vacancy 79-87	0.75	4.55
227	Boston Total Employment 79-86	Spaulding and Slye Space Added 79-87	0.70	4.04
228	Boston Total Employment 79-86	Spaulding and Slye Absorption 79-87	0.72	4.22
229	Boston Total Employment 79-86	Boston Office Permits 1982$ 79-87	0.11	0.93
230	Denver Total Employment 78-86	IREM Denver Office Rent 1982$ 79-87	0.44	(2.90)
231	Denver Total Employment 78-86	IREM Denver Office Vacancy 79-87	0.27	(1.63)
232	Denver Total Employment 78-86	IREM Denver Office NOI 1982$ 79-87	0.55	(2.92)
233	Denver Total Employment 78-85	BOMA Denver Office NOI 1982$ 79-86	0.08	0.72
234	Denver Total Employment 78-86	Denver Office Permits 1982$ 79-87	0.43	2.32
235	ACLI # of Loans Committed 79-86	IREM Boston Office Rent 1982$ 80-87	0.10	(0.81)
236	ACLI # of Loans Committed 79-86	IREM Boston Office Vacancy 80-87	0.13	(0.96)
237	ACLI # of Loans Committed 79-86	IREM Boston Office NOI 1982$ 80-87	0.14	(0.98)
238	ACLI # of Loans Committed 78-85	BOMA Boston NOI 1982$ 79-86	0.25	1.40
239	ACLI # of Loans Committed 78-86	Spaulding and Slye Rent 1982$ 79-87	0.23	(1.43)
240	ACLI # of Loans Committed 78-86	Spaulding and Slye Vacancy 79-87	0.05	(0.59)
241	ACLI # of Loans Committed 78-86	Spaulding and Slye Space Added 79-87	0.01	(0.31)
242	ACLI # of Loans Committed 78-86	Spaulding and Slye Absorption 79-87	0.00	0.19
243	ACLI # of Loans Committed 78-86	Boston Office Permits 1982$ 79-87	0.22	(1.40)
244	ACLI # of Loans Committed 78-86	IREM Denver Office Rent 1982$ 79-87	0.00	(0.14)
245	ACLI # of Loans Committed 78-86	IREM Denver Office Vacancy 79-87	0.00	0.11
246	ACLI # of Loans Committed 78-86	IREM Denver Office NOI 1982$ 79-87	0.09	(0.83)
247	ACLI # of Loans Committed 78-85	BOMA Denver Office NOI 1982$ 79-86	0.56	(2.78)
248	ACLI # of Loans Committed 78-86	Denver Office Permits 1982$ 79-87	0.18	(1.24)
249	ACLI # of Loans Committed 78-86	FRC Total Value Office 1982$ 79-87	0.03	(0.47)
250	ACLI # of Loans Committed 78-86	FRC Income Value Office 1982$ 79-87	0.16	1.14
251	ACLI # of Loans Committed 78-86	FRC Apprec. Value Office 1982$ 79-87	0.32	(1.84)
252	ACLI # of Loans Committed 78-86	FRC Total Rate of Return Office 79-87	0.00	0.24
253	ACLI # of Loans Committed 78-86	FRC Income Rate of Return Office 79-87	0.01	0.28
254	ACLI # of Loans Committed 78-86	FRC Apprec. Rate of Return Office 79087	0.01	0.23
255	ACLI Amount of Loans Cmtd. 1982$ 79-86	IREM Boston Office Rent 1982$ 80-87	0.02	0.38

