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The Effect of the Tax Reform Act of 1986 and Regional Economies on Apartment Values

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Abstract. **The theoretical effects of the Tax Reform Act of 1986 on commercial real estate have been widely written about; however, little empirical work has been done that actually measures the hypothesized effects. We find that, after controlling for general national economic conditions and regional effects, the effect of the Tax Act of 1986 was negatively related to apartment values. The magnitude of the effect was a function of the local vacancy rates and economic growth where those regions with strong economic growth and low vacancy rates were not affected, while regions with slow economic growth and high vacancy rates were strongly affected.**

Introduction

The effect of the Tax Reform Act of 1986 on commercial real estate values has been the subject of many previous studies—most of which have been theoretical in nature. It is the purpose of this paper to use empirical models to analyze some of the theoretical effects that have been proposed. It is important to understand how changes in tax law can impact the value of commercial multifamily property for two primary reasons. First, if tax law changes either add to or subtract from the value of such property, it is of interest to know if such changes in the value vary by region and local economic conditions. Second, a large number of multifamily commercial mortgages are held in the portfolio of insured depository institutions. If loans are backed by little equity, as many were at the time of the Tax Act of 1986, then a decline in value of only a few percentage points might result in a default and a significant loss to the funding institution. Thus, federally insured depository institutions have a direct interest in changes to tax law that might affect their capital adequacy.

In this paper we ask two primary questions. First, did the Tax Act of 1986 significantly affect apartment values? Second, if there was a significant effect, did the effect vary by region as categorized by economic growth and the degree of overbuilding of apartment real estate in the region?

There has been considerable debate over the past few years as to the overall net effect of the Tax Act of 1986 on commercial real estate as the Tax Act contained many

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provisions, resulting in both positive and negative effects for commercial real estate. The passive loss limitations, elimination of preferential treatment for capital gains, the lengthening of depreciation schedules, the lowering of investment tax credits, and the limitations on the deductibility of interest expense have been seen as negatively related to real estate values. The lowering of individual and corporate tax brackets have been suggested to have both negative and positive effects on commercial real estate values. Ling (1992, 1993), Hendershott, Follain and Ling (1987) (HFL hereafter), Copley and Garris (1989), and Fisher and Lentz (1986) used models and simulation techniques to show the theoretical effects of the Tax Act on real estate values. HFL suggest that the Tax Act did contain provisions that were harmful to commercial real estate but that the net effect of the law may be zero because of the downward pressure on interest rates resulting from the law. The positive effect of the decline in interest rates might totally offset the negative provisions of the law. In a simulation model where saving is independent of interest rates, HFL find "interest rates have to decline by 1.4 percentage points to offset the negative capital provisions of the act" (p. 75).

Using simulation techniques, Copley and Garris find that the Tax Act significantly reduced the expected IRRs of apartment property. "The reason for the reduced IRRs is the lower tax advantage afforded real estate mainly through lower depreciation deductions and the elimination of preferential capital gains. These two effects put downward pressure on rates of return which are not completely offset by lower tax rates and elimination of recapture rules" (pp. 219–20). They find that under the new law the average returns for residential properties decreased more from an increase in interest rates than under the old law. They also find average returns increased more from increases in growth rates and capitalization rates under the new law than the old law. In other words, the average returns are more sensitive to economic factors under the new law.

In contrast to the simulation techniques of Copley and Garris, which looked at changes in capitalization rates, growth rates of NOI, and interest rates, Ling suggests that the effect of the Tax Act should vary by the location of the property. Property located in regions with high economic growth and low vacancy rates should see less effect from any detrimental tax changes than property located in regions with low economic growth and high vacancy rates. His argument for this effect is that in areas with high growth and low vacancies, the property owner can quickly adjust rents to provide the required after-tax rate of return. When tax changes occur that remove tax benefits and hence value, rents can be raised quickly to the new equilibrium level. Where a market is overbuilt and economic growth is low, raising rents to make up for lost benefits would be futile because tenants would move to previously unoccupied property. In such overbuilt markets the speed at which rent levels adjust is a function of how quickly excess space can be filled. This in turn is said to be a function of: 1) obsolescence of a certain percentage of the existing space each year; 2) the degree of overbuilding; and 3) the economic growth in the local area. If growth is stagnant, then rents will adjust upward to equilibrium only as obsolete space is removed from the market. If economic growth is high and vacancy rates are moderate then the combination of the two will remove excess space sooner and rents will rise to equilibrium much more rapidly. The value of an existing property will then be priced below replacement cost as a function of the present value of the difference between the equilibrium rent needed to provide the investor with the required after-tax rate of return and the current and projected rent value prices over the period needed to bring the market back to equilibrium.

Ling has shown, theoretically, that property values should vary with economic conditions. Dokko, Edelstein, Pomer, and Urdang (1991) and Ambrose and Nourse (1993) have shown empirically that property values do vary by location. Their results suggest that any attempt at measuring economic effects on property values for commercial real estate needs to incorporate models that control for regional effects. To date there has not been an empirical test of the Tax Act on apartment property values that controls for regional differences, major macroeconomic variables, and shows the interaction effect of the Tax Act with apartment values by region.

In this paper, we empirically test the overall effect of the Tax Act of 1986 on apartment values and find that the Tax Act did have a significant negative effect on values. Secondly, we show that the interactions of the Tax Act with regions are significant and that the interaction effects follow those suggested by Ling.

