# INFORMATION TO USERS

# The effects of the Tax Reform Act of 1986 on the real estate capital markets and its differential effects on entity and functional forms: An empirical investigation

Hume, Evelyn C., Ph.D.

The Louisiana State University and Agricultural and Mechanical Col., 1988

THE EFFECTS OF THE TAX REFORM ACT OF 1986 ON THE REAL ESTATE
CAPITAL MARKETS AND ITS DIFFERENTIAL EFFECTS ON ENTITY
AND FUNCTIONAL FORMS: AN EMPIRICAL INVESTIGATION


A Dissertation


Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy


in

The Department of Accounting


by
Evelyn C. Hume

B.A., University of West Florida, 1984
M.A.I.S., University of West Florida, 1983
December 1988

## ACKNOWLEDGEMENTS

I wish to express my gratitude to the members of my dissertation committee, Anthony P. Curatola, Brian L. Langemeier, Margaret L. Shelton, Gary C. Sanger, and Robert J. Newman. Their suggestions and assistance were invaluable to me in conducting this research and writing this manuscript. A special debt of gratitude is owed to the Chairman of my committee, Kenneth N. Orbach, whose encouragement, guidance, and support inspired me throughout this project.

I wish to thank the Richard D. Irwin Foundation for partial financial support of this research.

Special recognition is extended to by husband, Clair, without whom this project would not have been possible. I am humbly grateful for his understanding, patience, and encouragement throughout the duration of this work. It is to him that I dedicate this dissertation.

TABLE OF CONTENTS

# LIST OF TABLES

# LIST OF FIGURES

ABSTRACT

Differences of opinion exist in the literature regarding the relationship between changes in tax policy and changes in the value of firms' capital stock. The purpose of this study was twofold. One aim was to determine whether the real estate capital markets react to public information regarding proposed or actual changes in tax law. The second and primary objective was to test the traditional economic theory that a direct relationship exists between changes in tax law and the value of the firm. Changes in cost recovery rules for real property and in corporate tax rates were the tax provisions of interest in this research project.

The study was conducted using stock return data for real estate firms over the years 1981-1987. The test periods were those months when new information regarding proposed and actual tax reform provisions were publicly announced. Regular corporations, real estate investment trusts, and master limited partnerships were the organizational forms included in the sample. The firms were also classified as to their functional form, either as building and development firms, property investment firms, mortgage investment firms, or hybrid investment

firms. Based on their organizational and functional forms, the firms were grouped into certain portfolios.

An intervention time series model was used to determine whether the portfolios earned excess returns during the test periods. In order to examine whether the real estate markets react to the new tax law information, ordinary least squares regression techniques were employed, and two-step full transformation procedures were carried out to correct for occurrences of autoregressivity. Generalized least squares regression techniques were used for testing the economic theory regarding the relationship between tax policy and the value of the firm.

The results indicate that the real estate markets do react to announcements concerning changes in tax policy. However, only minimal support was found for the economic theory of interest in this study.

# CHAPTER 1

## INTRODUCTION AND OVERVIEW

In 1986, Congress legislated sweeping changes of the tax law for individuals and businesses. One of the ostensible objectives of the Tax Reform Act of 1986 (TRA '86)[1] is to encourage business and personal decision-making based on sound economic choices rather than on tax results. Many provisions of TRA '86 are directed toward this end.[2] A number of tax preferences have been eliminated from the tax code and others restricted. Some of the legislative changes have broad-reaching implications while others are industry or entity specific. Real estate is expected to be particularly affected by TRA '86 and is the industry of interest in this study.

---

[1]Unless otherwise stated, TRA '86 and Act refer to the Tax Reform Act of 1986, Public Law 99-514, October 1986. The term "Code" and statutory provisions refer to the Internal Revenue Code of 1986.

[2]See e.g., P.L. 99-514, Sec. 211, eliminating the regular investment tax credit which discriminates against long-lived investments; Sec. 401 - 405, eliminating tax incentives that led to excessive investments in agricultural tax shelters by non-farmers; and Sec. 501, limiting the use of losses and credits from passive activities.

Contrary to a number of federal tax acts in the past, TRA '86 was intended neither to stimulate investment in the economy nor to rein inflation. Although some economists (e.g., Weidenbaum (1986)) believe that TRA '86 will result in a considerable down-turn in new investments and a consequent economic decline, the actual micro- and macro-economic impact of the new tax law is not yet known. Unfortunately, the various models that have been used to predict the effects of tax legislative changes do not yield consistent results.

This research uses stock market data to test theorized effects of TRA '86 on the real estate capital markets. Of further interest in this study is the differential impact the tax legislation has had on the various entity forms and functional forms of real estate activities due to the differences in tax law changes across these groups.

This chapter provides a comprehensive overview of the study. First, contributions of the research are considered. Second, certain TRA '86 provisions related to the taxation of real estate activities are summarized. Third, the theoretical underpinnings of the study are examined. Fourth, the research questions are addressed, followed by a summary of the research methods to be used in answering the research questions. Limitations and implicit assumptions of the study are then discussed. The

final section of the chapter discusses the relationship between tax law and accounting data.

## Significance of Study

Uncertainty regarding the economic effects of tax legislation has plagued investors, managers, economists, and other decision makers. Theoretical models that attempt to specify the nature, direction, and magnitude of the impact of new tax legislation are often at odds with each other. Empirical verification of tax change effects is useful for determining the validity of particular economic models and for gaining new insight into market reactions to such changes. Moreover, an examination of the differential impact on various entity and functional forms of businesses will provide information for evaluating tax legislation which is directed toward a particular business entity or function.

## Taxation of Real Estate

Real Estate Classifications. In order to consider the relationship between certain provisions of TRA '86 and the real estate industry, it is necessary to differentiate and classify the various entity forms and functional activity forms under which the industry operates. The term "entity form" relates to the organizational structure of the firm; the term "functional activity form" relates to the nature of real estate

activity in which the firm engages. This discussion focuses only on the entity and functional activity forms used in this study. These are summarized in Table 1.1.

TABLE 1.1

Real Estate Firm Classifications

1. Corporations

    a. Equity Investors

    b. Mortgage Investors

    c. Builders/Developers

2. Non-corporation (REITs & MLPs)

    a. Equity Investors

    b. Mortgage Investors

    c. Hybrid Investors

Entities engaged in real estate activities may be organized as corporations, real estate investment trusts (REITs), partnerships, or sole proprietorships. Earnings of regular corporations are taxed at the entity level, and earnings distributed to shareholders are again subject to taxation at the shareholder level. (Earnings of S corporations pass through to the shareholders and generally are taxed only at the shareholder level.) REITs generally are not taxed on earnings distributed to shareholders, and those earnings are subject to taxation only to the shareholders. However, losses are retained by

the REIT to be used to offset subsequent earnings. Partnerships are not taxed on their earnings but both earnings and losses of a partnership generally pass through to the partners. The individual partners are subject to taxation on the partnership income. Sole proprietors are, of course, taxed as individuals on their earnings. Because of data availability limitations, S corporations and sole proprietors are not considered in this study. For the same reason, only a limited number of parterships are included in the research.

The tax law also may affect real estate firms differently depending on the functional type of activity in which they are engaged. Functional activity classifications include equity investors, mortgage investors, hybrid investors, and builders/developers. Equity investors generally hold real property for the production of rental income. Mortgage investors own mortgages secured by real estate, and hybrid investors hold both income-producing property and real estate mortgages. Builders/developers generally own real property for resale. Certain provisions of the tax law may not have the same effect on these various real estate functional activities.

Changes in Real Estate Taxation Under TRA '86. A number of provisions of TRA '86 relate directly to the real estate industry, and others impact the industry

through their application to particular entity forms that deal primarily with real estate or to earnings derived from real estate activities. Provisions of TRA '86 that relate directly or indirectly to real estate include depreciation of structures, production period interest, passive activity rules[3], corporate and individual tax rates, and REIT provisions. Each of these is reviewed briefly here, and those changes specifically related to this study are discussed in greater detail in Chapter 3.

One major provision of TRA '86 is the change in depreciation rules for structures. The method required for recovering the cost of buildings placed into service after 1986 is the straight line method applied generally over 27.5 or 31.5 years depending on the class of real property (sec. 168(c)). In contrast, buildings placed into service after 1980 but before 1987 generally are depreciated using 175 percent declining balance over a period of 15, 18, or 19 years, depending on the year in which the asset was placed into service. Various accelerated depreciation methods may be used for structures placed into service before 1981 depending on the building's classification and the year in which it was placed into service (sec. 167(j) and reg. secs. 1.167(j)-1

---

[3] In general, a passive activity is any trade or business in which the taxpayer does not materially participate, any rental activity, and any limited partnership interest (sec. 469(a)).

et seq.). Consequently, the depreciation rules of TRA '86 allow a much slower write-off of newly acquired or constructed structures than for real estate placed into service prior to 1987. This provision relates primarily to real estate firms that derive earnings from owning rental property.

TRA '86 also repeals the provision that interest costs and property taxes incurred during construction of commercial and residential structures may be amortized over a period shorter than the depreciable life of the asset. Pursuant to section 263A, taxpayers who self-construct depreciable real property for use in a trade or business, or in an activity for profit, now generally must capitalize amounts paid for interest and property taxes during the period of construction and depreciate the cost over the applicable recovery period for the related building. Prior to 1986, taxpayers were required to amortize these costs over a period of 10 years. Thus, the recovery period for such costs has been lengthened from 10 years to 27.5 or 31.5 years.

A third provision directed toward the real estate industry is the classification of rental activities as passive activities (sec. 469(c)(2)). The significance of this provision is that under section 469 taxpayers generally may not use net passive losses to offset income from other sources. Unused passive activity losses may be

carried forward, however, and used in subsequent years to offset passive income. The use of passive losses to offset income from other sources had been a major element of certain real estate tax shelter investments.

A major provision of TRA '86 relating to corporations is the new corporate tax rate schedule. Prior to TRA '86, the top marginal corporate rate was 46 percent. By contrast, the top marginal tax rate effective July 1, 1987 is 34 percent (sec. 11(b)). This reduction in tax rates translates into a 26 percent decrease in the top marginal corporate tax rate.[4]

REITs also were targeted by TRA '86. REITs are entities that receive most of their earnings from owning either income producing real property or real estate mortgages. Certain requirements must be met for the distributed earnings of REITs to be exempt from taxation at the entity level. The requirements relate to the organizational structure, the source of income, the nature of the assets, and distribution of income. TRA '86 relaxed a number of these requirements to allow REITs greater flexibility in conducting their business (secs. 856, 857, 859, and 4981).

---

[4] The top stated marginal tax bracket for individuals was reduced from 50 percent to 28 percent (sec. 1).

Theoretical Issues

The effective rate at which capital is taxed and the
timing of deductions are theorized to have a significant
impact on the investment behavior at the entity level
(Hall and Jorgenson 1967). However, disagreement exists
concerning the effects of investment incentives or
disincentives on the value of a firm's capital stock. Two
opposing theories are of interest. The traditional
theory, viz., the theory more commonly accepted by tax
policy makers, posits an increase in the market value of
the firm in response to investment incentives. An
opposing theory presented by Feldstein (1981) and Auerbach
and Kotlikoff (1983), which will be referred to in this
study as the F-A-K theory, holds that the firm's market
value decreases when investment incentives are present.
Each theory is considered separately; then a discussion of
Lyon's model, which partially reconciles the two theories,
is presented.

The F-A-K Theory. The F-A-K theory holds that tax
legislation that affects newly-acquired capital
differently from old capital alters the relative market
values of the two types of capital. For example, when
depreciation methods for tax purposes are changed, the new
rules generally apply only to assets acquired subsequent
to the effective date of the new legislation and not to
existing assets. The F-A-K theory proposes that faster

write-off of new assets lowers the firm's net cost of purchasing such assets. Consequently, in a competitive market the value of existing assets is driven down and the market value of the firm reduced. As long as the supply curve for new assets has a positive slope, this theory may be applied in a symmetrical manner to changes in tax policy that increase the cost of purchasing or owning new assets.

A number of authors have criticized the F-A-K theory. Boadway and Wildasin (1984, p. 405) note that comparative static analysis, such as that put forth by the F-A-K theory, is not very useful for examining the process of movement from one steady state equilibrium to another because it gives no recognition to adjustment costs in its assessment of the relationship between tax policy and capital investments. A number of authors, including Eisner and Strotz (1963), Lucus (1967), and Mussa (1977), believe that the costs of adjusting to new levels of capital prevent the immediate adjustment in the value of existing capital. By omitting cost adjustment and time lag factors, the F-A-K theory ignores windfall profits or losses to holders of existing capital when tax policy changes. Chamley (1985) emphasizes that the entire path of future decisions should be considered when examining changes in tax policy.

The Traditional Theory. The traditional theory holds that investment incentives, such as accelerated depreciation, tax credits, and reduced tax rates for business, increase the value of the firm and the value of its common stock. The model explaining the relationship between changes in tax policy and the market value of the firm is predicated on the assumption that the firm attempts to maximize profit. Firms will continue to increase their investments in capital assets until the cost of the investments is equal to the net present value of future after-tax cash flows resulting from those investments. According to analyses conducted by Hall and Jorgenson (1967, 1971) and Abel (1982), changes in tax laws that provide investment incentives in the form of rapid depreciation, investment tax credits, or lower tax rates reduce the firm's cost of investments and increase the overall profitability of the firm by lowering the after-tax cost of capital assets. Since the market value of a firm's capital stock is a function of the market's expectations regarding future earnings of the firm, the value of the firm's equity shares increases.

Since investors value the equity of a firm based on expectations of earnings attributable to both existing assets and all predicted future investments, tax policy changes regarding investment incentives result in corresponding adjustments of investors' expectations.

Under the traditional theory, when investment incentives are removed from the tax law, investors will make a downward adjustment in their expectation of the firm's future investment plans and future profitability. Consequently, a downward adjustment in the market value of the firm's capital stock would likewise occur.

## Lyon's Model

Lyon (1986) notes that market competition, a driving force in the F-A-K theory, is absent from the classical theory. The mechanism in the F-A-K theory that allows increased (decreased) investments by some firms to decrease (increase) the profit of other firms is not allowed to operate in the traditional model analysis. Lyon expanded the traditional theory, which recognizes cost adjustment and time lag, to include the forces of market competition. Lyon's model can be useful in analyzing the impact of certain TRA '86 changes on the real estate capital markets: slower rate of cost recovery for newly-acquired real estate and lower tax rates for corporations.

## Research Questions

This study investigates empirically the differential impact of TRA '86 on the various functional forms and entity forms of real estate organizations. Although many provisions of TRA '86 discussed in this chapter are

expected to have some effect on the industry, the tax law changes of greatest interest to this research are those involving (1) depreciation requirements, and (2) the corporate tax rate changes. The manner in which TRA '86 affects real estate is investigated by examining these two interrelated issues. More specifically, this study will attempt to answer the following primary question:

> Are the real estate capital markets' responses to changes in the tax law consistent with those predicted by the traditional theory?

In order to answer the general question, three specific questions are proposed.

(1) Do the real estate capital markets react to publicly-available information concerning proposed or actual changes in the tax law?

(2) Does a change to straight line depreciation and longer recovery periods for real property result in an overall decrease in the market value of firms engaged in holding income-producing property relative to those engaged in other real estate activities?

(3) Does a decrease in corporate tax rates result in an increase in the market value of real estate corporations relative to other real estate entities, such as REITs and MLPs, that generally are not taxed at the entity level?

## Methodological Issues

Stock market data is used to examine the effect that announcements regarding tax law changes have had on share

prices. Stock prices have been determined to be an unbiased estimator of the value of the firm's future cash flows (Fama 1976). According to the efficient market / rational expectation hypothesis (Dyckman and Morse 1986, p. 5), all available information is incorporated instantaneously into the price of market securities. The equilibrium price in the market is that price which equates the supply of a firm's equity securities with their demand, and is set by a consensus of traders in the capital markets.

Under the semi-strong form of market efficiency, the consensus which sets the price of equity shares is based on all relevant public information. When new information becomes available to the public, it immediately is incorporated into the new price of the equity shares. Thus, by determining the magnitude and direction of changes in share prices around the announcement dates concerning TRA '86, the effects of the Act on the real estate capital markets can be examined.