256	ACLI Amount of Loans Cmtd. 1982$ 79-86	IREM Boston Office Vacancy 80-87	0.10	(0.82)
257	ACLI Amount of Loans Cmtd. 1982$ 79-86	IREM Boston Office NOI 1982$ 80-87	0.00	0.20
258	ACLI Amount of Loans Cmtd. 1982$ 78-85	BOMA Boston NOI 1982$ 79-86	0.41	2.03
259	ACLI Amount of Loans Cmtd. 1982$ 78-86	Spaulding and Slye Rent 1982$ 79-87	0.00	0.25
260	ACLI Amount of Loans Cmtd. 1982$ 78-86	Spaulding and Slye Vacancy 79-87	0.14	1.08
261	ACLI Amount of Loans Cmtd. 1982$ 78-86	Spaulding and Slye Space Added 79-87	0.17	1.18
262	ACLI Amount of Loans Cmtd. 1982$ 78-86	Spaulding and Slye Absorption 79-87	0.31	1.77
263	ACLI Amount of Loans Cmtd. 1982$ 78-86	Boston Office Permits 1982$ 79-87	0.02	(0.40)
264	ACLI Amount of Loans Cmtd. 1982$ 78-86	IREM Denver Office Rent 1982$ 79-87	0.15	1.11
265	ACLI Amount of Loans Cmtd. 1982$ 78-86	IREM Denver Office Vacancy 79-87	0.05	0.61
266	ACLI Amount of Loans Cmtd. 1982$ 78-86	IREM Denver Office NOI 1982$ 79-87	0.00	0.10
267	ACLI Amount of Loans Cmtd. 1982$ 78-85	BOMA Denver Office NOI 1982$ 79-86	0.14	0.99
268	ACLI Amount of Loans Cmtd. 1982$ 78-86	Denver Office Permits 1982$ 79-87	0.47	(2.49)
269	ACLI Weighted Avge. Interest Rate 79-86	IREM Boston Office Rent 1982$ 80-87	0.02	0.33
270	ACLI Weighted Avge. Interest Rate 79-86	IREM Boston Office Vacancy 80-87	0.08	0.71
271	ACLI Weighted Avge. Interest Rate 79-86	IREM Boston Office NOI 1982$ 80-87	0.12	0.92
272	ACLI Weighted Avge. Interest Rate 78-85	BOMA Boston NOI 1982$ 79-86	0.15	(1.02)
273	ACLI Weighted Avge. Interest Rate 78-86	Spaulding and Slye Rent 1982$ 79-87	0.33	1.88
274	ACLI Weighted Avge. Interest Rate 78-86	Spaulding and Slye Vacancy 79-87	0.11	0.91
275	ACLI Weighted Avge. Interest Rate 78-86	Spaulding and Slye Space Added 79-87	0.06	0.66
276	ACLI Weighted Avge. Interest Rate 78-86	Spaulding and Slye Absorption 79-87	0.00	0.16
277	ACLI Weighted Avge. Interest Rate 78-86	Boston Office Permits 1982$ 79-87	0.15	1.10
278	ACLI Weighted Avge. Interest Rate 78-86	IREM Denver Office Rent 1982$ 79-87	0.04	0.50
279	ACLI Weighted Avge. Interest Rate 78-86	IREM Denver Office Vacancy 79-87	0.02	0.37
280	ACLI Weighted Avge. Interest Rate 78-86	IREM Denver Office NOI 1982$ 79-87	0.16	1.16
281	ACLI Weighted Avge. Interest Rate 78-85	BOMA Denver Office NOI 1982$ 79-86	0.60	2.97
282	ACLI Weighted Avge. Interest Rate 78-86	Denver Office Permits 1982$ 79-87	0.06	0.69
283	ACLI Weighted Avge. Interest Rate 78-86	FRC Total Value Office 1982$ 79-87	0.08	0.76
284	ACLI Weighted Avge. Interest Rate 78-86	FRC Income Value Office 1982$ 79-87	0.13	(1.03)
285	ACLI Weighted Avge. Interest Rate 78-86	FRC Apprec. Value Office 1982$ 79-87	0.46	2.43
286	ACLI Weighted Avge. Interest Rate 78-86	FRC Total Rate of Return Office 79-87	0.01	(0.25)
287	ACLI Weighted Avge. Interest Rate 78-86	FRC Income Rate of Return Office 79-87	0.02	(0.36)
288	ACLI Weighted Avge. Interest Rate 78-86	FRC Apprec. Rate of Return Office 79087	0.01	(0.23)
289	ACLI Amount of Loans Cmtd. 1982$ 78-86	FRC Total Value Office 1982$ 79-87	0.19	1.26
290	ACLI Amount of Loans Cmtd. 1982$ 78-86	FRC Income Value Office 1982$ 79-87	0.74	4.47
291	ACLI Amount of Loans Cmtd. 1982$ 78-86	FRC Apprec. Value Office 1982$ 79-87	0.55	(2.93)
292	ACLI Amount of Loans Cmtd. 1982$ 78-86	FRC Total Rate of Return Office 79-87	0.22	(1.40)
293	ACLI Amount of Loans Cmtd. 1982$ 78-86	FRC Income Rate of Return Office 79-87	0.22	(1.39)
294	ACLI Amount of Loans Cmtd. 1982$ 78-86	FRC Apprec. Rate of Return Office 79-87	0.21	(1.38)
295	Boston Elevator Vacancy 78-86	Boston Elevator Rent 82$ 79-87	0.34	(1.88)
296	Boston Elevator Vacancy 78-86	Boston Elevator NOI 82$ 79-87	0.38	(2.08)
297	Boston Lowrise 12-24 Vacancy 79-86	Boston Lowrise 12-24 Rent 82$ 80-87	0.15	(1.03)
298	Boston Lowrise 12-24 Vacancy 79-86	Boston Lowrise 12-24 NOI 82$ 80-87	0.02	(0.33)
299	Boston Lowrise 25+ Vacancy 78-86	Boston Lowrise 25+ Rent 82$ 79-87	0.00	0.21
300	Boston Lowrise 25+ Vacancy 78-86	Boston Lowrise 25+ NOI 82$ 79-87	0.00	(0.21)
301	Boston Garden Vacancy 78-86	Boston Garden Rent 82$ 79-87	0.08	(0.78)
302	Boston Garden Vacancy 78-86	Boston Garden NOI 82$ 79-87	0.07	(0.73)
303	Boston Office Vacancy 80-86	Boston Office Rent 82$ 81-87	0.04	(0.45)
304	Boston Office Vacancy 80-86	Boston Office NOI 82$ 81-87	0.01	(0.24)
305	Spaulding and Slye Vacancy 79-86	Spaulding and Slye Rent 82$ 80-87	0.56	2.77
306	Spaulding and Slye Vacancy 79-86	Spaulding and Slye NOI 82$ 80-87	0.79	5.16
307	Boston Elevator Vacancy 78-87	Boston Elevator Rent 82$ 78-87	0.08	(0.83)