Data

Data on apartment property values were obtained from the Russell-NCREIF Property Index. This index is a product from the joint venture between the National Council of Real Estate Investment Fiduciaries (NCREIF) and the Frank Russell Company. For a detailed discussion of the Index, see Diehl (1993) and Mueller (1993). NCREIF provides two measures of return for apartment properties; the first is a measure of return based on net operating income and the second is the appreciation return obtained from the following formula:

$$R_{app}=\frac{(MT_t-MV_{t-1})+PS_t-CI_t}{MV_{t-1}+.5(CI_t-PS_t)-.33I_t},$$

where:

MV_t = market value of the property in quarter t;
MV_{t-1} = market value of the same property in quarter $t-1$;
PS_t = partial sales made of the property in quarter t;
CI_t = capital improvements made to the property in quarter t;
I_t = income in period t.

This formula for calculating the appreciation return for an individual property considers capital improvements, partial sales and current income. In measuring the effect of the Tax Act of 1986 on property values we are primarily interested in changes in the appraisal value for a representative group of apartments in various regions of the country. NCREIF provides apartment appreciation returns for four regions of the country—East, West, South and Midwest.[1] We use these appraisal returns to construct the dependent variable for each region. One limitation related to the study is the small number of properties in the earliest quarters of the study period. For example, in the first quarter of 1982 the number of properties ranged from two in the East to four in the Midwest. By the fourth quarter of 1988, the number of properties ranged from thirteen in the Midwest to twenty-four in the South. As the number of properties increases, the Index should be a better reflection of the true overall returns for a particular region.[2]

A second concern is the constantly changing portfolio of property making up the NCREIF Index. When properties are added or deleted from the index, then if those

properties are significantly different from the existing portfolio of properties, the value of the Index could be affected. One measure seemed to suggest the properties were similar; the average property sizes tended to average around 12 million dollars during the sample period.

The appreciation returns reported by NCREIF are based on appraisals. Theoretically, appraisal values should reflect as closely as possible the true market value of a property at the time of the appraisal. There has been considerable debate over whether these appraisal-based returns are indicative of the true market value. Geltner (1989) finds that there is an upward bias in the holding period rate of return by using appraisal data, but that the holding period return bias is "minor if appraised values in levels are unbiased" (p. 351). Gau and Wang (1990) find that "using appraisal data from a commingled real estate fund, we show that in actual application the size of the holding period return bias can be quite small and this bias may have no appreciable effect on real estate return indexes" (p. 40). Miles, Cole and Guilkey (1990) find that, when comparing appraisal values to estimated values derived from a model using observed transactions, the "appraisals were superior in predicting individual prices" (p. 425) than were the estimates based on their model. In a recent study by Webb (1994), the appraisal values of properties included in the NCREIF Index are compared to the actual transaction prices of the same properties in the following quarter. Assuming that the transaction price was determined in the previous quarter, i.e., the quarter of the reported appraisal, these two values should be directly comparable. Webb finds that appraisal values for all commercial property over the entire period, 1979–1992, are an unbiased estimate of the true value. However, when analyzing the bias in subperiods he finds measurable differences. In the pre-1986 period appraisal values are understated by 7.8% from the transaction price, from the first quarter of 1986 through the third quarter of 1987 they are understated by 2.3%, and from the fourth quarter in 1987 to the fourth quarter of 1990 they are overstated by 3.3%. The bias included in apartment appraisals was not analyzed separately, but if his results for all commercial property are equally valid for apartments, then his results would tend to cause the degree of the negative effect found in our analysis to be understated. At present the issue of the degree of bias in appraisal values remains unresolved. However, at present there are no superior databases using actual transaction prices for large numbers of properties for this period upon which to base a study.

In an attempt at capturing the supply and demand effects for apartments on a national level, we use three proxies for these effects that have been used widely in previous studies to measure changes in real estate values. First, we use the deflated amount of multifamily mortgages outstanding corrected for inflation to obtain comparable values in real terms. Giliberto (1992), Fergus and Goodman (1993), among others, suggest that this variable has both supply and demand effects. During the period of the mid-1980s many investors and institutions were seeking inflation protection and higher returns than were available elsewhere, which resulted in large amounts of capital being invested in apartments—thus a supply effect. Also, different regions of the country were experiencing high growth over this period resulting in increased demand for mortgage capital to fund new apartments—a demand effect.

To measure the general increase in demand for apartments due to economic growth on a national basis we chose to use the four-quarter growth in nonagricultural employment. Employment growth has been suggested as being positively related to commercial real estate values by Corcoran (1987), Anderson and Funderburk (1989), and Bradley (1990).

Finally, we use the number of completed multifamily apartment units as a supply variable. The use of apartment completions is similar to the use of the amount of new construction used by Giliberto (1992) and Bradley (1990) as a variable that is positively related to commercial real estate values. The previous three variables were all obtained on a quarterly basis from the *Federal Reserve Bulletin.*

To capture the effect on apartment values due to each of the four regions, the growth in personal income for each region is used as well as a set of dummy variables representing each region. Personal income growth is highly correlated with growth in employment, growth in domestic product, and growth in retail sales and is therefore an appropriate variable to use as a proxy for the overall regional economy. Personal income growth was obtained from the *Statistical Abstract of the U.S.* To construct these regional variables, on a quarterly basis, personal incomes for each state included in each region were added together to obtain the total regional income. To obtain a measure of how the Tax Act of 1986 interacted with each region, interaction variables were used between the Tax Act dummy variable and each of the regional income and regional dummy variables. To measure the overall impact of the Tax Act on each region we measure the net percentage change of the average values of the predicted index in the subtax period to the average predicted values net of the tax effects in the subtax period.