Time Period and Data. The test periods for this study are those months when significant new information regarding TRA '86 reached the market. From August, 1982 when the Bradley-Gephardt tax overhaul plan was introduced until TRA '86 was signed into law in October, 1986, and thereafter, several important announcements concerning TRA '86 were made public. Data over the period from

January 1, 1981 through December 31, 1987 will be analyzed. January 1, 1981 was selected as the beginning of the data time period because it represents the beginning of a reasonably stable period of time relative to tax legislation affecting real estate. Using data from January, 1981 forward allows the regression relation between overall market returns and returns in the real estate capital markets to be established for the time series before the occurrence of the announcements regarding TRA '86.

Monthly returns, computed by compounding daily returns, are used for analysis. To determine when information became publicly available, a search of The Wall Street Journal was conducted for announcements concerning the Act.

Sample Selection. The sample of firms used in this study were chosen from the population of publicly-traded entities engaged in real estate activities. The firm sample is made up of regular corporations and non-corporation firms, specifically REITs and master limited partnerships (MLPs). Only entities meeting the following requirements are included in the sample:

1. The firm must be listed on the American or New York stock exchange.

2. The firm must have at least 12 consecutive monthly returns during the sample period.

3.   The firm must have tax status continuity during
     its 12-month period of consecutive returns.

4.   The firm must have data available in the Center
     for Research in Security Prices (CRSP) daily
     stock return files.

The tax status of the sample entities will be verified for
each year of inclusion through Moody's.   The purpose of
the tax continuity requirement is to prevent possible
contamination of the results by effects of tax status
changes on the market value of firm equity.

The firms meeting the requirements for inclusion in
the sample will be grouped into portfolios, the
composition of which will vary depending on the research
question to be addressed.   Entity and functional activity
classifications as shown in Table 1.1 are used for
portfolio grouping.    Real estate activity
classifications, as designated by the Realty Stock Review
and SIC codes, were used to facilitate grouping sample
firms into functional classifications.   Firms which cannot
be clearly classified because of diversification or lack
of information availability will be eliminated from the
sample.

The Model.  The statistical model to be used in this
study is an expanded market model.   The market model
(Sharpe 1964, and Lintner 1965) posits that capital
assets will be priced by the market such that

(1.1)  $$E(r_i) = r_f + \beta_i[E(r_m) - r_f]$$

where:

>   $r_i$ = the return to security i
>
>   $r_f$ = the risk-free rate of return
>
>   $r_m$ = the market return
>
>   $\beta_i$ = cov$(r_i,r_m)$/var$(r_m)$, described as the systematic risk of security i
>
>   E  = expectation operator.

Expected return includes expectations about both dividends and capital gains. The model assumes that when the market is in equilibrium, the risk-adjusted rate of return is equal for all securities. However, in the event of some intervention in the return-generating process, abnormal returns may result for certain securities. This study adds dummy variables to the market model and uses ordinary least squares and seemingly unrelated regression techniques in order to examine the effect of interventions in the real estate capital markets.

Following the methodology suggested by Schwert (1981) and Larcker, Gordon, and Pinches (1980), and subsequently used by Chen and Sanger (1984), Binder (1985), Lyon (1986), and Sanger (1986, 1987), this study employs the technique of intervention analysis to examine the markets' reactions to information leading to the enactment of TRA '86. Intervention analysis is a regression technique using dummy variables representing

"some specified set of interventions that may change the nature or level of the return from the time series . . ." (Schwert, p. 272). Its use is appropriate when some economic event, such as a change in tax law, is believed to cause a change in the return-generating process of securities. Larcker, Gordon, and Pinches (1980) suggest that intervention analysis is preferable to cumulative average residual methodology for analyzing stock market reactions to financial announcements because it allows for changes in the measure of systematic risk of the sample firms.

Two different intervention dummy variables are added to the market model for this study. Shift dummy variables, $D_S$, are added to the model to specify a permanent change in $\alpha$ and/or $\beta$, and a switching regression technique is employed for identifying the point at which such change occurred. The purpose of identifying a shift in the regression relation is to avoid model misspecification and to obtain a better fit of the regression line. An information dummy variable, $D_{Ikt}$, is added for specifying months in the time series in which interventions may have occurred. The coefficient of the information dummy variable, $\delta_{pk}$, captures the abnormal returns in those months when information about TRA '86 became publicly available.

In the presence of announcements concerning impending changes in the tax law that may affect real estate portfolio returns, the market model corresponding to Equation 1.1 may be respecified as

$$(1.2) \qquad R_{pt} = \alpha_p + \alpha_p' D_s + \beta_p R_{mt} + \beta_p' D_s R_{mt}$$

$$+ \sum_{k=1}^{K} \delta_{pk} D_{Ikt} + e_{pt}$$

where:

$R_{pt}$ = the stochastic return on portfolio p in time period t

$R_{mt}$ = the stochastic return on the value weighted index of NYSE and AMEX stocks in time period t

$\alpha_p$ = the regression constant or intercept of portfolio p before the intervention

$\alpha_p'$ = the shift in the regression intercept of portfolio p due to the intervention

$\beta_p$ = the systematic risk coefficient of portfolio p before the intervention

$\beta_p'$ = the shift in the systematic risk coefficient of portfolio p due to the intervention

$D_s$ = shift dummy variable = $\begin{cases} 0 & \text{before the shift} \\ 1 & \text{after the shift} \end{cases}$

$D_{Ikt}$ = information dummy variable = $\begin{cases} 1 & \text{in infor-} \\ & \text{mation} \\ & \text{month k,} \\ & \text{but only} \\ & \text{if } t = k \\ 0 & \text{otherwise} \end{cases}$

$\delta_{pk}$ = coefficient of information dummy variable $D_{Ikt}$ for portfolio p

K   = number of months in which information concerning TRA '86 is publicly announced, where k ranges over those months, and only those months, during which such information is publicly announced.

$e_{pt}$ = the stochastic error term for portfolio p at time t.

Switching Regression Techniques.  Proposed tax legislation may result in a fundamental change in the return generating process over the sample period for real estate firms.   To estimate the coefficients of the intervention Equation 1.2, it is necessary to determine whether such a change occurred in the model parameters, and if so, to identify the point in the time series of returns at which the shift occurred.   For example, assuming no fundamental change in the time series returns, the regression line would remain unchanged as shown in Figure 1.1(a).  However, if some event, e.g., a change in tax law, were to cause a shift in the model parameters, the slope and/or the intercept of the regression line would not be constant over the entire time series.   Figure 1.1(b) shows an example where a shift occurs at point $t^{*}$.  By identifying the shift date and fitting a regression line having two different slopes and/or intercepts, the model is specified more accurately and a better fit is obtained.

Since it is not known a priori whether such a

Figure 1.1

Shifting Regression

(a) No change in time series        (b) Change in time series
    returns at time t*                   returns at time t*
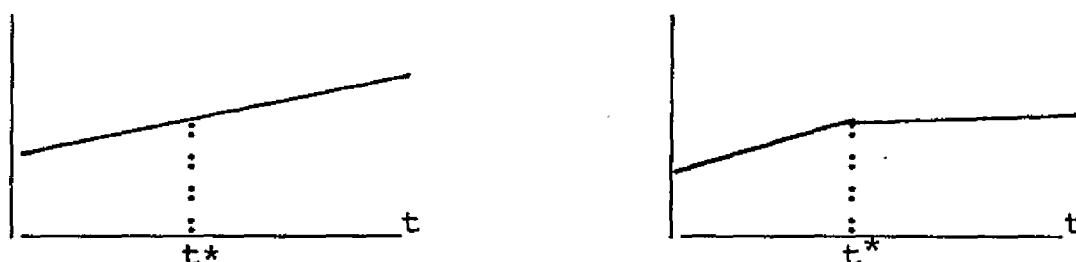


switch occurred, a switching regression technique will be used to determine if the regression equation switches from one regime to another. Moreover, if a switch occurs, the date (or month) of the switch must be identified. Quandt (1958, 1960) suggests that the shift in the regime can be identified through the use of maximum likelihood techniques whereby the time-frame is divided into two periods. One time period represents pre-shift (or pre-intervention); the other period represents post-shift (or post-intervention). Separate regression coefficients are estimated for each time period. This technique allows the intervention point to vary so that the "best" fit nonstationary ("kinked") regression line is found.

Switching regression techniques have been used in market studies by Sanger and Chen (1984), Sanger (1986),

and Lyon (1986). These researchers found that the regression equation did in fact switch from one regime to another during the sample period.

Abnormal Returns. An information dummy variable, $D_{Ikt}$, is included in the model to represent each month in which information regarding proposed tax law changes was publicly announced. For each month, k, in which the announcements reached the public, the dummy variable $D_{Ikk}$ in Equation 1.2, representing such month, takes on a value equal to one. For $t \neq k$, its value is zero. The purpose of $\delta_{pk}$ is to capture that part of the portfolio returns that is unique to information months and not explained by other terms in the model. Thus, $\delta_{pk}$ is a measure of the abnormal return on portfolio p in information month k.

Seemingly Unrelated Regression. The parameters of the model will be estimated by the use of regression. However, one of the assumptions of ordinary least squares regression is independent error terms. When all firms in the sample are from the same industry, the estimated coefficients may not be independent across firms. King (1966) identified positive contemporaneous cross-correlation among returns of securities within the same industry. If the residuals $e_{pt}$ in the intervention Equation 1.2 are not independent, the assumption of independence for ordinary least squares regression is violated. The seemingly unrelated regression (SUR) model,

a generalized least squares regression technique, controls for cross-correlation by allowing for joint estimation of all firms (Theil 1971, p. 298-99). Since the number of observations in the time series used to estimate the regression equation must be greater than the number of coefficients, the firms in this study are grouped into portfolios.

Theil (1971, pp. 309-310) shows that joint estimates of the coefficients in the seemingly unrelated regression model yield the same values of the coefficients as do the ordinary least squares estimates. The advantage of SUR, however, is that the use of the full estimated covariance matrix from the joint regression for hypothesis testing corrects for contemporaneous cross-correlation among portfolios. Thus, SUR permits tests of hypotheses concerning portfolios of real estate firms, while recognizing the lack of independence across portfolios; the efficiency of the estimates is thereby improved.

SUR techniques are used in this study for estimating Equation 1.2. Dummy variables in the model are used to capture the results of interventions in the return-generating process. In order to answer the research questions, tests on the information dummy variable coefficients will be conducted.

## Hypotheses

The traditional theory suggests that the market reacts to those changes in the tax law that encourage investment, increase deductions, or decrease the tax liability by making an upward adjustment in the value of the firm. Conversely, changes that provide investment disincentives, decrease deductions, or increase the tax liability cause a decrease in the value of the firm. Assuming market efficiency in the semi-strong form, any market adjustment would occur very quickly following public announcements regarding impending tax law changes. The following null hypotheses are presented for testing the real estate capital markets' reactions to announcements regarding TRA '86 and for determining whether the market behavior is consistent with the traditional theory.

HO1:   No significant abnormal returns were earned by any of the portfolios in any information month.

HO2:   No significant difference exists between abnormal returns of the non-equity portfolio and those of the equity portfolio for any information month.

HO3:   No significant difference exists between abnormal returns of the corporation portfolio and those of the non-corporation portfolio for any information month.

The first hypothesis attempts to test whether the real estate markets do in fact react to information

concerning tax policy changes. Hypothesis (2) is designed to test the markets' reactions to the change in depreciation rules. The traditional theory would predict that the market would revise its expectation regarding new investments and growth in those firms that are impacted by the slower write-off of real estate. Consequently, over the test period, the negative abnormal returns of the equity portfolio would have a higher absolute value than those of the non-equity portfolio. The issue of the change in corporate tax rates is addressed by hypothesis (3). The traditional theory predicts that the reduction in corporate tax rates would result in greater positive abnormal returns for the corporation portfolio than for the non-corporation portfolio. The purpose of the information coefficients, $\delta_{pk}$, in intervention Equation 1.2 is to capture the abnormal returns resulting at each market adjustment point. Therefore, tests of the coefficients, $\delta_{pk}$, have been conducted with various portfolio compositions. The composition of the portfolios depends on the nature of the hypothesis under consideration. Rejection of any null hypothesis would indicate that the real estate markets made adjustments as a result of the tax law information. If the difference between the estimated abnormal returns of the portfolios is significant and of the predicted sign, the evidence would suggest that the behavior of the real estate capital

markets is consistent with that predicted by the traditional theory with respect to the tax policy change in question. Any significant difference between portfolio returns not having the sign predicted by the traditional theory provides support for the F-A-K theory.

## Assumptions and Limitations

This study is premised on two theoretical economic assumptions. One assumption is that the market operates efficiently. The second assumption is that the market moves toward a new equilibrium following an event which creates disequilibrium in the economy. To the extent that these assumptions are not valid, the conclusions to be drawn from this study may be limited.

Another assumption made in the study relates to the degree of efficiency with which the market responds to new information. Abnormal returns resulting from each market adjustment are assumed to occur within the month of the information announcement. To the extent that the market reacts more slowly, the results may be biased.

The sample firms for this research are from the population of publicly-traded real estate firms. Therefore, findings and conclusions of this study may not be generalizable to other firms in the real estate industry. Moreover, the results of this study cannot be extended to other industries.

## Relationship Between Accounting Data and Tax Law

Changes in the tax law often impact the income statement, the balance sheet, and the statement of cash flows. The revenue inflows received by a firm are allocated among the factors of income production. These factors include labor, materials, interest, and taxes. The portion not otherwise allocated is the net income of the firm and represents return on equity. Tax legislation that alters statutory tax rates generally causes a change in the effective tax rate applied to the income of the firm and changes the firm's after-tax net income as shown on the income statement. Since the net income of the firm flows through to the equity section of the balance sheet and the sources of funds on the statement of cash flows, these financial statements also are affected by changes in tax rates.

Changes in the tax law regarding the rate at which fixed assets are depreciated also impact on the financial statements. The differences between accounting depreciation and tax depreciation create deferred tax liabilities which are reflected in the balance sheet. To the extent that the payment of income taxes is deferred until a later period, a greater amount of funds is available to the firm as working capital. The cash flow statement reports this deferment as a source of funds.

## Summary

This chapter provides an overview of the entire dissertation. It discusses the need for the study, relevant provisions of TRA '86, theoretical issues to be considered, the research questions to be addressed, research methods to be used, and limitations and assumption of the study. A detailed discussion of each of the above topics is contained in the chapters that follow. Chapter 2 addresses theoretical and economic issues relating to taxation and capital markets. Chapter 3 describes provisions of the TRA '86 relevant to this research that pertain directly or indirectly to real estate earnings. Chapter 4 presents the methodology to be used in the study, and Chapter 5 the results. The final chapter of this dissertation reports some conclusions derived from the findings of the study, discusses the limitations of the research, and suggests possible future research in areas related to this investigation.

CHAPTER 2

LITERATURE REVIEW

A survey of the literature reveals several studies concerning the relationship between tax policy and capital markets. Relevant studies are presented in this chapter in three sections. First, a review of those studies concerned with economic theory and simulation of the impact of tax policy on capital markets is presented. Second, those studies that attempt to provide empirical evidence of the relationship between the capital markets and changes in tax policy are discussed. The final section in this chapter summarizes and analyzes the results of the studies in each of the above sections.

Theoretical and Simulation Studies

Within the framework of the neoclassical theory of optimal capital accumulation, Hall and Jorgenson (1967) studied the relationship between tax policy and investment expenditures in a partial equilibrium analysis. The neoclassical theory of optimal capital accumulation holds that the firms's objective is to maximize profits. Profits are defined as gross revenues less the cost of current inputs and the rental cost of capital inputs.

The rental cost of capital is determined from the condition of market equilibrium whereby the value of an asset is equal to the sum of the discounted values of all capital services from the asset. To obtain optimum returns, the value of the marginal product of capital should be just equal to the rental cost of capital. Therefore, profit-maximizing firms will hold a level of capital stock which equates marginal product with the rental cost of capital.

In the Hall-Jorgenson model, the level of desired capital is a function of the value of the output, the rental cost of capital inputs, and the elasticity of output with respect to capital input. The tax rules of interest in the study relate to the rate of cost recovery of capital assets and the amount of investment tax credit allowed on the purchase of assets. Changes in tax policy that alter either or both of these items ostensibly change the rental cost of capital assets. Consequently, the desired level of capital stock and the value of the firm change.

Hall and Jorgenson conducted a simulation analysis to estimate the magnitude of the effects of tax policy changes on capital investment. Using data for structures and equipment for both the farm and non-farm sectors of the U.S. economy for the years 1929 through 1963, they estimated changes in the level of net investments during

periods of tax policy changes. These estimates were then compared with observed changes to evaluate the appropriateness of the model.