308	Boston Lowrise 12-24 Vacancy 79-87	Boston Lowrise 12-24 Rent 82$ 79-87	0.10	0.86
309	Boston Lowrise 25+ Vacancy 78-87	Boston Lowrise 25+ Rent 82$ 78-87	0.07	(0.80)
310	Boston Garden Vacancy 78-87	Boston Garden Rent 82$ 78-87	0.15	(1.20)
311	Boston Office Vacancy 80-87	Boston Office Rent 82$ 80-87	0.10	0.81
312	Denver Elevator Vacancy 78-86	Denver Elevator Rent 82$ 79-87	0.05	0.63
313	Denver Elevator Vacancy 78-86	Denver Elevator NOI 82$ 79-87	0.13	(1.02)
314	Denver Elevator Vacancy 78-87	Denver Elevator Rent 82$ 78-87	0.11	1.00
315	Denver Lowrise 12-24 Vacancy 78-86	Denver Lowrise 12-24 Rent 82$ 79-87	0.18	1.24
316	Denver Lowrise 12-24 Vacancy 78-86	Denver Lowrise 12-24 NOI 82$ 79-87	0.47	2.50
317	Denver Lowrise 12-24 Vacancy 78-87	Denver Lowrise 12-24 Rent 82$ 78-87	0.74	4.83
318	Denver Lowrise 25+ Vacancy 78-86	Denver Lowrise 25+ Rent 82$ 79-87	0.33	1.85
319	Denver Lowrise 25+ Vacancy 78-86	Denver Lowrise 25+ NOI 82$ 79-87	0.02	(0.40)
320	Denver Lowrise 25+ Vacancy 78-87	Denver Lowrise 25+ Rent 82$ 78-87	0.57	3.23
321	Denver Garden Vacancy 78-86	Denver Garden Rent 82$ 79-87	0.02	(0.39)
322	Denver Garden Vacancy 78-86	Denver Garden NOI 82$ 79-87	0.10	(0.87)
323	Denver Garden Vacancy 78-87	Denver Garden Rent 82$ 78-87	0.04	0.54
324	Denver Office Vacancy 79-86	Denver Office Rent 82$ 80-87	0.64	3.26
325	Denver Office Vacancy 79-86	Denver Office NOI 82$ 80-87	0.56	2.75
326	Denver Office Vacancy 79-87	Denver Office Rent 82$ 79-87	0.01	0.29
327	Boston Per Cap. Pers. Income 82$ 78-86	Boston Elevator Rent 82$ 79-87	0.82	5.67
328	Boston Per Cap. Pers. Income 82$ 78-86	Boston Elevator Vacancy 79-87	0.09	(0.81)
329	Boston Per Cap. Pers. Income 82$ 78-86	Boston Elevator NOI 79-87	0.76	4.76
330	Boston Per Cap. Pers. Income 82$ 78-86	Boston Lowrise 12-24 Rent 82$ 79-87	0.21	1.36
331	Boston Per Cap. Pers. Income 82$ 78-86	Boston Lowrise 12-24 Vacancy 79-87	0.06	(0.64)
332	Boston Per Cap. Pers. Income 82$ 78-86	Boston Lowrise 12-24 NOI 82$ 79-87	0.48	2.56
333	Boston Per Cap. Pers. Income 82$ 78-86	Boston Lowrise 25+ Rent 82$ 79-87	0.71	4.19
334	Boston Per Cap. Pers. Income 82$ 78-86	Boston Lowrise 25+ Vacancy 79-87	0.05	(0.62)
335	Boston Per Cap. Pers. Income 82$ 78-86	Boston Lowrise 25+ NOI 82$ 79-87	0.87	6.77
336	Denver Per Cap. Pers. Income 82$ 79-86	Denver Elevator Rent 82$ 80-87	0.53	2.59
337	Denver Per Cap. Pers. Income 82$ 79-86	Denver Elevator Vacancy 80-87	0.64	3.28
338	Denver Per Cap. Pers. Income 82$ 79-86	Denver Elevator NOI 82$ 80-87	0.02	0.37
339	Denver Per Cap. Pers. Income 82$ 79-86	Denver Lowrise 12-24 Rent 82$ 80-87	0.79	4.76
340	Denver Per Cap. Pers. Income 82$ 79-86	Denver Lowrise 12-24 Vacancy 80-87	0.57	2.83
341	Denver Per Cap. Pers. Income 82$ 79-86	Denver Lowrise 12-24 NOI 82$ 80-87	0.53	2.59
342	Denver Per Cap. Pers. Income 82$ 79-86	Denver Lowrise 25+ Rent 82$ 80-87	0.84	5.52
343	Denver Per Cap. Pers. Income 82$ 79-86	Denver Lowrise 25+ Vacancy 80-87	0.57	2.80
344	Denver Per Cap. Pers. Income 82$ 79-86	Denver Lowrise 25+ NOI 82$ 80-87	0.10	(0.83)
345	Boston Total Employment 78-86	Boston Elevator Rent 82$ 79-87	0.72	4.25
346	Boston Total Employment 78-86	Boston Elevator Vacancy 79-87	0.15	(1.11)
347	Boston Total Employment 78-86	Boston Elevator NOI 82$ 79-87	0.72	4.29
348	Boston Total Employment 78-86	Boston Lowrise 12-24 Rent 82$ 79-87	0.15	1.10
349	Boston Total Employment 78-86	Boston Lowrise 12-24 Vacancy 79-87	0.12	(0.96)
350	Boston Total Employment 78-86	Boston Lowrise 12-24 NOI 82$ 79-87	0.50	2.62
351	Boston Total Employment 78-86	Boston Lowrise 25+ Rent 82$ 79-87	0.71	4.13
352	Boston Total Employment 78-86	Boston Lowrise 25+ Vacancy 79-87	0.08	(0.80)
353	Boston Total Employment 78-86	Boston Lowrise 25+ NOI 79-87	0.82	5.69
354	Denver Total Employment 78-86	Denver Elevator Rent 82$ 79-87	0.36	(2.00)
355	Denver Total Employment 78-86	Denver Elevator Vacancy 79-87	0.53	(2.81)
356	Denver Total Employment 78-86	Denver Elevator NOI 82$ 79-87	0.07	(0.71)
357	Denver Total Employment 78-86	Denver Lowrise 12-24 Rent 82$ 79-87	0.51	(2.72)
358	Denver Total Employment 78-86	Denver Lowrise Vacancy 79-87	0.43	(2.31)
359	Denver Total Employment 78-86	Denver Lowrise NOI 82$ 79-87	0.75	(4.59)