Study Period

To most effectively determine the effects of the Tax Act of 1986 on apartment values the study period needs to be chosen that best isolates the effects of the Act from the confounding effects of other important regulatory acts. The most significant legislation enacted prior to the Tax Act of 1986, which directly affected commercial real estate, was the Economic Recovery Tax Act of 1981 (ERTA). ERTA was responsible for providing many of the value-enhancing regulations that the Tax Act of 1986 either partially or totally removed. Specifically, ERTA provided for accelerated depreciation, increased investment tax credits for historic properties, and lengthened the operating loss carryover from seven years to fifteen years. In an attempt to remove confounding effects from the prior period of ERTA, we have chosen the first quarter of 1982 to begin the study period.

The period after 1987 contained many changes in regulations and tax law but as can be seen in Exhibit 1, a major change occurred in the real estate market during 1989. In February 1989, the Financial Institutions Recovery, Reform and Enforcement Act (FIRREA) was in the formative stages and became law in August of that year. FIRREA provided for many changes in the regulations regarding capital requirements and portfolio composition for the Savings and Loan industry. Stillman (1992) and Saft (1991), among others, state that FIRREA directly resulted in a decline in capital availability for commercial real estate and negatively impacted the values of existing properties. Therefore, due to the possible confounding influence of the effects of FIRREA on apartment values, we have chosen the closing date for the study to be the fourth quarter of 1988.

In order to determine the effect of the Tax Act of 1986 on apartment values, the study period needs to be determined and the date for the imposition of the dummy variable for the Act needs to be ascertained. The major provisions of the Tax Act were proposed and debated for many months—even years, before the Act became effective on January 1, 1987 and some aspects of the Act were phased in. There is difficulty in determining an

approximate date where the market began to fully reflect the future changes the Act would cause. Sanger, Sirmans and Turnbull (1990) used various dates pertaining to the Tax Act of 1986 to measure the effect on the returns of Real Estate Investment Trusts (REITs) and non-REITs. They found that various dates before the enactment of the Tax Act were significantly negative for REITs but not non-REITs or vice-versa, but there was no single date that stood out as the turning point for the main impact of the Tax Act across all types of investments. They found no significant negative returns for either group surrounding the signing of the Tax Act of 1986 by President Reagan on October 24, 1986. Therefore, we chose the effective date of the Tax Act, January 1, 1987, to define the tax variables. To summarize the study period for the Tax Act of 1986, the period from the first quarter of 1982 through the fourth quarter of 1988 will be used—a total of twenty-eight quarters. The dummy variable for the Tax Act will equal one beginning with the first quarter of 1987.

Hypotheses

The first hypothesis to be tested is the question: Was there a significant effect on the value of apartment property as a result of the Tax Act of 1986? Second, if a significant effect is found, did the effect of the Tax Act of 1986 impact values in economically depressed regions differently than in regions with relatively stronger economic growth?

Model

The method used to test the Tax Act of 1986 is a time-series cross-sectional panel data design using the four regions as the cross-sections. There are seven years of quarterly data for each of the four regions for a total of 112 observations. Since the data is time series in nature, we found that autocorrelation was presented so the Parks method of analysis was chosen (see Parks, 1967). The Parks method allows for heteroscedasticity of the error terms and corrects for one period serial autocorrelation.

The dependent variable is a function of the appreciation return measure provided by NCREIF. This variable is hereafter referred to as the *INDEX* and it is a series of values for each cross-section i for period t computed by taking the product of the appreciation return values for each quarter as follows:

$$INDEX_{i,t} = \prod_{t=1}^{n}(1+ARET_{i,t}),$$

where i = region and t = time.

By using the *INDEX* to measure the change in apartment values we obtain a more comparable measure of the relative changes across time than by using the appreciation return measure.[3]

Using the *INDEX* as the dependent variable, the regression equation to test the hypothesis of whether there was an overall effect of the Tax Act of 1986 on apartment values is:

MODEL (1)
$$INDEX_{i,t} = a + B_1 Mort_t + B_2 Totgro_t + B_3 Const_t + B_4 Tax + B_5 West + B_6 Midwest + B_7 South + B_8 West\text{-}Income + B_9 East\text{-}Income + B_{10} Midwest\text{-}Income + B_{11} South\text{-}Income + e_{i,t},$$

where:

Mort = multifamily mortgages outstanding in quarter *t*;
Totgro = four-quarter growth in nonagricultural employment in quarter *t*;
Const = multifamily unit construction completions in quarter *t*;
Tax = a dummy variable for the Tax Act that is zero for time period 1982–1986 and one from 1987–1988;
West = dummy variable for the West region (1 if West, otherwise=0);
Midwest = dummy variable for the Midwest region (1 if Midwest, otherwise=0);
South = dummy variable for the South region (1 if South, otherwise=0);
West-Income = personal income growth in the West region in quarter *t*;
East-Income = personal income growth in the East region in quarter *t*;
Midwest-Income = personal income growth in the Midwest region in quarter *t*;
South-Income = personal income growth in the South region in quarter *t*.