The results of the Hall and Jorgenson study indicate that the 1954 increase in the rate of depreciation on capital assets substantially impacted the level of capital investments, particularly investment in structures. Both estimated and observed levels of investments in structures showed a significant increase. Similar conclusions were drawn concerning the 1962 tax law changes that reduced the depreciable lives of equipment and machinery and instated the investment tax credit. The researchers determined that these tax law changes resulted in a significant increase in the level of investment in the affected classes of assets.

In a subsequent study, Hall and Jorgenson (1971) reestimated their econometric model of investment behavior, taking into account data which became available after their 1967 study was conducted. They obtained a new set of investment functions for the non-farm sector of the economy. Employing the same methodology, Hall and Jorgenson used the new set of investment functions to reexamine the impact of the various tax policy changes that they had studied in their earlier work. The conclusions drawn in this study about the impact of the

1954 and 1962 tax law changes were substantially the same as those drawn in the 1967 work.

Hall and Jorgenson also examined the impact of the 1964 investment tax credit increase from 6 percent to 10 percent, and the suspension of the credit in 1966-67, coupled with a decrease in the rate of depreciation for structures. They concluded that the 1964 increase in the tax credit resulted in a sizable increase in capital investment in equipment. The suspension of the credit and the change in depreciation rules for structures resulted in a decline in investment spending for all classes of capital investments.

In both studies, Hall and Jorgenson concluded that tax policy can be a highly effective means of changing the level and timing of investment expenditures. They note that any change in tax policy which changes the rental cost of capital will have an inverse effect on the desired level of capital stock. The result is an adjustment in investment spending to reach the new desired level of capital stock.

Abel (1982) analyzed the dynamic effects of various tax policies in a q-model of investment based on Tobin's (1969) definition of q as the ratio of the market value of existing capital to the replacement cost of capital. Abel integrates the tax policy analysis of Hall and Jorgenson (1967, 1971) with the adjustment cost literature to

examine the dynamic effects of changes in tax policies in an optimizing framework.

Abel's model defines the value of the firm as the present value of after-tax cash flows from operating profit and tax savings from depreciation less after tax costs of new investments. The theoretical analysis indicates that tax policy shifts that change the after-tax cost of replacement capital also change the value of q. Consequently, the firm will adjust its level of investments to maximize after-tax cash flows. The results of Abel's analysis indicate that the value of the firm increases in response to an unanticipated increase in the rate of depreciation or investment tax credits or to a decrease in the business income tax rate.

Auerbach and Kotlikoff (1983) examined the effect of changes in the tax laws which lack parity between the treatment of newly-acquired capital and existing capital. Their analysis does not focus on the effects that investment incentives have on stock market prices, but their conclusions suggest that the market value of the firm is reduced as a result of such tax incentives. They contend that when investment incentives are implemented which apply only to new capital, the value of existing assets declines.

The Auerbach and Kotlikoff analysis is based on a two-period life cycle computer simulation model which

describes the perfect foresight growth path of life cycle economies under various fiscal policies. The simulation model calculates the equilibrium growth path of an economy consisting of government, household, and production sectors. Taxes on capital, consumption, and wages are considered in the model. Also included are levels of government consumption and choices of government deficit policies. The results of the simulation analysis indicate that investments incentives can be associated with the simultaneous decline in stock market values. Because the cost of new capital is lower than the value of existing capital, the return on existing capital must fall to compete with the newly-acquired capital.

In a subsequent work, Auerbach and Hines (1987) developed a framework for analyzing short-run effects of changes in tax policy. Using a discrete time model with one-year intervals, they predict the economic impact of tax proposals which would reduce or eliminate investment incentives.

The Auerbach-Hines model assumes two types of fixed investments, i.e. structures and equipment, and that there are costs associated with adjusting the capital stock when tax policy changes. The firm is assumed to choose that level of equipment, structures, and labor that maximizes the discounted value of its real after-tax cash flows. The model ignores changes in relative prices between

capital goods and output and between different types of capital.

Three types of parameters appear in the model: production parameters, financial markets parameters, and tax parameters. Production parameters relate to (1) gross shares of equipment and structures, (2) adjustment costs for new levels of capital, and (3) the rate of physical capital depreciation. Financial markets parameters relate to (1) rate of inflation, and (2) real after-tax required rate of return. Tax parameters relate to (1) the business tax rate, (2) investment tax credit rate, (3) the depreciation allowance for each of the two types of fixed investments.

The simulation model produces time series for investment in equipment and structures, effective tax rates, and market valuations of firms. The simulations begin with the assumption that in the beginning the economy is in a steady state. The researchers make assumptions as to firms' expectations about future changes in the values of the variables in the model, then solve the model over a period of many years to obtain a convergence to a new steady state. The results of the simulations indicate that when tax laws remove investment incentives, aggregate fixed investment falls and existing capital earns windfall profits. The windfall profits occur because the cost of new investment is greater than

the value of existing capital. According to the Auerbach-Hines analysis, the higher return required on new capital results in an increased return on existing capital. Market values of the firm's securities therefore will increase to reflect the greater rate of return earned by the old capital.

Hendershott (1985) conducted a simulation analysis to examine the impact of proposed tax reform packages on financial markets. Four proposals were examined, each of which had as its purpose improving economic efficiency by taxing different capital assets and sources of income more equally. Hendershott maintains that equities are claims on net cash flows generated for shareholders by capital. The market value of such equities should be the risk-adjusted present value of the cash flows accruing from the capital. The analysis was limited to projecting the impact of tax reform on the value of cash flows from the existing stock of capital only. Hendershott concluded that changes in corporate tax laws which reduce the taxation of existing capital increase stock prices by increasing after-tax cash flows and lowering the discount rate.

After the passage of the 1986 Tax Reform Act, Downs and Hendershott (1987) estimated the windfall gains and losses accruing to owners of capital securities resulting from TRA '86. They obtain results contrary to those of the

1985 Hendershott study. Using a cash flow model and simulation techniques, they analyzed the impact of the tax law changes on the value of the firm and its security prices. As in the prior work by Hendershott, the value of a firm's equity is defined as the discounted sum of expected after-tax net cash flows produced from the firm's capital.

In the model, net operating income and tax depreciation are expectations about all future periods and are attributable both to assets currently held and to future capital investments. Downs and Hendershott assume that each dollar of capital investment provides net operating income equal to the marginal product of capital. The replacement cost of capital is a function of the expected inflation rate, the economic rate of depreciation, the effective rate of investment tax credit, and the present value of tax depreciation. Future tax deductions accruing from existing capital were determined based on tax laws in effect when the assets were placed into service, and those deductions accruing from future investments were determined based on the tax laws after the enactment of TRA '86.

The results of the simulation indicate that TRA '86 should cause an overall increase in stock prices by 10 to 13 percent. The decrease in marginal tax rates accounts for only one quarter of the increase in stock prices; the

remaining projected increase is due to the repeal of the regular investment tax credit and to lengthened cost recovery periods for structures. Downs and Hendershott contend that the repeal of the investment tax credit and the lengthened depreciation for new capital forces the net operating income from existing capital upward.

The authors note that a decline in interest rates may occur because of reduced investment demands. On the one hand, this lower rate affects the value of the firm by lowering the discount rate used in computing the present value of future cash flows thereby increasing the firm's fundamental value and the price of its equity shares. On the other hand, lower interest rates reduce the marginal cost of capital, and thus net operating income. The effect is a lower firm value and reduced stock prices. The results indicate that these two effects offset each other.

The explanation given for the increase in stock prices after the removal of investment incentives from the tax laws and lowered corporate tax rates is similar to that presented in the F-A-K theory. Since changes in depreciation (and ITC) rules do not affect existing capital, newly-acquired capital must earn a higher rate of return to compete with existing capital. Downs and Hendershott explain, "The stock market largely values expected returns on the existing capital stock, and these

returns benefit from the adverse treatment of new investment."

## Empirical Studies

Sanger (1986) examined the effect of the Tax Reform Act of 1976 (P.L. 94-455) on the risk and return of REITs. The 1976 Act relaxed some provisions relating to REITs so that the requirements would be more workable. Conversely, certain requirements and limitations were made more restrictive. Using share price data as an indicator, Sanger attempted to determine whether the beneficial provisions outweigh the additional restrictions. He suggested that an increase in share prices of publicly-traded REITs induced by the passage of the 1976 Act would indicate that the beneficial provisions were dominant.

Sanger used monthly average returns of an equally-weighted portfolio of individual REITs over a time period surrounding the passage of the 1976 Act, including all pertinent information dates identified. The regression technique employed to determine the market's reaction to news concerning passage of the 1976 Act was intervention analysis. An information dummy variable was included in the market model to represent each month in which information concerning the 1976 Act was made public, and a shift dummy variable to indicate the shift in the regression regime. He used a switching regression technique to determine which information date was most

likely to cause a shift in the model parameters. The effects of announcements and the significance of changes in the model parameters were measured by t-tests of the model's coefficients.

The coefficients for two information dates were statistically significant, the first at the 1 percent level and the second at the 5 percent level. In both incidents, the market reacted favorably to announcements concerning changes in the tax laws relative to REITs. Sanger concluded that the market assessed the changes in the tax laws to be favorable to REITs and adjusted share prices accordingly.

Lyon (1986) conducted three studies in which he investigated empirically the effects of tax law changes on equity values and capital market returns. The first of these studies deals with the tax treatment of percentage depletion for the oil and gas industry. The second one concerns investment tax credits (ITC), and the third issue of interest is depreciation rules. Each of these studies will be reviewed separately.

The effects of the Tax Reform Act of 1969 (PL 91-172) on share prices of oil firms was the focus of Lyon's investigation into the relationship between percentage depletion and the capital market. The 1969 Act decreased

the rate of percentage depletion from 27.5 percent to 22 percent of gross income.[5]

Lyon presented econometric estimates of the change in firm value using two distinct methods, one which calculated the expected change in the value of oil producing properties, and the other which calculated the expected change in the value of after-tax earnings. He maintains that either may be suggestive of how the market may have interpreted the effects of the changes in the tax laws. Lyon's estimates predicted a decline in firm value for each of the firms in his sample.

Lyon's sample consisted of 51 publicly-traded firms incorporated in the U.S. and engaged in the business of extracting and/or refining petroleum. From news indices of The Wall Street Journal, The New York Times, and Congressional Quarterly Weekly Report, he identified eight separate dates of major announcements related to the 1969 Act and percentage depletion.

To investigate empirically the impact of the 1969 Act on stock prices of oil firms, Lyon modified the market model to include dummy variables representing information dates and used intervention analysis techniques. Since the firms in the sample were all in the same industry and therefore may not have been independent, Lyon controlled

---

[5]The Tax Reform Act of 1975 subsequently eliminated percentage depletion for major oil producers.

for contemporaneous cross-correlation by the use of Zellner's seemingly unrelated regression model.

Two hypotheses about the event days were tested. The first null hypothesis was that the sum of the abnormal returns across all firms for any one information date is equal to zero. The test of this hypothesis is equivalent to a test on the mean of the returns. The means of the abnormal returns on five of the information dates were less than zero. However, using a two-tailed test, Lyon found that the negative mean abnormal returns for only one information date was significant at the 10 percent level. The significant event was the announcement that votes on the Senate floor defeated both the amendment to retain percentage depletion and an amendment to reduce depletion. Two of the three positive mean abnormal return coefficients were significant at the 10 percent probability level. The significant dates represented, respectively, House hearings and the Senate Committee vote to change depletion to 23 percent.

The second null hypothesis was that the sum of the abnormal returns across all firms summed over all information dates is equal to zero. This hypothesis was not rejected. The initial results did not provide significant evidence that, overall, the market reacted to announcements about depletion legislation.

Lyon considered the possibility that the information date periods were misspecified. He suggested that a one-day reaction period following each information date may not be sufficient for detecting abnormal returns and respecified two of the event dates. The null hypothesis was thereafter rejected at the 6 percent probability level, indicating that the market did react unfavorably to information about depletion legislation.

In the second reported study, Lyon examined the effect of changes in the investment tax credit (ITC) on the value of the firm and on short-run market returns. He described the ITC as a government subsidy which reduced the net cost of acquiring new assets and increased after-tax profits to businesses purchasing qualifying assets.

The five-year timeframe for the study included two suspensions of the ITC and two impositions of the credit. The observation period began five months prior to the first Presidential request to suspend the credit and ended five month after the final request to reinstate the credit. A sample of 711 firms representing 30 different industries was drawn from U.S. firms listed on the New York Stock Exchange.

Lyon used three different estimation procedures to analyze the reaction of the market to announcements regarding the investment tax credit. The first was a two-step regression procedure in which he tested (1) whether

the security price of each firm in the sample was affected by the Presidential requests for the suspension or reinstatement of the ITC, and (2) whether the firms were cross-sectionally affected by the ITC changes.

Lyon found that the market did react to announcements concerning the suspension and reinstatement of the investment tax credit. Moreover, share prices of firms which were predicted to benefit to a greater extent from investment tax credits responded more favorably to reinstatements of the ITC and more adversely to its suspension than did firms not predicted to make considerable future investments in qualifying property.

The second estimation procedure was the seemingly unrelated regression technique. Because of the high degree of collinearity among some firms in the sample, Lyon divided the firms into four portfolios based on a normalized measure of the firms' predicted benefits from the investment tax credit. He then used seemingly unrelated regression to control for heteroscedasticity and contemporaneous cross-correlation. The statistical results under this procedure also supported the theory that stock prices for the portfolio of firms with the highest expected benefit from ITC would be more positively influenced by reinstatements of ITC and more negatively influenced by suspensions than would the prices of other portfolios.

The third estimation procedure was the restricted seemingly unrelated regression technique. Lyon was interested in whether the existence of a linear relationship could be established between changes in firm value and calculated expected direct benefits of ITC. He formed ten portfolios based on the decile ranking of the firm for ITC benefits and applied a restricted seemingly unrelated regression technique to determine if the relationship between the abnormal portfolio returns and estimated tax benefits from ITC was constant across all portfolios. The restriction that the coefficients of interest were equal across portfolios could not be rejected, indicating that a linear relationship may exist.

The third change in tax laws of interest in the Lyon studies is the enactment of the Accelerated Cost Recovery System (ACRS) provisions in the Economic Recovery Tax Act of 1981 (ERTA). Lyon examined empirically the effect of ERTA on the value of the firm.

The effect of the ACRS provisions on the net cost of 32 types of equipment and structures was calculated. Proxies for the expected change in firm value were developed by using the data on the ownership of the 32 types of equipment and structures by narrow industry groups and incorporating the data with firm-specific information. The change in the value of the firm was

calculated as a weighted average of savings to the firm from each of its different capital assets multiplied by its total investment.

Lyon used the capital asset pricing model for estimating the return for each firm. The risk-free rate of return was replaced by the monthly return on a 90-day Treasury bill, and a different beta was estimated for each firm from the time series regression. To test whether an individual security is affected by information regarding the Congressional approval of ERTA, a dummy variable was introduced into the model which takes on a value of one in July and August 1981, the months of Congressional action, and a value of zero in all other estimation periods. The regression regime was estimated for a 70 month period beginning 40 months prior to Congressional action on ERTA and extending 28 months beyond the period of action. The dummy variable coefficient provides a measure of the abnormal return to the individual security during the two months of Congressional action. From this point forward, the methodology employed by Lyon to examine the effect of ERTA on firm value and stock prices is almost identical to that used in the previous study concerning ITC. Therefore, the methodological details are omitted in this review.

The results of the first statistical procedure, the two-step regression estimates, failed to reject the null

hypothesis that the coefficients were significantly different from zero during the two months of Congressional action on ERTA. Tests of seemingly unrelated regression estimates on quartile portfolios also failed to reject the null hypothesis of equality between any pair of portfolios. No significant relationship was found to exist between actual changes in firm value and predicted changes in value. Test results of restricted seemingly unrelated regression estimates on decile portfolios were consistent with those of the other two procedures. No significant relationship was detected between predicted changes in firm values and the estimated abnormal return to the common stock of the sample firms during the Congressional action period.

Several possible reasons are suggested by Lyon for failure to obtain significant results. First, the period in question marked the beginning of the eighth post-war recession in the U.S. Any increase in returns caused by ACRS announcements may have been offset by recessionary declines. The use of the market returns in the modified capital asset pricing model partially controlled for the effect of the recession, but Lyon suggests the use of a multiple factor model of firm returns to control fully for regression effects.