360 Denver Total Employment 78-86	Denver Lowrise 25+ 82$ 79-87	0.73	(4.40)
361 Denver Total Employment 78-86	Denver Lowrise 25+ Vacancy 79-87	0.56	(2.99)
362 Denver Total Employment 78-86	Denver Lowrise 25+ NOI 82$ 79-87	0.03	(0.46)

APPENDIX B - DATA

	Boston Total Personal Income	% Change	1982 Dollars	Boston Per Capita Personal Income	% Change	1982 Dollars
1978	31,469.1		43,586.0	8,557		11,852
1979	35,107.0	11.56%	44,665.4	9,565	11.78%	12,169
1980	39,405.4	12.24%	45,980.6	10,751	12.40%	12,545
1981	44,244.8	12.28%	47,069.0	12,046	12.05%	12,815
1982	48,231.4	9.01%	48,231.4	13,170	9.33%	13,170
1983	52,666.8	9.20%	50,689.8	14,297	8.56%	13,760
1984	58,876.0	11.79%	54,666.7	16,198	13.30%	15,040
1985	64,616.0	9.75%	58,107.9	17,411	7.49%	15,657
1986	70,237.0	8.70%	61,557.4	18,959	8.89%	16,616
1987						

	Boston Population	% Change	Boston Total Employment	% Change	Denver Total Personal Income	% Change	1982 Dollars
1978	3,677.6		1,395.1	6.27%			
1979	3,670.3	-0.20%	1,443.5	3.47%	14,374.5		18,288.2
1980	3,662.9	-0.20%	1,474.1	2.12%	16,463.7	14.53%	19,210.8
1981	3,673.2	0.28%	1,481.1	0.47%	19,139.4	16.25%	20,361.1
1982	3,667.1	-0.17%	1,467.0	-0.95%	21,177.0	10.65%	21,177.0
1983	3,681.3	0.39%	1,525.3	3.97%	22,666.1	7.03%	21,815.3
1984	3,699.8	0.50%	1,608.9	5.48%	24,978.0	10.20%	23,192.2
1985	3,711.1	0.31%	1,644.6	2.22%	26,615.0	6.55%	23,934.4
1986			1,675.1	1.85%	27,740.0	4.23%	24,312.0
1987			1,712.0	2.20%			

	Denver Per Capita Personal Income	% Change	1982 Dollars	Denver Population	% Change	Denver Total Employment	% Change
1978						733.9	9.50%
1979	10,180		12,952	1,412.1		777.4	5.93%
1980	11,479	12.76%	13,394	1,428.8	1.19%	799.3	2.82%
1981	12,941	12.74%	13,767	1,477.6	3.41%	829.8	3.82%
1982	13,917	7.54%	13,917	1,522.5	3.04%	844.1	1.72%
1983	14,525	4.37%	13,980	1,562.4	2.62%	97.0	-88.51%
1984	15,783	8.66%	14,655	1,587.5	1.61%	106.4	9.69%
1985	16,476	4.39%	14,817	1,615.3	1.75%	103.6	-2.63%
1986	16,986	3.10%	14,887			103.2	-0.39%
1987						104.4	1.16%

	Avge. Int. Rate All Mortgages Closed	% Change	Int. Rate Commitments 25 year 75% ltv rati	% Change	Consumer Price Index For Rent 1982 = 100	% Change
1978	9.59%		9.70%		106.8	6.80%
1979	10.85%	13.14%	11.27%	16.19%	114.6	7.30%
1980	12.84%	18.34%	14.00%	24.22%	124.8	8.90%
1981	14.99%	16.74%	16.71%	19.36%	135.6	8.65%
1982	15.33%	2.27%	16.59%	-0.72%	145.9	7.60%
1983	12.82%	-16.37%	13.30%	-19.83%	154.4	5.80%
1984	12.48%	-2.65%	13.13%	-1.28%	162.4	5.20%
1985	11.71%	-6.17%	11.99%	-8.68%	172.3	6.11%
1986	10.26%	-12.38%	10.27%	-14.35%	182.4	5.84%
1987						

	Delinquency Rate Total Past Due	% Change	Foreclosures Started All Loans	% Change	ACLI # of Loans Committed	% Change
1978	4.58%		0.16%		2,286	23.30%
1979	4.63%	1.09%	0.14%	-9.52%	2,637	15.35%
1980	4.98%	7.57%	0.15%	1.75%	656	-75.12%
1981	5.24%	5.38%	0.16%	10.34%	493	-24.85%
1982	5.52%	5.34%	0.21%	31.25%	671	36.11%
1983	5.59%	1.22%	0.22%	2.38%	1,181	76.01%
1984	5.65%	1.12%	0.21%	-2.33%	1,138	-3.64%
1985	5.84%	3.32%	0.23%	8.33%	2,159	89.72%
1986	5.57%	-4.67%	0.25%	10.99%	2,135	-1.11%
1987	4.98%	-10.64%	0.26%	2.97%	1,891	-11.43%