This model will be used to test the first hypothesis: Did the Tax Act of 1986 have a significant effect on apartment values as measured by the Index? Formally:

$$HO: B_4=0 ,$$

$$HA: B_4\neq 0 .$$

To test the second hypothesis, Did the effect of the Tax Act of 1986 vary by region?, a model using interaction variables is used. This model is as follows:

MODEL (2) $$INDEX_{i,t}=a+B_1Mort_t+B_2Totgro_t+B_3Const_t+B_4Tax+B_5West+B_6Midwest+B_7South+B_8West\text{-}Income+B_9East\text{-}Income+B_{10}Midwest\text{-}Income+B_{11}South\text{-}Income+B_{12}West\text{-}Income*Tax+B_{13}East\text{-}Income*Tax+B_{14}South\text{-}Income*Tax+B_{15}Midwest\text{-}Income*Tax+e_{i,t} ,$$

where Model 2 is similar to Model 1 except for the added interaction variables which are defined as:

*West-Income*Tax* = interaction variable between the West Regional income growth and the Tax Act for quarter *t*;
*East-Income*Tax* = interaction variable between the East regional income growth and the Tax Act for quarter *t*;
*Midwest-Income*Tax* = interaction variable between the Midwest regional income growth and the Tax Act for quarter *t*;
*South-Income*Tax* = interaction variable between the South regional income growth and the Tax Act for quarter *t*;

Formally the second hypothesis can be stated:

$$HO: B_{12}=B_{13}=B_{14}=B_{15}=0 ,$$

HA: at least one of the coefficients—B_{12}, B_{13}, B_{14}, B_{15}—is not zero.

Regional Economic Conditions and Expected Results

The following descriptions of the economic conditions and vacancy rates affecting apartment property values in the four NCREIF regions are obtained from the *Trend Reports* published by the Institute of Real Estate Management (IREM) and the regional economic reviews for the years 1984 through 1988 from the *Journal of Property Management.* The *Trend Reports* provide yearly vacancy data regarding four types of apartment properties for selected metropolitan areas and IREM regions. The four types of apartments covered are: 1) elevator; 2) low-rise apartment complexes with fewer than twenty-five units; 3) low-rise apartment complexes with more than twenty-five units; and 4) garden apartments. The vacancy rates quoted from these reports for the regions and metropolitan areas will be those pertaining to the low-rise apartments with over twenty-five units because the average apartment property in the NCREIF index was valued at 12 million dollars and complexes of that average value would most likely have over twenty-five units.[4] The vacancy figures used to describe the NCREIF regions are based on the vacancy rates reported for the IREM regions which correspond to the NCREIF regions.

The ten IREM regions conform to the NCREIF regions in the following manner. IREM regions 1, 2, and 3 combine to approximate the NCREIF East region except that the East region contains North Carolina, South Carolina and Kentucky from IREM region 4. IREM regions 8, 9 and 10 combine to form the NCREIF West region except for North and South Dakota which are included in the NCREIF Midwest region and New Mexico which is included in the IREM region 4. IREM regions 5 and 7 combine to approximate the NCREIF Midwest region except for North and South Dakota. Finally, IREM regions 4 and 6 combine to approximate the NCREIF South region except for New Mexico which is in the NCREIF West region and Kentucky, South Carolina and North Carolina which are in the NCREIF East region.

The apartment market, like all commercial real estate markets, is a segmented market. Local economic conditions in one metropolitan area can differ drastically from another metropolitan area within the same region. However, national economic conditions regarding capital formation, interest rates, population growth, etc. have a general effect on the entire market. The following analyses for each region do not discuss the national economic scene, but instead describe the economic condition within each region by using growth in regional domestic product, growth in regional population, growth in regional retail sales, and regional unemployment. This data is obtained from the *Statistical Abstract of the U.S.* The predictions made as to the effect of the Tax Act are made from the theoretical effects of economic growth and vacancy rates on property value when value-enhancing benefits are removed by a regulatory act as described by Ling.

In 1985 the East region was experiencing high economic growth. The East had an unemployment rate of 6.2%—the lowest of the four regions—while gross regional product was growing at 7.76% and retail sales were growing at 8.19%. The northeastern states obtained a disproportionate share of government contracts—10% of all federal R&D and 11% of all defense contracts. The tax-shelter provisions from ERTA had given the impetus for large amounts of money to be invested by syndicators in the apartment market. At the same time the Emergency Tenants Protection Act dampened the construction of new apartments. This factor, along with the red tape typical of construction development in the East, resulted in very low vacancy rates as demand was high and supply was inadequate to meet that demand. The supply demand imbalance

resulted in rapidly rising rents and a healthy return to apartment owners. Vacancy rates in the East averaged between 3% and 4% for the year versus a national average of 6%. Boston, in particular, had an extremely low rate of .7%. Charlotte, Philadelphia and Washington, DC similarly all had very low rates of 4.5%, 3.7% and 3.7%, respectively.

In 1986 the economy was still strong with unemployment down to 5.7% and gross regional product growing at 7.9%. Construction of new apartments accelerated due to developers wanting to lock in revenue bond financing for their projects before the new proposed tax legislation was enacted that might remove the tax-exempt status of such financing. Many experts saw that the removal of the tax-exempt status of revenue bonds would result in a decline in new construction of apartments causing existing apartments to rise in value.