A second possible intervening factor is the provisions of ERTA which reduced personal income taxes.

The beneficial effects of personal tax cuts on consumer industries may have obscured the effects of changes in business taxes. The revenue reduction also may have increased the real after-tax interest rate and, consequently, the rate at which future cash flows are discounted.

A third problem relates to the limited time period for which abnormal returns were tested. If the changes in the tax laws were anticipated prior to the two months in question, the model would fail to capture the effects of information about changes in the tax laws.

## Summary and Analysis

A number of researchers have been concerned with determining the impact of various types of tax legislation on the capital markets. To this end, both static and dynamic econometric models have been developed in order to assess the relationship between tax policy changes and market responses. Moreover, some researchers focus on the short-run while others place greater importance on long-run equilibrium. Consequently, the results of the analyses have not been consistent. Some conclude that a positive relationship exists between tax incentives and firm value; others determine the relationship to be an inverse one.

Summers (1981) notes that both conclusions may be correct. In the short-run, new investments may return

windfall profits or losses to their owners. In the long-run, however, newly-acquired assets and pre-existing assets must compete against each other, and the resultant effect on firm value may be in the opposite direction than in the short run. Summers concludes that the net effect on the value of the firm depends on the relative magnitude of the two opposing forces.

Studies which use observed values for examining the relationship between changes in tax policy and firm values tend to support the theory that a direct relationship exists between investment incentives in the tax laws and changes in stock prices. Sanger found that when some of the restrictions placed on REITs were relaxed, the share price of REITs increased. Lyon's investigation into the effect of reductions in the percentage depletion allowance on the value of oil firms provided additional support for the theory of a positive relationship.

Upon examining the effect of the investment tax credit (ITC) on firm value, Lyon found that each time ITC was eliminated, share prices dropped for those firms which invest heavily in equipment and machinery. With each reinstatement of ITC, the share prices of those firms increased. However, Lyons' analysis of the effect of changes in depreciation laws on firm value provided only weak support for the theory of a direct relationship between tax incentives and firm prices. The changes were

in the theorized direction but were not statistically significant.

# CHAPTER 3

## LEGISLATIVE HISTORY

TRA '86 contains a number of provisions regarding the taxation of earnings from real estate related activities. This chapter reviews the legislative history of those tax law changes that are germane to this study. The legislative history is presented in two sections. The first section reviews the provisions relating to the depreciation of real property; the second section discusses the changes in corporate tax rates. In each section, the tax provisions as they stood before the enactment of TRA '86 are first presented, followed by a discussion of proposed bills and Congressional action in the chronological order of their occurrences. Next, the enacted versions of the provisions are described. This is followed by a review of subsequent legislative action relative to cost recovery of real property and to corporate tax rates. Finally, a short summary of the relevant changes is provided.

## Cost Recovery of Real Property

Prior Law. The method of depreciation used for recovering the cost of real assets depends on the

depreciation provisions in effect at the time the asset was placed into service. Consequently, assets placed into service prior to the effective date of TRA '86 may be depreciated under a number of different methods.

Since the inception of the Federal income tax in 1909, taxpayers have been allowed a deduction for depreciation of certain types of assets. Prior to 1954, taxpayers generally were permitted to use only the straight line method for recovering the cost of depreciable assets. However, the determination of the appropriate depreciable life and estimated salvage value was, with some limitations, left to the discretion of the taxpayer. In 1954, Congress began permitting the use of accelerated methods of depreciation, but inconsistencies still existed in the determination of useful lives of assets (Mertens Law of Fed Income Tax, sec. 23A.03).

The Asset Depreciation Range (ADR) system was established by Revenue Procedure 62-21, and was made a part of the tax law in the Revenue Act of 1971 (P.L. 92-178). The ADR system assigns a life range to broad classes of assets. Real property was assigned class lives of 40 to 60 years, depending on the purpose of the building's use. The ADR system afforded taxpayers considerable flexibility, however, in choosing a depreciable life, and accelerated depreciation methods permitted taxpayers to recover the cost of real property

at a much faster rate than would have occurred with the straight line depreciation method (sec.167). Consequently, depreciable real assets placed into service subsequent to 1970 but prior to 1981 may be depreciated using any number of methods over a period of 32 to 72 years. Permissible cost recovery methods for real property include (1) the straight line method, (2) the declining balance method up to 200% depending on the classification of the property, (3) the sum of the years digits method, and (4) any other consistent method whereby the amount of write-off during the first two-thirds of the asset's depreciable life does not exceed the amount that would have been written off using the declining balance method and the applicable percentage rate (sec. 168).

The Accelerated Cost Recovery System (ACRS) (sec. 168) was established with the enactment of the Economic Recovery Tax Act of 1981. Real property was assigned a statutory recovery period and depreciated using the 175% declining balance method (200% for low income housing), changing to the straight line method to maximize acceleration. For real property placed into service under ACRS rules but prior to March 16, 1984, the recovery period is 15 years. The cost of real property placed into service subsequent to March 15, 1984, but prior to May 9, 1985, is recovered over 18 years; property placed into services between May 8, 1985 and January 1, 1987 is

depreciated over 19 years. These changes in recovery periods for real property did not apply to real property classified as low-income housing.

The amount of depreciation allowable on 15-year real property in the years of acquisition and disposition was prorated based on the month in which the asset was placed into service or disposed of using a full-month convention. For 18 and 19 year property, a mid-month convention applies.

Bradley-Gephardt. The Bradley-Gephardt bill proposed a Simplified Cost Recovery System (SCRS) (U.S. Cong., House (hearings), 1985, 97-133). Under the provisions of SCRS, the cost of depreciable real property would be recovered over a period of 40 years. The amount of write-off for each year would be based on 250 percent declining balance depreciation applied to the adjusted basis of the asset. A mid-month convention applied to real property placed into service during the year. No provision was included for inflation adjustment.

Kemp-Kasten. The Kemp-Kasten bill for the "Fair and Simple Tax Act of 1984" originally contained no provision for changes to the ACRS rules (U.S. Cong. Senate 1985, S2600). However, a subsequent revision to the bill proposed a Neutral Cost Recovery System (NCRS) (U.S. Cong., House (hearings) 1985, 138-179). Under the

provisions of NCRS, the cost of depreciable real property would be recovered over a period of 25 years at a statutory straight line rate of six percent per year. In the year in which the asset was placed into service, the rate of depreciation would be four percent. No depreciation would be allowed in the year of disposal.

The invariant statutory depreciation rate would be applied to the inflation-adjusted basis of the asset rather than to the original cost basis. Moreover, in order to provide that the present value of the aggregate depreciation deductions is equal to the value of immediate expensing, the total amount of nominal dollars of depreciation on real property under NCRS would be greater than the inflation-adjusted original cost of the asset.

Treasury I. In its 1984 proposal for Tax Reform, the Treasury recommended the establishment of capital cost recovery rules whereby inflation would be explicitly factored into the depreciation system and "the real economic loss inherent in the use of assets over time" would be accounted for. A new Real Cost Recovery System (RCRS) was proposed that embodied three major changes to ACRS. These changes related to depreciable life, percentage rate of depreciation, and basis adjustment for inflation.

First, depreciable real assets (except utility property) would be reassigned a depreciable life of 63

years.    Second, the allowance for depreciation each period would be adjusted for inflation by means of a basis adjustment.    The inflation factor would be accounted for by increasing the unrecovered asset basis each year by the rate of inflation.    Third, an invariant depreciation rate of three percent would be applied to the inflation-adjusted declining balance of the asset.    No inflation adjustment would be allowed in the asset's first year, and a mid-month convention would apply in the years of acquisition and disposition.

The Treasury reported that ACRS results in failure to adequately measure inflation-adjusted income thereby over-taxing or under-taxing real economic income.    It further stated that ACRS distorts investment decisions and hampers economic efficiency by favoring certain classes of businesses or industries over others.    Moreover, the tax benefits of ACRS have given rise to tax shelters which have no economic justification.    The Treasury Department's report also cited complexity in the tax laws and uncertainty regarding fluctuating inflation rates as reasons for replacing ACRS with the RCRS.

President's Proposal.    Like the 1984 Treasury proposal, the President's proposal (1985) also recommended the establishment of a depreciation system whereby inflation would be explicitly taken into account.    A new Capital Cost Recovery System (CCRS) was proposed that

suggested three major changes to ACRS. These changes related to depreciable life, percentage rate of depreciation, and basis adjustment for inflation.

First, depreciable real assets (except utility property) would be reassigned a recovery period of 28 years. Second, the allowance for depreciation each period would be adjusted for inflation by means of a basis adjustment. The inflation factor would be accounted for by increasing the unrecovered asset basis each year by the rate of inflation. Third, an invariant depreciation rate of four percent would be applied to the inflation adjusted declining balance of the asset. However, the declining balance rate would switch to a straight line rate in the year in which the straight line rate yields a higher depreciation allowance than the declining balance rate. No inflation adjustment would be allowed in the asset's first year, and a pro-rata adjustment would apply in the year of disposition. A mid-month convention would apply in the years of acquisition and disposition.

The reasons cited for recommended changes in the cost recovery system were much like those mentioned in the Treasury I report. The President's Proposal mentioned problems with ACRS such as disregard of economic depreciation, non-neutrality of ACRS investment incentives, proliferation of tax shelters, and complexity in the tax law.

House Version of TRA '86. The House bill provided for the replacement of ACRS with the Incentive Depreciation System (IDS) (U.S. Cong., House (hearings) 1985, 97-133). Under IDS, assets would be grouped into ten classes, based generally on ADR midpoint lives. Real property, except low income housing[6], generally would be assigned to IDS Class 10 and depreciated using the straight line method over a period of 30 years. Allowable depreciation in the years of acquisition and disposition would be prorated based on the number of months the asset was held. Acquisition and disposition made during the month would be treated as if they occurred at mid-month.

For assets placed into service after the enactment of the bill and depreciated under the provisions of IDS, IDS deductions would be adjusted for inflation, beginning in 1988. The inflation adjustment would be one-half the rate of inflation in excess of five percent. However, no adjustment would be allowed in the years of acquisition or disposition.

Senate Version of TRA '86. The Senate version of the Tax Reform bill (1985) retained the ACRS with some modifications, and no provision was made for taking inflation into account in computing depreciation

---

[6]Low-income housing would be assigned to IDS Class 9 and the cost recovered using the double declining balance method, switching to straight line to maximize deductions, over a period of 30 years.

allowances. A major change introduced by the bill relates to depreciable real property. The Senate bill distinguished between residential and non-residential property and provided that the cost of all depreciable real property be recovered using the straight line method.

Under the Senate bill, the cost of residential rental property would be recovered over a period of 27.5 years using straight line depreciation. Residential property was defined as a structure from which at least 80 percent of its income is rental income from providing living accommodations on a non-transient basis.

The cost of non-residential real property would be recovered over a period of 31.5 years, also using straight line depreciation. The Bill defined non-residential real property as section 1250 class property that has class life in excess of 12.5 years and is not residential real property. A mid-month convention would have applied to both residential and non-residential real property at both acquisition and disposition.

Final Version of TRA '86. The final version of TRA '86 adopted the provisions of the Senate amendment with regard to the cost recovery of real property (P.L. 99-514). Thus, the Act requires that the cost of real property be recovered using the straight line method over 27.5 or 31.5 years, depending on the class of property,

and does not allow for inflation adjustments of depreciation deductions.

Omnibus Budget Reconciliation Act of 1987. Neither the House nor the Senate version of the Omnibus Budget Reconciliation Act of 1987 contained provisions relating to the cost recovery of real property.

## Corporate Taxation

Prior Law. Under the provisions of the 1954 Internal Revenue Code, regular corporations were taxed on earnings at a maximum rate of 46 percent on all income in excess of $100,000 (IRC 1954, sec. 11). Corporations having earnings less than $1,000,000 were taxed according to the following schedule:

| Tax Rate | Taxable Income |
|----------|----------------|
| 15 percent | $25,000 or less |
| 18 percent | $25,000 - $50,000 |
| 30 percent | $50,000 - $75,000 |
| 40 percent | $75,000 - $100,000 |
| 46 percent | over $100,000 |

A phase-out of graduated rates began after taxable corporate earnings exceeded $1,000,000, and were totally phased out at $1,405,000. Thus, corporations with taxable earnings of $1,405,000 or more were subject to taxation at a flat rate of 46 percent.

Corporations were further subject to an add-on minimum tax on certain tax preference items. Corporations generally were liable for a 15 percent minimum tax on tax

preferences in excess of the greater of (a) $10,000 or (b) the regular corporate income tax for the tax year (IRC 1954, sec. 56).

Bradley-Gephardt. The Bradley-Gephardt tax plan would tax corporate income at a flat rate of 30 percent and would eliminate the corporate minimum tax (U.S. Cong., House (hearings), 1985, 97-133).

Kemp-Kasten. Under the original proposal of the Kemp-Kasten Fair and Simple Tax Act, the first $50,000 of corporate income would be taxed at a rate of 15 percent. Income in excess of $50,000 would be taxed at 30 percent. Under the revised version of the bill, the maximum rate of taxation on corporate income would be 35 percent, and corporations would be taxed according to the following progressive rate schedule.

| Tax Rate | Taxable Income |
|----------|----------------|
| 15 percent | $50,000 or less |
| 25 percent | $50,000 - $100,000 |
| 35 percent | over $100,000 |

The benefits of the lower tax rates would not be phased out for high income corporations and the plan would retain the corporate minimum tax (U.S. Cong., House (hearings), 1985, 138-179).

Treasury I. The Treasury I proposal of Tax Reform for Fairness, Simplicity, and Economic Growth (1984)

would impose a flat-rate tax of 33 percent on taxable income of corporations. The proposal further would broaden the tax base for corporations and repeal the corporate minimum tax. The Treasury Report states that the progressive rate structure for corporations "serves no affirmative purpose" and encourages the use of the corporate form of organization to take advantage of lower tax brackets. The Treasury Department reported that by broadening the corporate tax base and imposing a flat tax at a lower rate, corporations would be taxed more uniformly.

President's Proposal. Recommendations for two major changes to the taxation of corporations are contained in The President's Tax Proposals to the Congress for Fairness, Growth, and Simplicity (1985): one is lower tax rates; the other is a dividends-paid deduction. The purpose of both provisions is to reduce the burden of taxation on corporations and encourage equity investment in the corporate sector.

The President's proposal would decrease the top marginal tax rate on corporate income to 33 percent and reduce the number of tax brackets to four. Corporations having income under $75,000 would be taxed according to the following schedule:

| Tax Rate | Taxable Income |
|----------|----------------|
| 15 percent | $25,000 or less |
| 18 percent | $25,000 - $50,000 |
| 25 percent | $50,001 - $75,000 |
| 33 percent | over $75,000 |

A phase-out of the graduated rates would begin at $140,000 and the phase-out would be complete on income of $360,000. Thus, corporations with income of $360,000 or more would pay a flat tax rate of 33 percent.

The plan predicted that the lower tax rates for corporations generally would reduce the after-tax cost of corporate equity capital, thereby making equity securities more comparative with debt. Corporations would thus be less encouraged to raise capital by issuing debt and would, instead, increase corporate equity investment.

The President's proposal would have replaced the then add-on minimum tax for corporations with an alternative minimum tax. The alternative minimum tax rate of 20 percent would apply to taxable income plus the excess of preference items over $10,000, and would be offset by foreign tax credits. The term "tax preference item" was redefined under the proposal to take into account additional preferences. An exemption of $15,000 would apply.

House Version of TRA '86. Under the House bill (1985), the following three-bracket graduated rate structure would apply to corporate income.

| Tax Rate | Taxable Income |
|----------|----------------|
| 15 percent | $50,000 or less |
| 25 percent | $50,001 - $75,000 |
| 36 percent | over $75,000 |

A phase-out of the benefit of graduated rates would occur on income between $100,000 and $365,000. An additional five-percent tax on such income would have the effect of requiring corporations having taxable income of $365,000 or more to pay tax at a flat rate of 36 percent.