	ACLI Amount Committed	% Change	1982 Dollars	ACLI Wted. Avge Int. Rate	% Change	GNP 1982 Dollars	% Change
1978	7,361,569	26.25%	10,196,079	9.57%	2.79%	3,115.2	5.30%
1979	10,761,541	46.19%	13,691,528	10.36%	8.25%	3,192.4	2.48%
1980	4,180,289	-61.16%	4,877,817	12.53%	20.95%	3,187.1	-0.17%
1981	3,262,305	-21.96%	3,470,537	13.90%	10.93%	3,248.8	1.94%
1982	4,828,452	48.01%	4,828,452	14.04%	1.01%	3,166.0	-2.55%
1983	9,965,874	106.40%	9,591,794	12.46%	-11.25%	3,279.1	3.57%
1984	12,968,835	30.13%	12,041,630	12.81%	2.81%	3,501.4	6.78%
1985	20,633,779	59.10%	18,555,557	11.67%	-8.90%	3,607.5	3.03%
1986	24,063,920	16.62%	21,090,202	9.53%	-18.34%	3,713.3	2.93%
1987	20,951,196	-12.94%	17,838,396			3,821.1	2.90%

	GNP Current $s	% Change	GNP Deflated by CPI	Comp. Index of 12 leading inds	% Change	CPI Index	% Change CPI Index
1978	2,249.7	13.00%	2,090.8	145.8		65.2	7.6%
1979	2,508.2	11.49%	2,252.5	145.1	-0.48%	72.6	11.3%
1980	2,732.0	8.92%	2,407.1	138.2	-4.76%	82.4	13.5%
1981	3,052.6	11.73%	2,767.2	140.9	1.95%	90.9	10.3%
1982	3,166.0	3.71%	2,982.3	136.8	-2.91%	96.5	6.2%
1983	3,405.7	7.57%	3,299.7	156.0	14.04%	99.6	3.2%
1984	3,765.0	10.55%	3,609.2	165.3	5.96%	103.9	4.3%
1985	3,998.1	6.19%	3,864.2	168.6	2.00%	107.5	3.5%
1986	4,235.0	5.93%	4,153.9	179.3	6.32%	109.6	2.0%
1987	4,488.6	5.99%	4,330.5	189.5	5.69%	113.6	3.6%

	Implicit Price Deflator GNP 1982=100	Boston Elevator Rent IREM	% Change	1982 Dollars	Boston Elevator Vacancy IREM	% Change	Vacancy*100
1978	0.722	4.40		6.09	2.68%		2.68
1979	0.786	4.61	4.77%	5.87	1.95%	-0.73%	1.95
1980	0.857	5.11	10.85%	5.96	1.17%	-0.78%	1.17
1981	0.940	5.56	8.81%	5.91	1.06%	-0.11%	1.06
1982	1.000	6.32	13.67%	6.32	1.70%	0.64%	1.70
1983	1.039	7.50	18.67%	7.22	1.32%	-0.38%	1.32
1984	1.077	8.08	7.73%	7.50	1.16%	-0.16%	1.16
1985	1.112	8.46	4.70%	7.61	0.59%	-0.57%	0.59
1986	1.141	8.29	-2.01%	7.27	0.80%	0.21%	0.80
1987	1.175	10.39	25.33%	8.85	1.73%	0.93%	1.73

	Boston Elevator NOI IREM	% Change	Index 1978=109.1	1982 Dollars	Boston Lowrise 12-24 Rent IREM	% Change	1982 Dollars
1978	1.34		109.1	1.86			
1979	1.44	7.46%	117.2	1.83	3.93		5.00
1980	1.99	38.19%	162.0	2.32	3.90	-0.76%	4.55
1981	1.89	-5.03%	153.9	2.01	4.62	18.46%	4.91
1982	2.59	37.04%	210.9	2.59	5.60	21.21%	5.60
1983	3.17	22.39%	258.1	3.05	6.89	23.04%	6.63
1984	4.14	30.60%	337.1	3.84	6.23	-9.58%	5.78
1985	4.57	10.39%	372.1	4.11	6.33	1.61%	5.69
1986	3.87	-15.32%	315.1	3.39	6.73	6.32%	5.90
1987	4.99	28.94%	406.3	4.25	6.61	-1.78%	5.63

	Boston Lowrise 12-24 Vacancy IREM	% Change	Vacancy*100	Boston Lowrise 12-24 NOI IREM	% Change	Index 1979=118.1	1982 Dollars
1978							
1979	2.54%		2.54	1.03		118.1	1.31
1980	2.03%	-0.51%	2.03	1.10	6.80%	126.1	1.28
1981	1.91%	-0.12%	1.91	2.24	103.64%	256.8	2.38
1982	1.79%	-0.13%	1.79	2.38	6.25%	272.9	2.38
1983	2.90%	1.12%	2.90	2.74	15.13%	314.2	2.64
1984	1.77%	-1.14%	1.77	3.37	22.99%	386.4	3.13
1985	1.41%	-0.35%	1.41	3.30	-2.08%	378.4	2.97
1986	2.38%	0.97%	2.38	3.09	-6.36%	354.3	2.71
1987	1.97%	-0.41%	1.97	3.30	6.80%	378.4	2.81

	Boston Lowrise 24+ Rent IREM	% Change	1982 Dollars	Boston Lowrise 24+ Vacancy IREM	% Change	Vacancy*100
1978	4.01		5.55	1.75%		1.75
1979	4.41	9.98%	5.61	1.13%	-0.61%	1.13
1980	4.66	5.67%	5.44	1.07%	-0.06%	1.07
1981	5.40	15.88%	5.74	0.91%	-0.16%	0.91
1982	5.53	2.41%	5.53	1.81%	0.90%	1.81
1983	6.14	11.03%	5.91	1.79%	-0.02%	1.79
1984	7.55	22.96%	7.01	1.57%	-0.22%	1.57
1985	7.80	3.31%	7.01	1.28%	-0.29%	1.28
1986	7.90	1.28%	6.92	0.51%	-0.78%	0.51
1987	8.00	1.27%	6.81	1.25%	0.74%	1.25