Overall, vacancy levels remained very low, averaging around 1.5% in the northeastern states while the area containing Pennsylvania, Maryland and Virginia averaged 6% versus the national average of 6.8%. Therefore, the conditions in the East, at the time of the Tax Act of 1986, were those of high economic growth and low vacancy. The interaction of the Tax Act with these conditions should result in a minimal impact on property values.

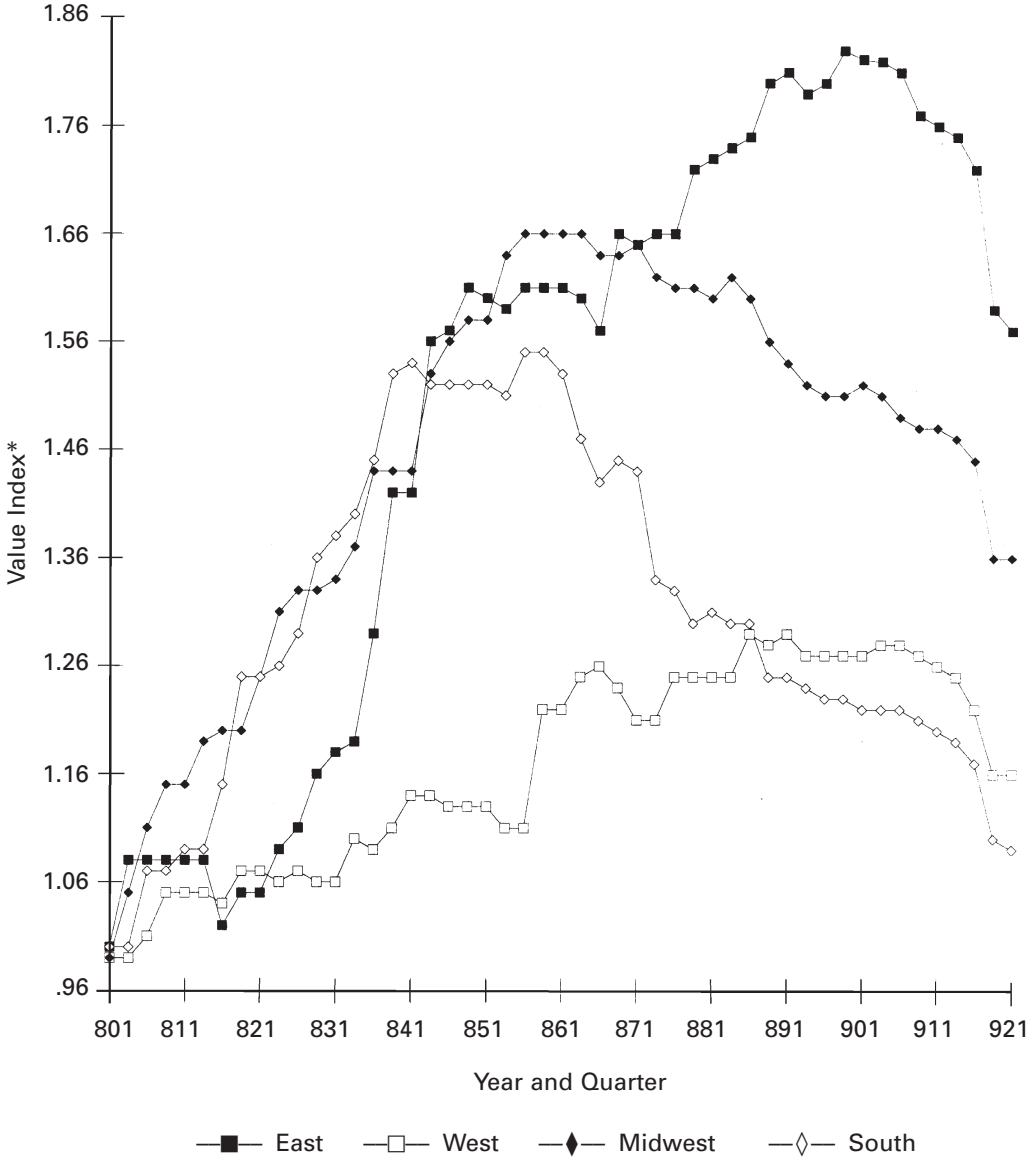
In 1987–1988 economic growth remained strong with declining unemployment and an increase in the growth of the gross regional product of over 9% each year. The demand for housing spurred many new housing construction projects yet simultaneously forced prices to increase. These conditions were good for apartments in the short term as single-family homes became further out of reach for young families and first-time buyers, thus increasing the demand for apartments. The long-term implications were that the housing prices, being out of reach, would slow economic growth as people moved out of the area and firms relocated in less expensive areas. During this two-year period, after the enactment of the Tax Act of 1986, apartment vacancy rates were relatively unchanged. The national vacancy rate rose to 7.8%, but the East retained very low rates of between 3.2% and 5.5%.