Senate Version of TRA '86. The Senate bill (1986) for TRA '86 would impose a maximum tax rate of 33 percent on corporate income under a graduated rate schedule and would also reduce the number of brackets from five to three. The purpose of the provision was to promote economic growth by lowering tax rates and thereby increasing the return on investments. The Senate Finance Committee felt that lower tax rates also would improve resource allocation and promote tax compliance. Moreover, a graduated structure was retained to encourage growth in small businesses. Income up to $100,000 would be taxed according to the following schedule.

| Tax Rate | Taxable Income |
|----------|----------------|
| 15 percent | $50,000 and less |
| 25 percent | $50,001 - $75,000 |
| 33 percent | over $75,000 |

Corporate income in excess of $100,000 would have levied upon it an additional five percent tax up to an

additional tax of $11,000. The benefit of graduated rates would be phased out by the additional five percent tax for corporations with income between $100,000 and $320,000. Thus, corporations with income in excess of 320,000 would pay a flat tax at a rate of 33 percent.

The Senate version of tax reform would replace the corporation add-on minimum tax with an alternative minimum tax and would more broadly define "tax preference items." Under the Senate provisions, corporations would pay a tax of at least 20 percent of an amount approximating economic income. A $40,000 exemption would be allowed on tax preference items, but this exemption would be phased out on income between $150,000 and $310,000.

Final Version of TRA '86. The final version of The Tax Reform Act of 1986 provides for a three-bracket graduated tax on corporate income with an additional tax imposed on income in excess of $100,000. The tax rate schedule imposed by TRA '86 is as follows:

| Tax Rate | Taxable Income |
|---|---|
| 15 percent | $50,000 and less |
| 25 percent | $50,001 - $75,000 |
| 34 percent | over $75,000 |

Corporate income in excess of $100,000 now has levied upon it an additional 5 percent tax up to an additional tax of $11,750. Thus, corporations with income in excess of $335,000 must pay a flat rate of 34 percent.

Like the Senate version of tax reform, the final bill replaces the corporation add-on minimum tax with an alternative minimum tax and more broadly defines "tax preference items."

Omnibus Budget Reconciliation Act of 1987. The Omnibus Budget Reconciliation Act of 1987 does not provide for a change in tax rates for corporations, other than for certain personal service corporations. However, the House version of the bill (1987) would have raised the alternative minimum tax base. The House bill provided that 100 percent of the excess of book and adjusted current earnings over other alternative minimum taxable income would be a tax preference item for corporations. For many corporations, the alternative minimum tax provision generally would result in a tax liability of a greater percentage of book income.

The Senate version of the bill (1987) provided for no change to the alternative minimum tax provisions of TRA '86, and the Joint Conference followed the Senate amendment. Consequently, the Omnibus Budget Reconciliation Act of 1987 does not alter the alternative minimum tax base.

Summary

From the time of the introduction of the Bradley-Gephardt tax plan until the enactment of TRA '86, the

proposed corporate taxation and real property cost recovery provisions experienced considerable evolutionary change. Real property now is subject to longer recovery periods, and the use of accelerated depreciation methods for newly-acquired real property is no longer permitted. For corporate taxation, the result is a reduction in the tax rate and a broader income tax base. The focus of this study is on the reaction of the real estate capital markets to the evolutionary Congressional procedure and to the final legislative results.

CHAPTER 4

RESEARCH METHODOLOGY

This study investigates the impact of the Tax Reform Act of 1986 (TRA '86) on the real estate capital markets. More specifically, it is intended to determine if the Act results in a differential effect on firm values across entity and functional forms of real estate activities with regard to depreciation and corporate tax rates.

This chapter presents the methodology used to answer the above question. The first section discusses the time frame of the study and the data. Second, the sample selection techniques and criteria are described. Third, the development of the statistical model is presented, and fourth, the statistical methods to be used in the research are explained. Finally, the hypotheses are listed along with a discussion of portfolio composition, followed by a brief summary of the issues outlined in this chapter.

Time Period and Data

The test periods for this study are the months when significant new information regarding TRA '86 was publicly announced. In order to identify those months in which information became publicly available, a search of The

68

<u>Wall Street Journal</u> was conducted for announcements concerning the Act. Announcements regarding TRA '86 appeared during at least 13 separate months. These months are specified as information months and are shown in Table 4.1.

Monthly data over the period from January 1, 1981 through December 31, 1987 was used to establish the relationship between over-all market returns and returns in the real estate market. January 1, 1981 was selected as the beginning of the data time period because it represents the beginning of a reasonably stable period of time relative to tax legislation affecting real estate. Under ERTA, the cost of property placed into service after 1980 generally could be "recovered" under an accelerated form of depreciation. Although the recovery period for real property was lengthened from 15 to 18 years by the Deficit Reduction Act of 1984 (PL 98-369) and further lengthened to 19 years in 1985 (PL 99-121), there was no change in recovery method. Any reaction by the market to these changes in recovery periods was expected to be very small and not to have a significant effect on the results of this study. Tests of significance were conducted for those months in which a change in recovery period may have caused market reactions. The results confirmed that the change in recovery period did not affect significantly the real estate capital markets.

TABLE 4.1

Dates and Descriptions of Announcements Concerning
the Tax Reform Act of 1986[*]

| Event Number | Date | Description of Event |
|---|---|---|
| 1. | August 1982 | The Bradley-Gephardt tax overhaul plan is introduced. |
| 2. | April 1984 | The Kemp-Kasten tax reform bill is introduced. |
| 3. | November 1984 | Treasury I is presented by Treasury Secretary Donald Regan. |
| 4. | May 1985 | The President's Tax Reform Plan is introduced by the Treasury Department. |
| 5. | November 1985 | Tax overhaul bill is passed by House Ways and Means Committee.[**] |
| 6. | December 1985 | Ways and Means bill is passed by the full House. |
| 7. | May 1986 | Senate version of tax reform bill is passed by Senate Finance Committee. |
| 8. | June 1986 | Senate Finance bill is passed by the full Senate. |

Table 4.1 (con't)

| Event Number | Date | Description of Event |
|---|---|---|
| 9. | August 1986 | Compromise tax bill is approved by House and Senate Conference Committee. |
| 10. | September 1986 | Conference Committee Bill is passed by full House and Senate. |
| 11. | October 1986 | Tax Reform Act of 1986 is signed into law by President Reagan. |
| 12. | October 1987 | House passes its version of Omnibus Budget Reconciliation Act of 1987. |
| 13. | December 1987 | Omnibus Budget Reconciliation Act of 1987 is passed by Senate and Conference Committee. |

*Source:   The Wall Street Journal

** Although the bill was reported to the House on December 3, 1985, virtually all of the provisions had been voted on and agreed to by the Committee by the end of November. Consequently, for the purpose of this research, November is treated as the information period.

## Sample Selection

The sample of firms used in this study was chosen from the population of publicly-traded firms engaged in real estate activities. The sample includes regular corporations, real estate investment trusts (REITs), and master limited partnerships (MLPs) identified from a listing published by Realty Stocks Review.

The requirements that entities had to meet to be included in the sample are repeated here.

1.   The firm must be listed on the American or New York stock exchange.

2.   The firm must have data available in the Center for Research in Security Prices (CRSP) daily stock return files.

3.   The firm must have at least 12 consecutive monthly returns during the sample period.

4.   The firm must have tax status continuity during its 12-month period of consecutive returns.

The first and second requirements relate to data availability. The purpose of the third requirement is to prevent the inclusion of short-lived firms whose reaction to information events may be atypical. The tax continuity requirement prevents possible contamination of the results by effects of changes in tax status on the market value of firm equity. The tax status of the sample entities was verified for each year of inclusion through Moody's.

To facilitate grouping the firms into portfolios for statistical analysis, each firm in the sample was identified according to the entity form under which it operates. These entity forms include regular corporations and non-corporations (i.e., REITs and MLPs). Each firm further was classified as to the functional form of real estate activities in which it engages. These include equity investors, mortgage investors, hybrid investors[7], and builders/developers. Realty Stock Review classifications and SIC codes were used to identify the primary functional activity of each firm. Firms that could not be classified clearly because of diversification or lack of information availability were eliminated from the sample.

Statistical Techniques and Hypotheses

The Model. The capital asset pricing model (Sharpe 1964 and Lintner 1965) holds that capital assets will be priced by the market such that

(4.1) $$E(r_i) = r_f + \beta_i[E(r_m) - r_f]$$

where:

$r_i$ = the return to security i

$r_f$ = the risk-free rate of return

---

[7] Hybrid investors are firms which hold both real property for the production of income and mortgages backed by real property.

$r_m$ = the market return

$\beta_i$ = cov$(r_i, r_m)$/var$(r_m)$, described as systematic risk

E is the expectation operator.

The expected return of security i includes expectations by the market about both dividends and capital gains. The model assumes that when the market is in equilibrium, the risk-adjusted rate of return is equal for all securities. Therefore, absent a change in the stochastic return process, the returns to security i at time t can be modeled as

$$(4.2) \qquad r_{it} = \alpha_i + \beta_i r_{mt} + e_{it}$$

where:

$r_{it}$ = the stochastic return on security i at time t measured as the change in price plus any dividends paid at time t, divided by the price at time t-1

$\alpha_i$ = the regression intercept of security i

$\beta_i$ = the systematic risk of security i

$r_{mt}$ = the weighted average market return at time t

$e_{it}$ = the stochastic error term for security i at time t.

In the event of some intervention in the return-generating process, abnormal returns may result for certain securities. The method used in this study for examining the effect of interventions on the real estate capital markets is the addition of dummy variables to the

market model and the use of seemingly unrelated regression.

Following methodology suggested by Schwert (1981) and Larcker, Gordon, and Pinches (1980), and subsequently used by Chen and Sanger (1984), Binder (1985), Lyon (1986), and Sanger (1986, 1987), this study employs the technique of intervention analysis to examine the real estate markets' reaction to information leading to the enactment of TRA '86. Intervention analysis is a regression technique using dummy variables representing "some specified set of interventions that may (permanently or temporarily) change the nature or level of the return from the time series . . ." (Schwert 1981, p. 272). Its use is appropriate when some economic event, such as a change in tax laws, is believed to change the level of risk for a particular security, or group of securities, or to result in abnormal returns. Larcker, Gordon, and Pinches (1980) suggest that intervention analysis is preferable to cumulative average residual methodology for analyzing stock market reactions to financial announcements because it allows $\alpha$ and $\beta$ to vary in periods of abnormal returns.

Two different intervention dummy variables are added to the market model for this study. Shift dummy variables, $D_S$, are added to the model to specify a permanent change in $\alpha$ and/or $\beta$, and a switching regression

technique is employed for identifying the point in the time series at which such change occurred. The purpose of identifying a shift in the regression relation is to avoid model misspecification and to obtain a better fit of the regression line. For specifying months in which announcements concerning TRA '86 may have resulted in interventions in the return generating process, an information dummy variable, $D_{Ikt}$, is added to the model. The coefficient of the information dummy variable captures the abnormal returns in those months when information about TRA '86 became publicly available to the market.

In the presence of announcements concerning impending changes in the tax law that may affect real estate protfolio returns, the market model corresponding to Equation 4.2 may be respecified as

$$(4.3) \quad R_{pt} = \alpha_p + \alpha_p' D_s + \beta_p R_{mt} + \beta_p' D_s R_{mt}$$

$$+ \sum_{k=1}^{K} \delta_{pk} D_{Ikt} + e_{pt}$$

where:

$R_{pt}$ = the stochastic return on portfolio p in time period t

$R_{mt}$ = the stochastic return on the value weighted index of NYSE and AMEX stocks in time period t

$\alpha_p$ = the regression constant or intercept of portfolio p before the intervention

$\alpha_p'$ = the shift in the regression intercept of portfolio p due to the intervention

$\beta_p$  = the systematic risk coefficient of portfolio p before the intervention

$\beta_p'$ = the shift in the systematic risk coefficient of portfolio p due to the intervention

$D_s$ = shift dummy variable = $\begin{cases} 0 \text{ before the shift} \\ 1 \text{ after the shift} \end{cases}$

$D_{Ikt}$= information dummy variable = $\begin{cases} 1 \text{ in information} \\ \phantom{1} \text{month k,} \\ \phantom{1} \text{but only if} \\ \phantom{1} t = k \\ 0 \text{ otherwise} \end{cases}$

$\delta_{pk}$ = coefficient of information dummy variable $D_{Ikt}$ for portfolio p

K    = number of months in which information concerning TRA '86 is publicly announced, where k ranges over those months, and only those months, during which such information is publicly announced

$e_{pt}$ = the stochastic error term for portfolio p at time t.

Switching Regression.    When estimating the parameters of the market model, a constant value of $\alpha$ and $\beta$ over the entire time series generally is assumed. However, uncertainty regarding the outcome of proposed tax legislation may have resulted in a fundamental change in the regression relation of real estate returns to the market returns at some point in the time series. Consequently, a stationary regression line may not describe adequately the relationship between the market returns and the returns of the portfolios in this study. To estimate Equation 4.3, therefore, it is necessary to

determine whether such a change occurred, and if so, to identify the point in the time series of returns at which the model parameters shifted.

Since the date of the switch is not known a priori, a switching regression technique is used to determine when the regression equation switches from one regime to another (Quant 1958, 1960). Quant suggests that the shift in the regime can be identified through the use of maximum likelihood techniques whereby the observations of the time series are partitioned into two groups and a separate regression equation is estimated for each group. The possible switch date representing the dividing point is allowed to vary and two new regression equations are estimated for each date until the likelihood function for the entire period is maximized.

Figure 4.1(a) shows a regression line that is estimated using dividing point $t_1$. Figure 4.1(b) shows a second regression line that is estimated using dividing point $t_2$. The partition point that maximizes the likelihood function with respect to t indicates the point in the time series at which the regression parameters switched from one regime to a second regime. Details of the switching regression technique are presented in Quant (1958).

**Figure 4.1**

Comparison of Regression Lines

(a) Regression line when time-frame of returns is divided at time $t_1$.
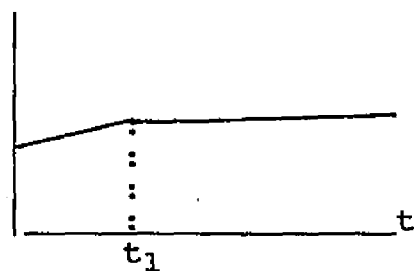
(b) Regression line when time-frame of returns is divided at time $t_2$.
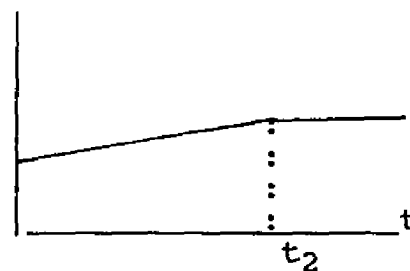


The shift in the regression equation is incorporated into the model by the addition of dummy shift variables, $D_s$. The dummy shift variables take on a value of zero before the shift and a value of one after the shift. Thus, the shift variable coefficients indicate the direction and magnitude of the shift in the regression relation. The switching regression technique used in this study better specifies the relationship between overall market returns and returns within the real estate capital markets whenever a tax change announcement acts as an

intervention and a permanent change occurs in the relationship.[8]

Abnormal Returns. An information dummy variable, $D_{Ikt}$, is included in the model to identify abnormal returns in those months in which information regarding proposed tax law changes was publicly announced. For each month, k, in which new information concerning TRA '86 is reported in The Wall Street Journal, the dummy variable $D_{Ikk}$ in Equation 4.3 takes on a value equal to one. In all other months, $t \neq k$, $D_{Ikt}$ is zero. The dummy variable coefficient, $\delta_{pk}$, is designed to capture that part of the portfolio return that is unique to information months and not explained by other terms in the model. Thus, $\delta_{pk}$ measures the abnormal return on portfolio p in month k.

Seemingly Unrelated Regression. The coefficients of Equation 4.3 were determined by the use of ordinary least squares (OLS) regression techniques. For the purpose of

---

[8] Researchers who have used switching regression techniques in capital market studies include Sanger (1986) and Lyon (1986). Sanger examined the impact of the Tax Reform Act of 1976 on REITs and determined, by use of switching regression, that the regression relationship for REIT returns obeyed two separate regression regimes. Similar results were found for the oil and gas industry by Lyon. The results of these studies suggest that an intervention in the time series of the return-generating process may cause a shift in the regression coefficients should be examined.

cross-sectional comparisons, however, OLS is not appropriate. Ordinary least squares regression assumes that the error terms in the regression model are uncorrelated. However, since all firms in the sample are from the same industry, the error terms may be correlated (King 1966). Independent error terms is not, however, an assumption of generalized least squares regression.