	Boston Lowrise 24+ NOI IREM	% Change	Index 1978=109.1	1982 Dollars	Boston Garden Rent IREM	% Change	1982 Dollars
1978	0.87		109.1	1.20	4.26		5.90
1979	1.71	96.55%	214.4	2.18	4.27	0.23%	5.43
1980	1.32	-22.81%	165.5	1.54	4.40	3.04%	5.13
1981	2.15	62.88%	269.6	2.29	5.14	16.82%	5.47
1982	2.20	2.33%	275.9	2.20	4.92	-4.28%	4.92
1983	2.72	23.64%	341.1	2.62	5.91	20.12%	5.69
1984	3.68	35.29%	461.5	3.42	6.51	10.15%	6.04
1985	4.03	9.51%	505.4	3.62	7.22	10.91%	6.49
1986	4.28	6.20%	536.7	3.75	8.58	18.84%	7.52
1987	4.69	9.58%	588.1	3.99	9.20	7.23%	7.83

	Boston Garden Vacancy IREM	% Change	Vacancy*100	Boston Garden NOI IREM	% Change	Index 1978=109.1	1982 Dollars
1978	1.88%		1.88	1.87		109.1	2.59
1979	3.04%	1.17%	3.04	1.70	-9.09%	99.2	2.16
1980	2.04%	-1.01%	2.04	1.88	10.59%	109.7	2.19
1981	2.12%	0.09%	2.12	2.00	6.38%	116.7	2.13
1982	2.03%	-0.09%	2.03	2.60	30.00%	151.7	2.60
1983	2.37%	0.34%	2.37	2.44	-6.15%	142.4	2.35
1984	2.15%	-0.22%	2.15	2.73	11.89%	159.3	2.53
1985	1.66%	-0.49%	1.66	3.91	43.22%	228.1	3.52
1986	2.33%	0.67%	2.33	4.74	21.23%	276.5	4.15
1987	1.49%	-0.84%	1.49	5.00	5.49%	291.7	4.26

	Boston Office Rent IREM	% Change	1982 Dollars	Boston Office Vacancy IREM	% Change	Vacancy*100
1978						
1979						
1980	7.41		8.65	3.43%		3.43
1981	12.04	62.48%	12.81	7.93%	4.50%	7.93
1982	10.98	-8.80%	10.98	2.55%	-5.37%	2.55
1983	12.78	16.39%	12.30	1.90%	-0.65%	1.90
1984	11.67	-8.69%	10.84	3.62%	1.72%	3.62
1985	15.42	32.13%	13.87	12.09%	8.47%	12.09
1986	14.25	-7.59%	12.49	0.00%	-12.09%	0.00
1987	15.56	9.19%	13.25	0.39%	0.39%	0.39

	Boston Office NOI IREM	Index % Change	1980=127.2	1982 Dollars
1978				
1979				
1980	3.43		127.2	4.00
1981	5.66	65.01%	209.9	6.02
1982	6.02	6.36%	223.2	6.02
1983	7.70	27.91%	285.6	7.41
1984	7.41	-3.77%	274.8	6.88
1985	8.73	17.81%	323.7	7.85
1986	8.20	-6.07%	304.1	7.19
1987	8.14	-0.73%	301.9	6.93

	Boston Office NOI BOMA	% Change	Index 1977=100	1982 Dollars	Spaulding and Slye Rent	% Change	1982 Dollars
1978	2.29		93.9	3.17			
1979	2.58	12.66%	105.7	3.28	10.50		13.36
1980	5.76	123.26%	236.1	6.72	12.30	17.14%	14.35
1981	3.62	-37.15%	148.4	3.85	14.70	19.51%	15.64
1982	2.86	-20.99%	117.2	2.86	17.10	16.33%	17.10
1983	2.09	-26.92%	85.7	2.01	17.70	3.51%	17.04
1984	4.44	112.44%	182.0	4.12	19.26	8.81%	17.88
1985	7.50	68.92%	307.4	6.74	20.37	5.76%	18.32
1986	5.18	-30.93%	212.3	4.54	20.15	-1.08%	17.66
1987					19.96	-0.94%	16.99

	Spaulding and Slye Vacancy	% Change	Spaulding and Slye Added	% Change	Spaulding and Slye Absorption	% Change
1978						
1979	2.62%		1,251.600		1,269.715	
1980	3.29%	25.52%	1,132.600	-9.51%	955.496	-24.75%
1981	7.53%	129.14%	2,362.362	108.58%	1,946.146	103.68%
1982	10.47%	39.02%	2,249.747	-4.77%	1,495.991	-23.13%
1983	14.50%	38.47%	2,242.913	-0.30%	1,964.907	31.34%
1984	11.92%	-17.84%	2,501.240	11.52%	1,972.570	0.39%
1985	16.06%	34.81%	4,534.016	81.27%	2,883.613	46.19%
1986	18.65%	16.12%	4,666.962	2.93%	4,268.731	48.03%
1987	16.57%	-11.15%	2,967.468	-36.42%	2,708.240	-36.56%