The West was experiencing moderate economic growth in 1985. Employment was increasing while unemployment was at 7% and falling. Population was growing faster than all other regions with a growth rate of almost 2% and personal income was growing at 7.5%. Strong development in 1984 resulted in high vacancy rates in some areas of the West where other areas had very low vacancies. For instance, Denver had a vacancy rate of 12.5% while the Los Angeles rate was only 3.4%. Over the entire region vacancy levels averaged about 8.2% in the northwest and 4.4% in California, Arizona and Nevada.

Oil prices caused a decline in economic growth in many areas in 1986. Denver, in particular, was especially hit hard by the oil-induced economic decline and had a severely depressed economy and overbuilt apartment market with vacancies of 13.5%—double the national average. Vacancy levels in the entire West region rose approximately 2% from the 1985 levels with much of this increase attributed to overbuilding. Overall, the West had moderate economic growth in 1986 with the growth rate in gross regional product falling from 7.7% in 1985 to 6.29% in 1986.

Beginning in 1987, the economy improved from the 1985–1986 level and the vacancy rates stabilized at the 1986 levels in most areas of the West. California, with a rate of 6.4%, was still below the national average of 7.8%, but the rest of the West had vacancy levels approaching 10%. Gross regional product growth rebounded to 7.6% for the year, population kept growing at almost 2% annually, and personal income grew at 7.5%. Thus

Exhibit 1
Apartment Values 1980–1992



Source: National Council of Real Estate Investment Fiduciaries
*Index = the compound appreciation return based on the NCREIF appreciation returns for each region; Index = 1 for 1979(4).

the effect of the Tax Act in the West should be mitigated by the new economic growth and vacancy levels either slightly below or slightly higher than the national average.

The Midwest was experiencing moderate to slow economic growth in 1985 with unemployment dropping to just over 8% from 10% in 1983. Gross regional product growth was just over 5.7%, the lowest of the four regions, and population growth was stagnant with a growth rate of only .1%. Personal income growth was also the lowest of the four regions at only 5.3% for the year. The apartment market was somewhat overbuilt in Kansas City which had a vacancy rate of over 9%, but St. Louis had a strong market with a vacancy rate of 3.1%. Over the entire Midwest, vacancy levels were between 4.3% and 7.9% with the average about equal to the national average of 6%.

By 1986 the economy was still healthy, but the apartment market was weakening due to oversupply. Some areas still had healthy markets for apartments and other areas were oversupplied. The apartment market was seen as neither robust nor depressed. Overall, vacancy levels in the region rose less than 1% to remain below the national average of 7.8% that year. As of January 1, 1987, the date the Tax Act became effective, economic growth had slowed but remained positive. This slow growth is shown by the growth in gross regional product for 1986 and 1987 at 5.5% annually. Unemployment had fallen continually since 1983 to stand at 6.67% in 1987, about the same as the West, not as low as the East, but not as high as the South. The conditions regarding vacancy levels and economic growth suggest that the Tax Act would have only moderate effects in the Midwest.

Conditions for apartments in 1987 were relatively unchanged in most areas of the Midwest from 1986. Vacancy levels throughout the region averaged between 5.9% and 7.7% versus a national average of 7.8%. Growth in gross regional product remained at 5.5%, unemployment declined about .6% from 1986, and growth in retail sales weakened somewhat to 3.3% versus 4.4% in 1986.

In 1988, rising agricultural prices helped economic growth and, overall, the growth in gross regional product rose 2% to 7.6% for the year. Unemployment had fallen even further to a rate of 5.7%. Vacancy levels for most of the Midwest rose slightly to average between 6.5% and 8.2% versus a national average of 7.8%. The conditions in the Midwest closely approximated those in the West during the time period the Tax Act took effect, both with moderate vacancy levels and economic growth, so the impact of the Tax Act should be similar in both regions.

The South was experiencing high economic growth and apartment vacancies were moderate in 1985, however, due to high absorption, apartments did well in spite of vacancy levels above the national average. Overall, vacancy rates in the South averaged between 7.8% and 16.4% for the year. The growth in gross regional product for 1985 was 6.2%, higher than the Midwest but lower than the East or West. Personal income grew at a rate of 6.8% and population growth was moderate at 1.59%. Most areas were showing lower unemployment than previous years with an overall rate of 7.5%—down from 9.4% in 1983. There were many new construction projects started for apartments and condominiums. Professionals were concerned that speculation in apartments would result in a future glut and oversupply, adding to the 20% to 25% vacancy rates that existed in many areas of the South.

By 1986, economic growth slowed and the fears of overbuilding were realized. Vacancy rates for the region averaged between 8.8% and 16.7% and many metropolitan areas were severely overbuilt. For instance, Houston's vacancy rate was over 20%. Growth in gross regional product declined to only 2.6% for the year, unemployment increased to over 8%,

and personal income growth declined to 5.2% from 6.8% in 1985. Apartments were overbuilt in almost all areas of the South with high vacancies and low confidence about the future due to low oil and gas prices. High and rising vacancies, coupled with low economic growth, should have caused the Tax Act to strongly affect the South.

The economy in the South continued to be depressed in 1987 with the growth in gross regional product remaining far below the levels of the other regions at 4.3%. Unemployment in the South was significantly higher than the other regions with a rate of over 7.4%. Growth in the gross regional product rose to 4.6% in 1987 from 1986, but remained the lowest of all the regions. Vacancy levels rose significantly in 1987 to average between 9.7% and 19% in the region. Vacancy levels fell somewhat in 1988, but apartment property remained overbuilt long after the Tax Act became effective. Overall, the South had the slowest economic growth of all four regions both before and after the enactment of the Tax Act of 1986. Vacancy levels for almost all metropolitan areas of the South were either slightly above or significantly above the national average.