Seemingly unrelated regression (SUR) is a generalized least squares regression technique that controls for cross-correlation by allowing for joint estimation of all firms (Zelner 1962). For SUR, Equation 4.3 is disaggregated into a system of equations, and pairs of equations are estimated simultaneously. Normally, each firm in the sample could be represented by one equation. However, since the number of observations in the time series must be greater than the number of regression coefficients, the SUR technique necessitates grouping the firms into portfolios, with each portfolio being represented by one equation in the system.

The return of a portfolio is the weighted average of the returns of the individual securities comprising the portfolio, and can be expressed as:

(4.4)     $R_p = \Sigma\ x_i r_i,\quad \Sigma\ x_i = 1,$

where:

   $R_p$ = the rate of return of the portfolio

$x_i$ = the proportion of the portfolio value
     attributable to security i

$r_i$ = the rate of return on security i.

Theil (1971, pp. 309-310) shows that joint estimates of the coefficients in the SUR model yield the same values of the coefficients as do the ordinary least squares estimates. However, SUR uses the full estimated covariance matrix from the joint regression for conducting tests of hypotheses concerning the estimated coefficients. Thus, this technique corrects for cross-correlation among portfolios and improves the efficiency of the estimates.

In order to test the hypotheses and answer the research questions, OLS estimates were first obtained for individual portfolios, and an overall F test was conducted for each portfolio. Tests of significance on the coefficients of the information dummy variable were conducted using two-tail t tests. OLS is appropriate for tests of significance whereby cross-sectional differences are not of interest. Next, for conducting tests of cross-sectional differences, joint estimates of all the coefficients of Equation 4.3 were obtained for pairs of portfolios, using SUR techniques. An overall F test was conducted on each pair of portfolios. Tests of significant differences on the coefficients were conducted using Theil's F test (Judge et al. 1985).

Before estimating the coefficients of the model, the assumptions of the regression model were tested. Serial correlation was found in the returns of some portfolios and variable transformation was necessary for improving the estimates of the standard errors.

Hypotheses. In order to determine whether the real estate capital markets respond to changes in the tax law as predicted by the traditional theory, three specific research questions are proposed.

(1)     Do the real estate capital markets react to publicly available information concerning proposed or actual changes in the tax law?

(2)     Does a change from accelerated depreciation to straight line and longer recovery periods for real property result in an overall decrease in the market value of firms engaged in holding income-producing property relative to those engaged in other real estate activities?

(3)     Does a decrease in corporate tax rates result in an increase in the market value of real estate corporations relative to other real estate entities, such as REITs and MLPs, that generally are not taxed at the entity level?

Three hypotheses are presented for answering the research questions. In order to address the first specific research question and ascertain whether the real estate capital markets react to announcements concerning tax law changes, the firms were grouped into 6 portfolios as shown in Table 4.2.

For statistical testing, the following null hypothesis is presented:

TABLE 4.2

Portfolio Composition for Hypothesis 1

| Portfolio | Firm Classification Comprising Each Portfolio |
|-----------|----------------------------------------------|
| 1. | Corporations - Equity Investors |
| 2. | Corporations - Mortgage Investors |
| 3. | Corporations - Builders/Developers |
| 4. | REITs and MLPs - Equity Investors |
| 5. | REITs and MLPs - Mortgage Investors |
| 6. | REITs and MLPs - Hybrids |

H01: No significant abnormal returns were earned by any of the portfolios in any information month.

The hypothesis may be stated in the following notational form:

$$H01: \quad \delta_{pk} = 0 \text{ for all } \delta_{pk}$$

A separate F test was conducted for each of the six portfolios. For those portfolios found to be significant, a separate two-tail t-test was conducted on each $\delta_{pk}$. From the results of the t-tests, it can be determined whether the real estate capital markets adjusted to new

information, and the information months in which each portfolio reacted to tax announcements can be identified.

For addressing the second specific research question and determining the market reaction to a slower write-off of depreciable assets, the sample firms were grouped into 2 portfolios as indicated in Table 4.3. One portfolio comprises firms classified as equity investors; a second portfolio is made up of firms engaged in other activities.

TABLE 4.3

Portfolio Composition for Hypotheses 2 and 3

| Hypothesis | Firm Classifications Comprising Each Portfolio | |
| --- | --- | --- |
| | Portfolio 1 | Portfolio 2 |
| 2 | Equity Investors | Mortgage Investors and |
| | | Builders/Developers (Non-equity) |
| 3 | Corporations | REITs and MLPs (Non-corporation*) |

* The term "non-corporations" is used to indicate that the entities are not taxed as regular corporations.

The following null hypothesis is presented for testing:

HO2: No significant difference exists between abnormal
     returns of the equity investor portfolio and those
     of the non-equity investor portfolio for any
     information period.

In notational form, the hypothesis may be stated as

follows:

$$\text{HO2: } \delta_{1k} = \delta_{2k} \text{ for all } k$$

where subscripts 1 and 2 denote equity investor portfolios

and non-equity portfolios, respectively. The traditional

theory would predict a decline in the market values of

equity investors relative to other real estate firms as a

result of slower write-off of depreciation. An overall F

test was conducted to determine if there is a significant

difference between the two equations representing the two

portfolios. A separate F-test of the equality of the

coefficients was then conducted for each set of $\delta_{pk}$. If

HO2 is rejected for any information month and the

significant difference is of the predicted sign, the

evidence would provide support for the traditional theory

that slower write-off of depreciation results in a

downward adjustment by the capital market concerning

expected after-tax earnings and, consequently, the value

of affected firms. Rejection of HO2 with a significant

difference of a positive sign as predicted by the F-A-K

theory would support the F-A-K theory. Failure to reject

would not be inconsistent with the assertion that the

change in depreciation of structures had no differential effect on the real estate capital markets.

The third specific research question relates to the change in firm value resulting from changes in marginal tax rates for corporations. To determine whether the market value of corporations increased relative to real estate firms not taxed at the entity level, two portfolios were compared. As indicated in Table 4.3, one portfolio is comprised of regular corporations; the other is made up of entities not taxed as regular corporations (i.e., REITs and MLPs). The following hypothesis is presented:

HO3: No significant difference exists between abnormal returns of the corporation portfolio and those of the non-corporation portfolio for any information period.

In notational form, the hypothesis may be stated as follows:

$$HO3: \delta_{1k} = \delta_{2k} \text{ for all } k$$

where the subscripts 1 and 2 represent the corporation portfolio and the non-corporation portfolio, respectively. The traditional theory suggests that the market would have made an upward adjustment in its expectations regarding after-tax earnings of regular corporations relative to non-corporations as a result of information regarding a decline in corporation tax rates. For testing the hypotheses, an overall F test was conducted to determine

if there is a significant difference between the two equations representing the two portfolios. A separate F test was then conducted for each set of $\delta_{pk}$. If HO3 is rejected for any information month and the significant difference is of the sign predicted by the traditional theory, evidence would be adduced that the market reacted to information in that particular month by translating the lower tax rates into higher relative firm values in the real estate industry. Such reaction would provide support for the traditional theory.

If HO3 is rejected and the sign of the significant difference is not as predicted by the traditional theory, the evidence would suggest that the F-A-K theory is appropriate. Failure to reject would not be inconsistent with the assertion that the change in corporate tax rates caused no differential effects between corporations and other entity forms (i.e., entities not taxed as regular coporations).

## Summary

The traditional theory suggests that the market adjusts to information concerning changes in tax policy that alters the cash flows or tax liabilities of taxpayers. Slower write-off of the cost of structures would result, ceteris paribus, in a devaluation of securities of firms that hold equity interests in real estate. A decrease in corporate tax rates would cause an

increase in the value of corporations relative to other real estate organizational forms. The procedures described in this chapter are designed to test whether the real estate capital markets reacted to certain changes made be TRA '86 an a manner consistent with the traditional theory.

The traditional theory is of primary concern in this study. However, significant results contrary to those predicted by the traditional theory would lend support to the F-A-K theory that an inverse relationship exists between tax incentives and the market value of the firm.

# CHAPTER 5

## EMPIRICAL ANALYSIS

This chapter presents the empirical results of the effect of announcements concerning TRA '86 on the real estate capital markets. The statistical findings are presented in five sections. First, the selected sample is briefly described. Second, shift in parameter estimates are discussed. Third, the presence of assimilation effects on announcement dates is presented. Finally, significant differences in excess returns among portfolios are reviewed, followed by a discussion of mitigating and confounding effects.

### Selected Sample

Application of the criteria for sample selection discussed in Chapter 4 resulted in a total sample size of 127 real estate firms.[9]  Fifty-four percent of the companies included in the sample are relatively large firms and their securities are traded on the New York Stock Exchange. The remaining 46 percent are smaller

---

[9]A list of the companies included in the sample is provided in Appendix A.

companies whose stocks are traded on the American Stock Exchange.

Table 5.1 presents a tabulation of the number of firms in each portfolio classification. For the first stage of the statistical analysis, firms were classified according to both their organizational form and their functional activity form. Based on Realty Stock Review classifications and SIC codes, 41 of the sample firms were classified as building and development (B&D) corporations, 15 as equity corporations, and eight as mortgage corporations. Twenty-eight firms were classified as equity REITs or MLPs, 23 as mortgage REITs or MLPs, and 12 as hybrid REITs or MLPs.

For the second stage of the analysis, firms were first classified as either equity or non-equity companies depending on their functional activity. Forty-three real estate companies in the sample are classified as equity companies. The remaining 84 companies are non-equity companies.

All firms in the sample were subsequently reclassified as to their organizational form, either as corporations or as non-corporations. The corporation portfolio includes only those companies organized as regular C corporations. The non-corporation portfolio comprises REITs and MLPs. As indicated in the tabulation,

TABLE 5.1

Number of Companies In Each Portfolio

| Portfolio Composition | Number of Companies |
|---|---|
| B&D Corporations | 41 |
| Equity Corporations | 14 |
| Mortgage Corporations | 8 |
| Equity REITs and MLPs | 28 |
| Mortgage REITs and MLPs | 23 |
| Hybrid REITs and MLPs | 13 |
| Corporations | 64 |
| Non-corporations | 63 |
| Equity Firms | 43 |
| Non-equity Firms | 84 |

the corporation portfolio contains 64 firms; the non-corporation portfolio contains 63 firms.

## Shifts in Regression Equations

The switching regression technique was applied to identify a possible shift in the regression equation associated with each portfolio. The results are shown in Table 5.2. No hypotheses concerning the significance of the shift in either the intercept of the regression line or the beta coefficient were proposed. It may be noted, however, that during the sample period, eight of the ten portfolios did experience a significant shift in the beta coefficient. In most cases the shift in the portfolio regression equation occurred during the first quarter of 1983. The regression equation shifts appear to generally correspond to announcements of expected growth in GNP and increased real estate activity due to declining interest rates. In no case did the month in which the shift occurred coincide with a month in which an announcement concerning TRA '86 was made public. Consequently, it cannot be concluded from this study that the shift in the systematic risk of the portfolios may be attributed to information regarding TRA '86. The significance of such shifts in the beta coefficient can be related only to other factors in the market.

TABLE 5.2

Results of Shifting Regression Technique

| Portfolio | Shift Date | Beta Shift Estimate | t statistic |
|---|---|---|---|
| B&D Corp. | Mar. 1983 | -0.197 | -0.93 |
| Equity Corp. | Jan. 1983 | -0.424 | -1.71*** |
| Mortgage Corp. | Aug. 1983 | -0.531 | -1.97** |
| Equity Non-corp. | Apr. 1983 | -0.319 | -2.75* |
| Mortgage Non-corp | Mar. 1983 | -0.372 | -2.56** |
| Hybrid Non-corp. | Apr. 1986 | -0.666 | -3.64* |
| Equity Firms | Jan. 1983 | -0.341 | -2.65* |
| Non-Equity Firms | Mar. 1983 | -0.327 | -2.27** |
| All Corporations | Mar. 1983 | -0.341 | -2.12** |
| All Non-corp. | Mar. 1983 | -0.249 | -2.31** |

* = significant at the 1% level.
** = significant at the 5% level.
*** = significant at the 10% level.

Assimilation Effects

The first hypothesis relates to the propensity of the markets to assimilate information concerning changes in tax law. Ordinary least squares (OLS) regression was used to obtain the coefficient estimates, and a Durbin-Watson test was conducted to determine if the variables were serially correlated. The results of the Durbin-Watson indicated the presence of autoregressivity in the returns for some of the portfolios. Autocorrelation affects the efficiency of the parameter estimates and biases the estimate of the standard error. Consequently, the results of the t-tests are not valid (Johnson 1963, p.179).

To correct for autocorrelation, the Yule-Walker procedure of variable transformation was utilized. The Yule-Walker is a generalized least squares method which uses OLS residuals to estimate the covariances across observations.[10] This two-step full transformation procedure may appropriately be used to correct for autoregression in both large and small sample sizes (Park and Mitchell 1980). For those portfolios that exhibited autoregressivity, the values of the transformed variables were used for conducting tests of significance.

_____

[10]See Gallant and Goebel (1976) for a computational explanation of the Yule-Walker estimation.

In order to determine if the real estate markets react to information regarding tax law changes, an F test of significance was first conducted for each portfolio. As shown in Table 5.3, all the F statistics are significant. Next, t-tests for the presence of assimilation effects were conducted on the coefficient for each information date for each of six portfolios. The coefficient estimates are presented for each portfolio and each announcement date in Table 5.4. The t-statistic is shown in parentheses below the corresponding parameter estimate.

The first indication of a market reaction to possible changes in tax law occurred when the Bradley-Gephardt tax overhaul plan was introduced in August 1982.

TABLE 5.3

Tests of Significance on Individual Portfolios

| Portfolio | F Value | p Value |
| --- | --- | --- |
| B&D Corporation | 21.83 | .0001 |
| Equity Corporation | 5.54 | .0001 |
| Mortgage Corporation | 6.73 | .0001 |
| Equity Non-corporation | 8.01 | .0001 |
| Mortgage Non-corporation | 7.72 | .0001 |
| Hybrid Non-corporation | 6.92 | .0001 |

# TABLE 5.4

## Tests of Information Period Coefficients

## Coefficient Estimates and t-Statistics

| Information Period Event | Corporations | | | Non-Corporations | | |
|---|---|---|---|---|---|---|
| | B & D | Equity | Mortgage | Equity | Mortgage | Hybrid |
| Bradley-Gephardt Proposal | .0644 (1.82)*** | -.0819 (-1.55) | -.0101 (-0.19) | -.0222 (-0.95) | .0103 (0.34) | .0349 (1.39) |
| Kemp-Kasten Proposal | -.0458 (-1.46) | .0334 (0.68) | .0041 (0.08) | -.0168 (-0.77) | .0023 (0.08) | .0236 (0.96) |
| Treasury I Proposal | .0318 (1.01) | .0141 (0.29) | -.0119 (-0.22) | .0207 (0.94) | .0372 (1.35) | .0378 (1.57) |
| President's Proposal | -.0209 (-0.66) | .0079 (0.16) | .1080 (2.04)** | -.0018 (-0.08) | .0171 (0.62) | -.0160 (-0.66) |
| TRA '86, Ways & Means | .0327 (0.95) | -.0154 (-0.31) | .0080 (0.15) | -.0207 (-0.92) | -.0520 (-1.85)*** | -.0672 (-2.61)** |
| TRA '86 Full House | .0173 (0.49) | -.0079 (-0.16) | -.0418 (-0.79) | -.0136 (-0.60) | .0346 (1.23) | -.0203 (-0.79) |
| TRA '86 Senate Finance | -.0165 (-0.47) | -.0583 (-1.17) | -.0122 (-0.23) | -.0239 (-1.03) | -.0097 (-0.34) | -.0362 (-1.37) |

Table 5.4 (con't)

| Information Event | Portfolios | | | | | |
| | Corporations | | | Non-Corporations | | |
| | B & D | Equity | Mortgage | Equity | Mortgage | Hybrid |
|---|---|---|---|---|---|---|
| TRA '86 Full Senate | -.0726 (-1.91)*** | .0307 (0.62) | .0478 (0.88) | .0489 (2.19)** | .0031 (0.11) | .0593 (2.18)** |
| TRA '86 Conference | -.0732 (-1.81)*** | -.0031 (-0.06) | .0130 (0.24) | .0060 (0.27) | .0523 (1.84)*** | .0431 (1.59) |
| TRA '86 House & Senate | .0264 (0.70) | .0184 (0.37) | -.0497 (-0.92) | .0091 (0.39) | .0021 (0.07) | -.0114 (-0.38) |
| TRA '86 Enactment | -.0181 (-0.49) | .0026 (0.05) | .0325 (0.60) | -.0080 (-0.35) | .0167 (0.59) | .0243 (0.87) |
| OBRA '87 House | .0872 (1.69)*** | .0055 (0.09) | .0435 (0.59) | -.0646 (-2.19)** | -.0135 (0.37) | -.2266 (-4.25)* |
| OBRA '87 Senate & Conference | -.0531 (-1.30) | -.0609 (-1.21) | -.0472 (-0.85) | -.0088 (-0.38) | -.0359 (-1.23) | -.0208 (-0.74) |

* = significant at the 1% level.
** = significant at the 5% level.
*** = significant at the 10% level.