	Boston Res. Permits (units)	% Change	Boston Office Permits Millions $	% Change	1982 Dollars
1978	4,535		48.2		66.76
1979	4,388	-3.24%	99.8	107.05%	126.97
1980	3,157	-28.05%	104.6	4.81%	122.05
1981	3,176	0.60%	329.0	214.53%	350.00
1982	2,505	-21.13%	150.6	-54.22%	150.60
1983	2,643	5.51%	202.0	34.13%	194.42
1984	3,411	29.06%	305.6	51.29%	283.75
1985	6,404	87.75%	340.0	11.26%	305.76
1986	6,769	5.70%	244.5	-28.09%	214.29
1987	6,243	-7.77%	229.3	-6.22%	195.23

	Denver Elevator Rent IREM	% Change	1982 Dollars	Denver Elevator Vacancy IREM	% Change	Vacancy*100
1978	3.40		4.71	4.69%		4.69
1979	3.80	11.76%	4.83	1.58%	-3.11%	1.58
1980	4.14	8.95%	4.83	1.88%	0.30%	1.88
1981	4.76	14.98%	5.06	2.85%	0.97%	2.85
1982	5.29	11.13%	5.29	2.03%	-0.82%	2.03
1983	6.36	20.23%	6.12	1.98%	-0.05%	1.98
1984	6.41	0.79%	5.95	3.53%	1.55%	3.53
1985	6.71	4.68%	6.03	4.32%	0.79%	4.32
1986	6.42	-4.32%	5.63	12.07%	7.75%	12.07
1987	6.92	7.79%	5.89	11.71%	-0.37%	11.71

	Denver Elevator NOI IREM	% Change	Index 1978=109.1	1982 Dollars	Denver Lowrise 12-24 Rent IREM	% Change	1982 Dollars
1978	1.78		109.1	2.47	2.74		3.80
1979	1.98	11.24%	121.4	2.52	3.66	33.58%	4.66
1980	2.36	19.19%	144.6	2.75	3.68	0.55%	4.29
1981	2.53	7.20%	155.1	2.69	3.96	7.61%	4.21
1982	2.99	18.18%	183.3	2.99	4.18	5.56%	4.18
1983	3.61	20.74%	221.3	3.47	4.79	14.59%	4.61
1984	3.73	3.32%	228.6	3.46	4.76	-0.63%	4.42
1985	4.01	7.51%	245.8	3.61	5.61	17.86%	5.04
1986	3.14	-21.70%	192.5	2.75	5.67	1.07%	4.97
1987	3.15	0.32%	193.1	2.68	6.32	11.46%	5.38

	Denver Lowrise 12-24 Vac. IREM	% Change	Vacancy*100	Denver Lowrise 12-24 NOI IREM	% Change	Index 1978=109.1	1982 Dollars
1978	2.35%		2.35	1.20		109.1	1.66
1979	8.20%	5.85%	8.20	1.56	30.00%	141.8	1.98
1980	4.34%	-3.86%	4.34	1.96	25.64%	178.2	2.29
1981	5.79%	1.46%	5.79	1.95	-0.51%	177.3	2.07
1982	2.86%	-2.93%	2.86	2.26	15.90%	205.5	2.26
1983	3.49%	0.63%	3.49	2.12	-6.19%	192.7	2.04
1984	5.46%	1.97%	5.46	2.60	22.64%	236.4	2.41
1985	6.81%	1.35%	6.81	2.87	10.38%	260.9	2.58
1986	9.88%	3.06%	9.88	2.82	-1.74%	256.4	2.47
1987	12.50%	2.62%	12.50	3.06	8.51%	278.2	2.61

	Denver Lowrise 25+ Rent IREM	% Change	1982 Dollars	Denver Lowrise 25+ Vac. IREM	% Change	Vacancy*100
1978	2.94		4.07	5.39%		5.39
1979	3.43	16.67%	4.36	5.54%	0.15%	5.54
1980	4.05	18.08%	4.73	3.95%	-1.59%	3.95
1981	4.47	10.37%	4.76	6.04%	2.09%	6.04
1982	4.68	4.70%	4.68	3.21%	-2.84%	3.21
1983	5.05	7.91%	4.86	2.91%	-0.29%	2.91
1984	5.50	8.91%	5.11	6.55%	3.63%	6.55
1985	5.95	8.18%	5.35	6.27%	-0.27%	6.27
1986	6.50	9.24%	5.70	12.62%	6.34%	12.62
1987	6.71	3.23%	5.71	14.12%	1.50%	14.12

	Denver Lowrise 25+ NOI IREM	Index % Change	1978=109.1	1982 Dollars	Denver Garden Rent IREM	% Change	1982 Dollars
1978	1.29		109.1	1.79	3.07		4.25
1979	1.36	5.43%	115.0	1.73	3.78	23.13%	4.81
1980	2.40	76.47%	203.0	2.80	3.93	3.97%	4.59
1981	2.36	-1.67%	199.6	2.51	4.68	19.08%	4.98
1982	2.77	17.37%	234.3	2.77	5.24	11.97%	5.24
1983	2.75	-0.72%	232.6	2.65	6.05	15.46%	5.82
1984	2.96	7.64%	250.3	2.75	6.74	11.40%	6.26
1985	3.22	8.78%	272.3	2.90	6.85	1.63%	6.16
1986	2.89	-10.25%	244.4	2.53	6.41	-6.42%	5.62
1987	2.82	-2.42%	238.5	2.40	6.34	-1.09%	5.40