The overall inference obtained from the IREM regional vice-presidents indicates that the East had, by far, the highest economic growth and the lowest vacancy rates among the four NCREIF regions. Conversely, the South had anemic growth and was the most overbuilt at the time of the enactment of the Tax Act of 1986. The West and Midwest both had similar characteristics of slow economic growth and moderate vacancy rates. These conditions lead to our prediction that the East should be the least affected by the Tax Act while the South would be the most severely affected. The Midwest and the West should be affected, but not as much as the South nor as little as the East.

Empirical Results

Hypothesis 1

The results of the test of Hypothesis 1, for the effect of the Tax Act of 1986 on apartment values, is given in Exhibit 2. The results show that the national economic variables, multifamily mortgages outstanding, four-quarter growth in nonagricultural employment, and apartment completions are all positive and statistically significant. The Tax Act dummy variable is found to be negative and significant at the .05 level. The East regional income variable and the Midwest dummy variable are positive and significant. The regional income variables for the other regions are not statistically significant. The results indicate that overall the Tax Act of 1986 had a *significant* negative impact on apartment values. What is of interest now, however, is whether that negative impact varied by region according to theory.

Hypothesis 2

The results from the test of Hypothesis 2 are given in Exhibit 3. To determine if the Tax Act of 1986 had a significant impact on apartment values and reject the null hypothesis, there needs to be at least one interaction variable found to be statistically significant. The results show that the coefficient of the tax dummy variable is negative but not statistically significant. The effects of the Tax Act are now being captured by the interaction effects, some of which are significant. The interaction between the South personal income growth and the Tax Act is significant and negative. This result reveals that, controlling for the national and regional economic influences on commercial real estate value, the Tax

Exhibit 2
Time-Series Cross-Sectional Regression Results for Testing the Effect of the Tax Act of 1986 on Apartment Property Values Using Model 1 for 1982–1988 (dependent variable = the value index (*INDEX*))

Variable	Parameter Estimate	*t*-value	*p*>ITI
Intercept	−.517	−1.403	.1635
Tax Act Dummy Variable	−.036	−2.136	.0351
Complete	.000184	8.48	.0098
Multifamily Mortgage Total	.000139	2.63	.0001
4-Quarter Growth for Total Nonagricultural Employment	1.152	2.928	.0042
4-Quarter Growth in Personal Income—East	.000004201	4.68	.0001
4-Quarter Growth in Personal Income—West	.000000793	−.95	.3402
4-Quarter Growth in Personal Income—South	−.000000532	−.65	.5169
4-Quarter Growth in Personal Income—Midwest	.000000259	.59	.5543
South Region	.0517	.54	.8566
Midwest Region	.172	2.39	.0183
West Region	.0332	.18	.5860

R-squared = .62; Observations = 112; Cross-sections = 4; Method = Parks; SSE = .708; SST = 1.882

Exhibit 3
Time-Series Cross-Sectional Regression Results for Testing the Effect of the Tax Act of 1986 on Apartment Property Values Using Model 2 for 1982–1988 (dependent variable = the value index (*INDEX*))

Variable	Parameter Estimate	*t*-value	*p*>ITI
Intercept	−.134984	−.4162	.6782
Tax Act Dummy Variable	−.025332	−.8214	.4135
Complete	.000154	3.122254	.0024
Multifamily Mortgage Total	.000165	9.700752	.0001
4-Quarter Growth for Total Nonagricultural Employment	.784346	2.309222	.0231
4-Quarter Growth in Personal Income—East	.000004252	4.530375	.0010
4-Quarter Growth in Personal Icome—West	−.000001021	−1.1091	.2702
4-Quarter Growth in Personal Income—South	.000001431	1.329557	.1868
4-Quarter Growth in Personal Income—Midwest	.000000763	1.684857	.0953
Interaction between East Personal Income Growth and Tax Act	.000000583	1.085329	.2805
Interaction between West Personal Income Growth and Tax Act	−3.09E-08	−.04039	.9679
Interaction between South Personal Income Growth and Tax Act	−.000003476	−3.47292	.0008
Interaction between Midwest Personal Income Growth and Tax Act	−·000000495	−·80396	.4234
South Region	.043425	.505128	.6146
Midwest Region	.177024	2.656096	.0093
West Region	.077906	.848212	.3984

R-squared = .82; Observations = 112; Cross-sections = 4; Method = Parks; SSE = .339; SST = 1.882

Act did have a much different effect in the South region than in the other three regions. To measure the net effect of the Tax Act on apartment values in each region, the sum of the effects on the Tax Act dummy variable and the regional interactions needs to be computed. The net effects and method of computing the net effect for each region is given in Exhibit 4.

To determine the net effect in each region due to the Tax Act of 1986 the sum of the effects of the Tax Act dummy variable and each of the regional interaction variables are added in the following manner. The coefficient of the Tax Act dummy variable is added to the value of the product of the coefficient of the regional interaction variable and the mean value of the regional income growth for the period 1987 to 1988. The sum of these two is divided by the mean value of the predicted index for each specific region, for the period 1987–1988, obtained from the regression results but deleting the tax-related variables. The result of these computations gives a figure that is interpreted as the mean percentage difference between what the index values actually are and what they would have been without the influence of the Tax Act.