Note. All significance levels are for two-tailed tests of the null hypothesis.

For that test period, the abnormal return coefficient of the B&D corporation portfolio differs positively from zero at the 10 percent significance level. No other significant market reaction was observed in any of the portfolios until May 1985 when the President's tax reform proposal was unveiled. One possible explanation for the this lack of significance is that the markets placed a low probability on the occurrence of a change in tax law. Another possibility is that the markets did expect changes in the tax law, but due to the variations in the different tax reform proposals, there was no consensus as to the direction of such change. If so, differing opinions among investors could have resulted in offsetting reactions in the market such that an overall impact was not measurable.

During the month of the announcement of the President's tax proposal, one portfolio showed a significant abnormal return. The information coefficient of the mortgage corporation portfolio for May 1985 is barely significant at the five percent level. A combination of several provisions embodied in the President's proposal would be likely to have contributed to the positive market reaction relative to mortgage corporations. First, the proposed reduction in corporate tax rates and the repeal of the alternative minimum tax for corporations both may be considered as positive

factors affecting after-tax earnings of the mortgage corporation. Second, the tax plan generally would have allowed corporations a dividends paid deduction equal to 10 percent of dividends paid to shareholders. This deduction also would increase after-tax earnings. These factors, taken together with the President's endorsement of the tax plan, provide a plausible explanation of the positive market reaction in May 1985.

Tests of significance on the information coefficient for the month in which the Ways and Means Committee voted affirmatively on the House version of TRA '86 indicate that negative abnormal returns were earned by two portfolios in that period. The information coefficient of the mortgage non-corporation portfolio (REITs and MLPs) is negative and differs from zero at the ten percent level of significance. The coefficient of the hybrid non-corporation portfolio for November 1985 is significantly negative at the five percent level.

Prior to the Ways and Means Committee vote, the National Association of Real Estate Investment Trusts had been lobbying for relaxed rules governing the requirements for REIT status and the ongoing REIT operations. However, the bill passed by the Ways and Means Committee did not embody provisions for changes in the rules for REITs. If the REIT market had expected positive changes in tax law relative to REITs, that

expectation would probably have been incorporated into the price of REIT shares. When the Ways and Means Committee then failed to include those REIT provisions in the bill, the response of the non-corporation market would likely have been negative.

Tests of significance failed to indicate that any of the portfolios earned abnormal returns during the month of December 1985 when TRA '86 was passed by the full House or during May 1986 when the Senate Finance Committee passed its version of the tax reform bill. The passage of the bill by the House was probably fully anticipated by the markets and, consequently, the House vote would not result in abnormal market returns. The lack of significance for the month of the Finance Committee vote may be due to the differences between the House and the Senate versions of the tax reform bill. Such differences could have caused uncertainty in the markets regarding the final legislative outcome and prevented investors from acting on the new information. Another probable reason for the lack of significant results during these periods is that most informed analysts still thought fundamental tax reform was impossible.

The greatest number of significant results occur around the time of the full Senate vote and the Conference Committee agreement on TRA '86. By that time, the market

had evidently begun to place a greater probability on eventual tax reform.

The results of the analysis for the information month (June 1986) in which the full Senate passed its tax reform bill indicate that three portfolios earned abnormal returns. The information coefficient for B&D corporations is negative and significant at the ten percent level. The information coefficients for the hybrid non-corporation portfolio and the equity non-corporation portfolio are positive and significant at the five percent level. Some remaining uncertainty concerning the eventual outcome of Congressional action toward tax reform may account for the mixed results in the market in the period surrounding the Senate vote.

The results of the tests of significance for the month in which the Conference Committee voted on the final version of TRA '86 indicate that the B&D corporation portfolio again earned a negative abnormal return. The information coefficient is significant at the ten percent level, indicating that the market perceived the changes in tax law as being detrimental to the building and development industry. The information coefficient for the mortgage non-corporation portfolio differs positively from zero at the ten percent significance level. Why this portfolio was affected positively by the Committee vote is not clear since no provision was contained in the bill

that should have impacted uniquely the mortgage non-corporation portfolio.

The analysis does not indicate a market reaction during the month of the passage of TRA '86 by the full House and Senate nor during the month in which the bill was signed into law. It is plausible that, following the passage of the bill by the Conference Committee, the market anticipated the subsequent events. If so, no significant abnormal returns would be indicated for those months.

In October 1987, when the House passed its version of the Omnibus Budget Reconciliation Act, three portfolios exhibited significant abnormal returns. The information coefficient of B&D corporation portfolio is positive at the ten percent significance level. The equity non-corporation portfolio and the hybrid non-corporation portfolio had negative information coefficients for October 1987 at the five percent and the one percent significance levels, respectively.

Caution must be exercised in interpreting the results of the tests of significance for this information period. The stock market crash which occurred in the same month in which the bill was passed by the House probably had a more substantial effect on the market than did any legislative action. Moreover, the bill did not contain provisions that were predicted to impact substantially the

real estate industry. Consequently, the significant results obtained from the t-tests cannot necessarily be attributed to the passage of the Omnibus Budget Reconciliation Act.

## Cross-Sectional Differences

This section reports the empirical results of simultaneous estimations of Equation 1.2 for examining the differential effects of announcements concerning changes in cost recovery rules for real property and of those concerning changes in tax rates for corporations. The results of the statistical tests for determining significant differences between excess returns of comparative portfolios are reported in Tables 5.5 and 5.6, respectively. The reported F statistics are tests of equality on the values of the information period coefficients. Each statistic is distributed with 1 and 134=N(T-K) degrees of freedom, where N=2 is the number of equations, T=84 is the number of time periods, and K=17 is the number of independent variables in each equation.

Differential Effects of Changes in Cost Recovery for Real Property. The second hypothesis relates to the differential effects of announcements regarding changes in depreciation periods and methods for real property. For comparative purposes, all firms in the sample were included in either the equity portfolio or the non-equity

portfolio. The traditional theory predicts that for those announcements regarding tax law changes whereby the cost recovery of real property would occur more slowly than under pre-existing law, the coefficients representing abnormal returns of the equity portfolio will algebraically be smaller than those of the non-equity portfolio. All announcement periods in this study indicate a slower cost recovery except those regarding the Kemp-Kasten bill and OBRA. The overall F test was significant at the one percent level. The results of the individual F tests are presented in Table 5.5.

The null hypothesis of no significant difference between the information period coefficients of the equity portfolio and those of the non-equity portfolio was rejected at the one-percent level for one of the announcement dates. During the month of August 1982, when the Bradley-Gephardt tax plan was introduced, the excess return coefficient of the equity portfolio is -.06299, while the coefficient of the non-equity portfolio is .04301. The negative direction of the abnormal return coefficient for the equity portfolio is consistent with the traditional theory. Moreover, in further support of the traditional theory, the algebraic difference between the information coefficients of the two portfolios is negative. For all information periods subsequent to the announcement of the Bradley-Gephardt plan, there was no

## TABLE 5.5

Tests of Significant Differences Between
the Equity and the Non-equity Portfolio

| Information Period Event | Coefficient Estimates | | Sign of Diff.* | F value | p value |
| | Equity Portfolio | Non-equity Portfolio | | | |
| --- | --- | --- | --- | --- | --- |
| Introduction of Bradley-Gephardt Tax Plan | -.06299 | .04301 | − | 8.572 | .004 |
| Introduction of Kemp-Kasten Tax Plan | .00031 | -.01490 | + | 0.193 | .657 |
| Introduction of Treasury-I Tax Plan | .01877 | .01401 | + | 0.019 | .890 |
| Introduction of President's Tax Plan | .00374 | .01130 | − | 0.049 | .825 |
| Passage of TRA '85 by Ways and Means Committee | -.02242 | -.00157 | − | 0.366 | .546 |
| Passage of TRA '85 by House | -.01645 | .00634 | − | 0.525 | .471 |
| Passage of TRA '86 by Finance Committee | -.03788 | -.02968 | − | 0.058 | .810 |
| Passage of TRA '86 by Senate | .04201 | -.01485 | + | 2.780 | .098 |

Table 5.5 (con't)

| Information Period Event | Coefficient Estimates | | Sign of Diff.* | F value | p value |
|---|---|---|---|---|---|
| | Equity Portfolio | Non-equity Portfolio | | | |
| Conference Committee Agreement on TRA '86 | .00477 | -.01761 | + | 0.516 | .516 |
| Passage of TRA '86 by House and Senate | .01379 | .01692 | - | 0.008 | .929 |
| TRA '86 Signed by President | -.00888 | -.01168 | + | 0.007 | .935 |
| Passage of OBRA '87 by House | -.02755 | .02795 | - | 1.511 | .221 |
| Senate Passage and Conference Committee Agreement on OBRA '87 | -.02928 | -.05160 | + | 0.422 | .517 |

* A negative sign indicates that the equity portfolio coefficient is algebraically smaller than that of the non-equity portfolio. A positive sign indicates that the equity portfolio coefficient is algebraically greater than that of the non-equity portfolio.

significant difference in the information coefficient of the equity and the non-equity portfolios for any information month. However, in support of the traditional theory, the sign of the difference between the abnormal returns of the two portfolios, though not statistically significant, is negative for six of the announcement periods.

For the month in which the Kemp-Kasten bill was announced, the equity portfolio excess return is greater algebraically than that of the non-equity portfolio. However, the original version of the bill proposed no change in cost recovery methods. Consequently, the significant results in that information period cannot necessarily be attributed specifically to a market response to the Kemp-Kasten bill.

Differential Effects of Changes in Corporate Tax Rates. The third hypothesis concerns the differential effects of announcements regarding changes in the taxation of corporations. In order to compare the estimated excess returns across groups, regular corporations in the sample of firms were placed into one portfolio. A second portfolio contained all other sample firms. The traditional theory predicts that, for each test period except those related to OBRA, estimated excess returns will be positive for the corporation portfolio and algebraically greater than those of the non-corporation

portfolio. The overall F test was significant at the one percent level. The results of the individual F tests are presented in Table 5.6.

The null hypothesis of no significant difference between the corporation portfolio and the non-corporation portfolio is rejected at the five percent level for two information periods. The results indicate that in August 1986, when the compromise tax bill for TRA '86 received the approval of the Joint Conference Committee, the excess return coefficient of the corporation portfolio was -.0448. The excess return coefficient of the non-corporation portfolio was .0289. The direction of the difference in excess returns, however, is not consistent with the traditional theory, but is as predicted by the F-A-K theory. In four other information months, the differences in the excess returns of the two portfolios, though not statistically significant, are of the sign predicted by the traditional theory.

The second significant difference between the excess returns of the two portfolios occurred during October 1987, the month in which the Omnibus Budget Reconciliation Act of 1987 was approved by the House. However, caution should be exercised in interpreting this result. It is probable that the sudden and dramatic downturn of the stock market, which occurred in the same month as the OBRA '87 approval by the House, rendered the results of

TABLE 5.6

Tests of Significant Differences Between the
Corporation and the Non-Corporation Portfolio

| Information Period Event | Coefficient Estimates | | Sign of Diff.* | F value | p value |
| | Corp. Portfolio | Non-Corp. Portfolio | | | |
| --- | --- | --- | --- | --- | --- |
| Introduction of Bradley-Gephardt Tax Plan | .02690 | .00108 | + | 0.576 | .449 |
| Introduction of Kemp-Kasten Tax Plan | -.01049 | -.00331 | − | 0.128 | .721 |
| Introduction of Treasury-I Tax Plan | .00978 | .02503 | − | 0.221 | .629 |
| Introduction of President's Tax Plan | .00501 | .01455 | − | 0.087 | .769 |
| Passage of TRA '85 by Ways and Means Committee | .01611 | -.03596 | + | 2.561 | .112 |
| Passage of TRA '85 by House | -.00399 | .00073 | − | 0.021 | .884 |
| Passage of TRA '86 by Finance Committee | -.02822 | -.03522 | + | 0.047 | .829 |
| Passage of TRA '86 by Senate | -.02095 | .03046 | − | 2.553 | .113 |

Table 5.6 (con't)

| Information<br>Period Event | Coefficient<br>Estimates | | Sign of<br>Diff.* | F<br>value | p<br>value |
|---|---|---|---|---|---|
| | Corp.<br>Portfolio | Non-Corp.<br>Portfolio | | | |
| Conference Committee<br>Agreement on TRA '86 | -.04482 | .02885 | - | 5.164 | .025 |
| Passage of TRA '86<br>by House and Senate | .02519 | .00343 | + | 0.440 | .508 |
| TRA '86 Signed<br>by President | -.01922 | -.00122 | - | 0.311 | .578 |
| Passage of OBRA '87<br>by House | .05551 | -.05366 | + | 6.555 | .012 |
| Senate Passage and<br>Conference Committee<br>Agreement on OBRA '87 | -.06134 | -.02385 | - | 1.335 | .250 |

* A positive sign indicates that the corporation portfolio coefficient is algebraically greater than that of the non-corporation portfolio. A negative sign indicates that the corporation portfolio coefficient is algebraically smaller than that of the non-corporation portfolio.

statistical tests for this information month
uninterpretable. The differences between excess returns
of the two portfolios earned during the month of the
market crash cannot necessarily be attributed to
Congressional action concerning OBRA '87.

## Confounding and Mitigating Effects

There are several possible explanations for the low
level of significance found in the analysis of the
differential effects for equity and non-equity portfolios
and for corporation and non-corporation portfolios. One
possibility is that the market fully anticipated, and
reacted to, the information prior to the month in which
the announcement actually occurred. A review of The Wall
Street Journal in the month immediately prior to each
announcement period indicates that, in some cases, the
market did receive information regarding the probable
results of upcoming legislative action. Under these
circumstances, the reaction of the market may have
occurred in small degrees over the period of time in which
numerous bits of information were released. Consequently,
the market reaction may not be measurable in the month of
the Congressional announcement.

A second possible cause for insignificant results in
some information periods relates to the scope of the tax
law revision. Many of the provisions of TRA '86 may have
had opposing effects on the real estate capital markets.

One such example is the decrease in the top marginal tax rates for individuals which occurred simultaneously with the reduction in corporate tax rates. If, on average, corporations and non-corporations have the same earnings payout ratio, any change in tax rates for individuals should impact the market value of the two groups equally. However, an examination of the earnings payout history of the two portfolios over the time period of this study reveals that the payout ratio of the non-corporation portfolio has been more than two and one-half times greater than that of the corporation portfolio. With lower tax rates, individuals' preferences for taxable dividends may have increased. Consequently, the demand for those "higher-dividend" investments would increase, thereby driving up the value of the non-corporation portfolio relative to the corporation portfolio. In summary, while the decrease in corporate rates may drive up the market value of the corporation portfolio, the decrease in individual rates may force the value downward relative to the non-corporation portfolio. The unequal impact of the reduction in individual tax rates on the market value of corporations and non-corporations could have a confounding effect resulting in insignificant differences between those two portfolios.

CHAPTER 6

SUMMARY AND CONCLUSIONS

This chapter provides a summary of the examination of the impact of legislative action surrounding TRA '86 on the real estate capital markets and discusses conclusions drawn from the results of the statistical analysis of the data. The chapter includes four sections. First, the research project and the procedures for statistical analysis are summarized. Second, conclusions derived from the empirical results are presented. Third, the scope and limitations of the study are discussed. Finally, some suggestions for future research are given.

## Summary

Two opposing theories are enunciated in the literature concerning the impact of changes in the tax law. The traditional theory suggests that a positive relationship exists between tax incentives for businesses and the market value of the firm. According to this theory, tax law changes that provide businesses with incentives to increase capital investments stimulate expansion of the firm which, in turn, increases the firm's market value. On the contrary, the F-A-K theory holds

that a converse relationship exists between tax benefits and firm value. Newly-enacted provisions that encourage increased capital investments generally apply only to newly-acquired capital and, thus, drive down the value of existing capital. The consequence, as interpreted by the F-A-K theory, is a decline in the market value of the firm.