	Denver Garden Vacancy IREM	% Change	Vacancy*100	Denver Garden NOI IREM	% Change	Index 1978=109.1	1982 Dollars
1978	7.12%		7.12	1.33		109.1	1.84
1979	8.31%	1.19%	8.31	1.73	30.08%	141.9	2.20
1980	6.09%	-2.22%	6.09	1.80	4.05%	147.7	2.10
1981	5.34%	-0.75%	5.34	1.97	9.44%	161.6	2.10
1982	6.30%	0.96%	6.30	2.40	21.83%	196.9	2.40
1983	4.05%	-2.25%	4.05	3.25	35.42%	266.6	3.13
1984	8.66%	4.62%	8.66	3.39	4.31%	278.1	3.15
1985	7.67%	-0.99%	7.67	3.36	-0.88%	275.6	3.02
1986	14.64%	6.97%	14.64	2.63	-21.73%	215.7	2.30
1987	14.66%	0.02%	14.66	2.69	2.28%	220.7	2.29

	Denver Office Rent IREM	% Change	1982 Dollars	Denver Office Vacancy IREM	% Change	Vacancy*100
1978						
1979	7.10		9.03	3.15%		3.15
1980	7.15	0.70%	8.34	10.44%	7.29%	10.44
1981	8.41	17.62%	8.95	1.99%	-8.45%	1.99
1982	8.97	6.66%	8.97	8.47%	6.48%	8.47
1983	11.36	26.64%	10.93	7.94%	-0.53%	7.94
1984	10.00	-11.97%	9.29	16.39%	8.45%	16.39
1985	15.58	55.80%	14.01	9.59%	-6.80%	9.59
1986	14.00	-10.14%	12.27	7.97%	-1.62%	7.97
1987	12.75	-8.93%	10.86	9.18%	1.22%	9.18

	Denver Office NOI IREM	% Change	Index 1979=100	1982 Dollars
1978				
1979	4.42		118.1	5.62
1980	3.46	-21.72%	92.4	4.04
1981	4.37	26.30%	116.8	4.65
1982	5.26	20.37%	140.5	5.26
1983	7.47	42.02%	199.6	7.19
1984	6.84	-8.43%	182.8	6.35
1985	9.65	41.08%	257.8	8.68
1986	7.27	-24.66%	194.3	6.37
1987	6.57	-9.63%	175.5	5.59

	Denver Office NOI BOMA	% Change	Index 1977=100	1982 Dollars	Denver Res. Permits (units)	% Change
1978	4.57		118.4	6.33	6,961	
1979	3.38	-26.04%	87.6	4.30	5,690	-18.26%
1980	4.24	25.44%	109.8	4.95	5,239	-7.93%
1981	6.10	43.87%	158.0	6.49	4,883	-6.80%
1982	6.06	-0.66%	157.0	6.06	8,064	65.14%
1983	7.10	17.16%	183.9	6.83	12,575	55.94%
1984	7.10	0.00%	183.9	6.59	9,728	-22.64%
1985	8.75	23.24%	226.7	7.87	7,313	-24.83%
1986	5.77	-34.06%	149.5	5.06	7,679	5.00%
1987					3,295	-57.09%

	Denver Office Permits Millions $	% Change	1982 Dollars	FRC Total Value Office	% Change	1982 Dollars
1978	129.0		178.7	121.2		167.9
1979	183.2	42.02%	233.1	145.0	19.64%	184.5
1980	230.9	26.04%	269.4	182.7	26.00%	213.2
1981	612.6	165.31%	651.7	220.8	20.85%	234.9
1982	267.3	-56.37%	267.3	242.5	9.83%	242.5
1983	262.5	-1.80%	252.6	272.1	12.21%	261.9
1984	290.0	10.48%	269.3	305.4	12.24%	283.6
1985	17.2	-94.07%	15.5	331.9	8.68%	298.5
1986	71.2	313.95%	62.4	344.9	3.92%	302.3
1987	28.4	-60.11%	24.2	345.7	0.23%	294.3

	FRC Income Return Office	% Change	1982 Dollars	FRC Apprec. Return Office	% Change	1982 Dollars
1978	109.1		151.1	111.3		154.2
1979	118.1	8.25%	150.3	123.3	10.78%	156.9
1980	127.2	7.71%	148.4	144.7	17.36%	168.8
1981	136.6	7.39%	145.3	163.2	12.79%	173.6
1982	146.7	7.39%	146.7	166.9	2.27%	166.9
1983	157.4	7.29%	151.5	174.7	4.67%	168.1
1984	168.1	6.80%	156.1	183.7	5.15%	170.6
1985	180.3	7.26%	162.1	186.1	1.31%	167.4
1986	192.6	6.82%	168.8	181.0	-2.74%	158.6
1987	205.3	6.59%	174.8	170.0	-6.08%	144.7

	FRC Total R of R Office	% Change	FRC Income R of R Office	% Change	FRC Apprec. R of R Office	% Change
1978	21.24%		9.14%		11.33%	
1979	19.60%	-7.72%	8.20%	-10.28%	10.76%	-5.03%
1980	26.00%	32.65%	7.68%	-6.34%	17.34%	61.15%
1981	20.85%	-19.81%	7.40%	-3.65%	12.76%	-26.41%
1982	9.85%	-52.76%	7.42%	0.27%	2.30%	-81.97%
1983	12.16%	23.45%	7.27%	-2.02%	4.64%	101.74%
1984	12.24%	0.66%	6.82%	-6.19%	5.16%	11.21%
1985	8.68%	-29.08%	7.28%	6.74%	1.33%	-74.22%
1986	3.93%	-54.72%	6.82%	-6.32%	-2.75%	-306.77%
1987	0.23%	-94.15%	6.58%	-3.52%	-6.05%	120.00%