Overall, the results show that, as a result of the Tax Act of 1986, apartment values fell by 12.9% in the South. Prices in the Midwest and West fell by 3.57% and 2.3%, respectively, while prices rose in the East by 1.56%; however, the effects in these three regions are not statistically significant.

The results indicate that the Tax Act of 1986 did have a significant impact on apartment values, with apartments being affected the least in the East, followed by the West and Midwest, and finally, a strong significant negative impact in the South. These results agree with the hypothesis that the effect should be stronger in regions where economic growth was poor and vacancy rates high. The previous discussion on economic conditions concluded that the South had the slowest economic growth and the highest vacancy rates of the four regions. Therefore, the empirical results are consistent with the hypothesized theoretical effects.

Exhibit 4
The Overall Effect of the Tax Act of 1986 on Each Region

		East	Midwest	South	West
Tax[1]		−0.253	−.0253	−.0253	−.0253
	+				
Regional Income Tax[2]		.0498	−.0237	−.1369*	−.0016
	=	.0245	−.049	−.1622	−.0269
Divided by[3]		1.57	1.37	1.26	1.17
Net Effect	=	.0156	−.0357	−.1287	−.0230

[1]The coefficient of the Tax Act dummy variable from regression results; [2]The product of the individual regional interaction coefficients with the mean value of the regional income growth for the period 1987–1988. The mean value of the regional income growth for each region during the 1987–1988 period: East, 85,135; Midwest, 47,879; South, 39,387; and West, 51,687. These figures are given in millions of dollars; [3]The mean value of the predicted regional *INDEX* without the influence of the Tax Act of 1986. *INDEX*=1.00 for 1981 (4).
*Coefficient was statistically significant at the .01 level.

Summary and Conclusions

The Tax Act of 1986 was broad-based and made fundamental changes to the tax rules regarding almost all individuals, corporations and areas of investments, particularly real estate. Studies have speculated and theorized about the effects of the Tax Act on real estate values and the interaction of any effect with local economic conditions. This is the first empirical study to test the impact of the Tax Act on apartment values and the interaction of that effect with regional economic conditions.

The overall impact of the Tax Act was negative; however, the impact was not distributed evenly among the regions. The results agree with the predicted interaction effects of the Tax Act. Since the East had the best economic growth and lowest vacancy rates at the time the Tax Act became effective, it should have been affected the least and the results indicate that there was no significant impact in the East. The Midwest and the West were characterized as having lower overall growth rates and higher vacancy rates and, therefore, the finding of a negative impact for the two is not surprising. Finally, the South, having the lowest economic growth and the highest degree of overbuilding of the four regions, should have had the greatest interaction with the Tax Act, which is what we found.

The results from this study should help real estate-related professionals and law makers better understand how tax law changes interact with economic growth and vacancy levels to affect real estate values. Some of the benefits resulting from a more complete understanding of these relationships should be to help real estate professionals make more accurate: 1) forecasts of future rent changes; 2) property appraisals; 3) real estate lending risk assessments; and 4) property tax assessments. This study should also bring about better understanding of savings and loan associations and commercial bank failures that resulted after 1986.

Although this study dealt with a limited number of apartment properties, the methodology used should provide a basis for examining the effect of the 1986 Tax Act and other tax changes on other types of real estate properties. Generalizing these results and the supporting theory will ultimately depend on similar tests of other properties and tax changes.

Notes

[1]The NCREIF data is divided up into four regions—the East, West, South, and Midwest. The *East* region includes Maine, Vermont, New Hampshire, New York, Massachusetts, New Jersey, Delaware, Pennsylvania, West Virginia, Virginia, South Carolina, North Carolina, Kentucky, Maryland, Rhode Island, and Connecticut. The *West* region includes California, Oregon, Washington, Idaho, Nevada, Montana, Wyoming, Utah, Colorado, Arizona, and New Mexico. The *South* region includes Texas, Oklahoma, Arkansas, Louisiana, Mississippi, Tennessee, Alabama, Georgia, and Florida. The *Midwest* region includes North Dakota, South Dakota, Minnesota, Wisconsin, Nebraska, Kansas, Missouri, Iowa, Illinois, Indiana, Ohio, and Michigan.

[2]The NCREIF data reports appreciation returns for apartments in three different ways. First, they report the average return for apartments on a national basis and second they break down the data to obtain returns on a regional basis. NCREIF also reports returns for eight subregions but these returns are not available until the fourth quarter of 1989 and thereafter.

[3]The method of computing an unbiased Index value based on the formula derived by Geltner was tried. The results obtained were not significantly different than those using the uncorrected values. Therefore, we chose to perform the analysis using the uncorrected values provided by NCREIF.

[4]Vacancy data was provided by IREM for elevator and garden, as well as low-rise, apartments. We chose to use the vacancy rates for the low-rise +25 group of apartments due to the limited number of cities included in the elevator group. We analyzed the correlation between vacancy rates for the low-rise +25 group and garden apartments and found a correlation of .82 for the period 1985–1988. Therefore we felt that rather than report both sets of vacancy rates, the vacancy rates on the low-rise +25 group adequately represented the group of apartments categorized as over $25 million.

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