A number of simulation studies have been conducted which tend to refute the traditional theory and support the F-A-K theory. However, some empirical works have found evidence that the traditional theory is appropriate for explaining the behavior of the capital markets when tax law changes. This study attempts to determine if the behavior of the real estate capital markets during legislation regarding TRA '86 provides support for the traditional theory.

To determine whether the value of the firm changed in response to announcements concerning TRA '86, a sample of 127 real estate firms was grouped into six portfolios having different entity and operational characteristics. The portfolio return was modeled by a regression equation containing intervention dummy variables for capturing abnormal returns in those months in which new information was believed to reach the market. Using ordinary least squares (OLS) regression, the excess portfolio returns were then identified for those information periods, and

their level of significance determined by the use of t-tests. The purpose of the OLS procedure was to determine if the market assimilated the tax reform information.

To investigate the differential impact of the legislation across portfolios, the sample firms were again grouped into portfolios, first according to the nature of their operation, and second by organizational structure. The intervention model was again used. A generalized least squares (GLS) regression technique, known as seemingly unrelated regression, and F tests were employed for examining the cross-sectional differences in returns. For both OLS and GLS regression, a switching regression technique was utilized to improve the fit of the regression line.

## Conclusions

The first null hypothesis tested in this study is that no significant abnormal returns were earned by any of the portfolios in any information month. As indicated in Table 6.1, this hypothesis is rejected; t tests at six information periods (representing five separate portfolios) were significant at levels ranging from one to ten percent. In total, there were twelve occurrences of significant excess returns, nine of which appear to be related to announcements of legislative action on tax reform.

TABLE 6.1

INCIDENTS OF STATISTICALLY SIGNIFICANT EXCESS RETURNS

| Event | Portfolio | Alpha Level |
|---|---|---|
| Introduction of Bradley-Gephardt Proposal | B & D Corp. | .10 |
| Introduction of President's Tax Plan | Mortgage Corp. | .05 |
| Passage of TRA '85 by Ways and Means Committee | Mortgage Non-corp. Hybrid Non-corp. | .10 .01 |
| Passage of TRA '86 by Senate | B & D Corp. Equity Non-corp. Hybrid Non-corp. | .10 .05 .05 |
| Conference Committee Agreement on TRA '86 | B & D Corp. Mortgage Non-corp. | .10 .10 |
| Passage of BRA '87 by House and Senate | B & D Corp Equity Non-corp. Hybrid Non-corp. | .05 .05 .01 |

The results provide some evidence that the real estate capital markets do respond to information concerning changes in tax law. The findings suggest that the hybrid non-corporation portfolio and the B & D corporation portfolio were affected in more instances than were the other portfolios. Perhaps the nature of their activities causes these groups to be more sensitive to tax law changes. Equity corporations seem to have been

impacted the least. This result is contrary to the expectation that those announcements regarding changes in real property depreciation rules would adversely affect firms that hold real property for the production of income.

The greatest number of portfolios showing excess returns occurred in the month in which the Omnibus Reconciliation Act of 1987 (OBRA '87) was passed by the House and Senate. During that same month, however, the stock market experienced its most severe decline since the market crash of 1929. Consequently, the behavior of the real estate capital markets in that information period cannot necessarily be attributed to changes in tax law.

The second null hypothesis tested is that no significant difference exists between abnormal returns of the equity portfolio and the non-equity portfolio for any information period. Findings of significance in which the excess returns of the equity portfolio are less than those of the non-equity portfolio provide support for the traditional theory. The third hypothesis is that no significant difference exists between the corporation portfolio and the non-corporation portfolio for any information period. Support for the traditional theory is provided by significant differences between portfolios whereby the excess returns of the corporation portfolio

TABLE 6.2

INCIDENTS OF STATISTICALLY SIGNIFICANT CROSS SECTIONAL
DIFFERENCES IN EXCESS RETURNS

| Event | Portfolio Pair | Alpha Level |
|---|---|---|
| Introduction of Bradley-Gephardt Tax Plan | Equity & Non-equity | .01 |
| Senate Approval of TRA '86 | Equity & Non-equity | .10 |
| Conference Agreement of TRA '86 | Corp. & Non-corp. | .05 |
| House and Senate Approval of OBRA '87 | Corp. & Non-corp. | .01 |

are greater than those of the non-corporation portfolio.
Table 6.2 provides a listing of those events and

portfolio pairs wherein significant cross-sectional

differences are indicated.

The results provide only minimal support for the

traditional theory. In the month in which the Bradley-

Gephardt tax plan was announced, the excess return

coefficient of the equity portfolio exhibited a

significantly smaller value than did that of the non-

equity portfolio. The behavior of the capital markets in

that information period is consistent with that predicted

by the traditional theory. In the month in which the

Senate voted on TRA '86, the excess return coefficient of

the non-equity portfolio was algebraically greater than that of the equity portfolio. This result is inconsistent with the traditional theory.

The month in which the Joint Conference Committee approved a compromise bill, the corporation and non-corporation portfolios earned significantly different excess returns. However, the traditional theory suggests that the abnormal return of the corporation portfolio at that time should have been positive. It was not, nor was its value algebraically greater than that of the non-corporation portfolio. Consequently, the market reaction in that information period does not support the traditional theory but rather is consistent with the F-A-K theory.

The corporation portfolio did earn a positive excess return greater than that of the non-corporation portfolio in the month of the passage of OBRA '87 by the House and Senate. However, because of the instability in the stock market during that same month, it is unclear whether the market reaction is in response to Congressional action or to other factors. Consequently, the increase in firm values for corporations may not necessarily be taken as support for the traditional theory.

## Scope and Limitations

This study examined and analyzed the relationship between specific provisions the Tax Reform Act of 1986

and the real estate capital markets. Consequently, the results and conclusions may not be extended to other markets and other changes in tax law without reservation. Moreover, the sample companies used for study were drawn from the population of publicly-traded firms listed by the Center for Research in Security Prices (CRSP), and the sample selection criteria could have resulted in a selection bias. Therefore, caution also should be used in applying the results to other groups of companies.

Several economic assumptions under which this study was carried out are worthy of note. First, it was assumed that the markets operate efficiently in the semi-strong form. Second, a linear relationship is assumed to exist between the expected earnings of the firm and the firm's stock prices. Third, the assumption is made that the market moves toward a new equilibrium following an event that creates disequilibrium in the economy. While empirical support for these assumptions is contained in the literature (Beaver 1981), the results of this study depend upon their degree of validity and should be interpreted within the context of these restraints.

Another assumption made in this study relates to the timing of the market response to new information. Any excess returns resulting from each market adjustment are assumed to occur in the same month in which the information becomes public. To the extent that the market

reacts more slowly or has access to information before it is made publicly available, the information may be biased.

The focus of this study is on TRA '86 provisions relating to depreciation of real property and corporate income tax. However, it is possible that other provisions of the Act may have impacted the markets. For example, the change in tax rates for individuals is a provision which may have broad-reaching implications for the capital markets. This study assumes that the change in tax rates for individuals is reflected in the over-all market returns. Interpretations of the statistical results should be made with these constraints in mind.

Finally, the economic and political environment during the time period for this study could have had a unique impact on the results of this study. Consequently, the results may not be generalizable to periods that are not economically and politically similar.

## Suggestions for Future Research

In recent years, there has been a proliferation of master limited partnerships (MLPs) formed for the purpose of investing in real property. In the past, the limited availability of share price data for MLPs has deterred studies of the relationship between changes in such prices and changes in tax law. The growth in the market for publicly-traded partnership shares, however, has encouraged the collection and dissemination of MLP share

price information. Both the 1986 Act and OBRA '87 contained provisions for restricting deductions for losses on passive income investments such as limited partnership shares. As an extension to this work, researchers may examine the relationship between share prices and passive loss rules.

Another area of interest for future research is the impact of tax law changes on industries other than real estate. The results of such studies could be beneficial for Congressional decision making. Researchers may investigate the impact of certain provisions of TRA '86 that relate to specific segments of the economy, such as agricultural, oil and gas, or regulated investment companies.

Because of the post hoc nature of stock market studies, the methodological techniques that are currently used are not always able to distinguish between the effects of changes in tax law and effects of extraneous variables in the economy. Consequently, results may be biased. Future researchers may attempt to refine the methodology for measuring the market effects of changes in tax law so that extraneous variables have a smaller impact on the results of the studies.

# REFERENCES

Abel, Andrew B. 1982. Dynamic Effects of Permanent and Temporary Tax Policies in a q Model of Investment. _Journal of Monetary Economics_ 9: 353-373.

Aharony, Joseph and Itzhak Swary. 1981. Effects of the 1970 Bank Holding Company Act: Evidence from Capital Markets. _The Journal of Finance_ 36 (September): 841-853.

Ahsan, Syed M. 1976. Taxation in a Two-Period Temporal Model of Consumption and Portfolio Allocation. _Journal of Public Economics_ 5: 337-352.

Amoaka-Adu, Ben. 1983. The Canadian Tax Reform and its Effect on Stock Prices: A Note. _The Journal of Finance_ 38 (December): 1669-1675.

Auerbach, Alan J. and Laurence J. Kotlikoff. 1983. Investment Verses Savings Incentives: The Size of the Bang for the Buck and the Potential for Self-Financing Business Tax Cuts. _The Economic Consequences of Government Deficits_, ed. Laurence Meyer, 121-149. Boston: Kluwer-Nijoff Publishing Co.

Auerbach, Alan J. and James R. Hines, Jr. 1987. Anticipated Tax Changes and the Timing of Investment. _The Effects of Taxation on Capital Accumulation_, ed. Martin Feldstein, Chicago: University of Chicago Press.

Beaver, William H. 1981. _Financial Reporting: An Accounting Revolution_. N. J.: Prentice-Hall.

Binder, John J. 1985. Measuring the Effects of Regulation with Stock Price Data. _The Rand Journal of Economics_ 16 (Summer): 167-183.

Boadway, Robin W. and David E. Wildasin. 1984. _Public Sector Economics_ 2d ed. Boston, Toronto: Little, Brown and Company.

Chamley, Christophe. 1985. Efficient Tax Reform in A Dynamic Model of General Equilibrium. Quarterly Journal of Economics 100 (May): 335-356.

Chen, Andrew H. and Gary C. Sanger. 1985. An Analysis of the Impact of Regulatory Change: The Case of Natural Gas Deregulation. Financial Review 20 (February): 36-54.

Deficit Reduction Act of 1984, PL 98-369.

Downs, Thomas and Patric H. Hendershott. 1987. Tax Policy and Stock Prices. National Tax Journal 40 (June): 183-190.

Dyckman, Thomas R. and Dale Morse. 1986. Efficient Capital Markets and Accounting: A Critical Analysis. 2nd ed. New York: Basic Books.

Economic Recovery Tax Act of 1981, P.L. 97-34.

Eisner, Robert and R.H. Strotz. 1963. Determinates of Business Investment. Commission on Money and Credit, Impacts of Monetary Policy. N. J.: Prentice Hall, pp. 59-337.

Fama, Eugene F. 1976. Foundations of Finance. New York: Basis Books.

Feldstein, Martin. 1981. The Tax Cut: Why the Market Dropped. The Wall Street Journal, 11 November, 26.

Gallant, A. and J. Goebel. 1976. Nonlinear Regression with Autoregressive Errors. Journal of American Statistical Association 71: 961-967.

Hall, Robert and Dale W. Jorgenson. 1971. Application of the Theory of Optimal Capital Accumulation. Tax Incentives and Captial Spending, ed. Gary Fromm, 9-60. Washington, D.C.: The Brookings Institute.

Hall, Robert and Dale W. Jorgenson. 1967. Tax Policy and Investment Behavior. American Economic Review 57 (June): 391-414

Harberger, Arnold C. 1962. The Incidence of the Corporate Income Tax. Journal of Political Economy 70 (June): 215-240.

Hendershott, Patric H. 1985. Tax Reform and Financial Markets. Economics of Tax Simplification. Federal Reserve Bank of Boston Conference Series No. 29 (October).

Internal Revenue Code of 1986, sec. 263A.

Internal Revenue Code of 1986, sec. 167(j).

Internal Revenue Code of 1954, sec. 11.

Internal Revenue Code of 1986, sec. 168(c).

Internal Revenue Code of 1986, sec. 11.

Johnson, J. 1963. Econometric Methods. New York: McGraw-Hill, Inc.

Judge, G., Griffith, W., Hill, C., Lutkepohl, H., and Lee, Tsoung-Chao. 1985. The Theory and Practice of Econometrics. New York: John Wiley and Sons.

King, Benjamin F. 1966. Market and Industry Factors in Stock Price Behavior. Journal of Business 39 (supp., Jan): 139-160.

Larcker, David F., Lawrence A. Gordon, and George E. Pinches. 1980. Testing for Market Efficience: A Comparison of the Cumulative Residual Methodology and Intervention Analysis. Journal of Financial and Quantititive Analysis 15 (June): 267-287.

Lintner, John. 1967. The Valuation of Risky Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets. Review of Economics and Statistics 47 (August): 13-37.

Lucus, Robert E., Jr. 1967. Adjustment Costs and the Theory of Supply. Journal of Political Economy. 75 (August): 321-334.

Lyon, Andrew Bennet. 1986. How Do Stock Prices Change When Corporate Tax Laws Change? An Empirical Analysis of the Effect of Tax Laws on the Value of the Firm. Ph.D. Diss., Princton University.

Mertens Law of Federal Income Taxation. 1986. Ill.: Callaghan & Company.

Musgrave, Richard A. and Peggy B. Musgrave. 1984. <u>Public Finance in Theory and Practice</u>. New York: McGraw-Hill, Inc.

Mussa, Michael. 1977. External and Internal Adjustment Costs and the Theory of Aggregate and Firm Investment. <u>Economica</u> 44 (May): 163-178.

Omnibus Budget Reconciliation Act of 1987.

Quandt, Richard E. 1960. Tests of the Hypothesis that a Linear Regression System Obeys Two Separate Regimes. <u>Journal of the American Statistical Association</u> 55 (June): 324-330.

Quandt, Richard E. 1958. The Estimation of the Parameters of a Linear Regression System Obeying Two Separate Regimes. <u>Journal of the American Statistical Association</u> 53 (December): 872-880.

Revenue Act of 1971, P.L. 92-178

Revenue Act of 1981, P.L. 97-34.

Rev. Proc. 62-21, 1962-2 CB 418.

Sandmo, Agnar. 1977. Portfolio Theory, Asset Demand and Taxation: Comparative Statics with Many Assets. <u>Review of Economic Studies</u> 44 (June): 197-219.

Sanger, Gary C. 1987. Recent Tax Reform and Real Estate Investment Trusts: The Effects of the 1986 Tax Reform Act. Working Paper #8723-88, Louisiana State University.

Sanger, Gary C. 1986. The Effects of the 1976 tax Reform Act Upon the Risk and Return of Real Estate Investment Trusts. Unpublished manuscript, Louisiana State University.

Schwert, G. William. 1981. Using Financial Data to Measure Effects of Regulation. <u>Journal of Law and Economics</u> 24 (April): 121-158.

Sharpe, William F. 1964. Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk. <u>Journal of Finance</u> 19 (September): 425-442.

Summers, Lawrence H. 1981. Taxation and Corporate Investment: A q-Theory Approach. <u>Brookings Papers on Economic Activity</u> 1: 67-127.

Tax Reform Act of 1986, PL 99-514.

Tax Reform Act of 1969, PL 91-172.

Tax Reform Act of 1976, PL 94-455.

Tax Act of 1985, PL 99-121.

Theil, Henri. 1971. Principles of Economics. New York: John Wiley.

Treasury Regulation 1.167(j)-1.

U.S. Congress. House. Committee on Ways and Means. Fundamental Tax Reform and Other Tax Issues. 99th Cong., 1st sess., 1985.

U.S. Congress. House. Conference Report. Omnibus Budget Reconciliation Act of 1987. 100th Cong., 1st sess., 1987. H.R. 3545

U.S. Congress. Senate. Committee on Finance. Tax Reform Act of 1986. 99th Cong. 2d sess., 1986. H.R. 3838.

U.S. Congress. House. Committee on the Budget. Omnibus Budget Reconciliation Act of 1987. 100th Cong., 1st sess., 1987. H.R. 3545.

U.S. Congress. House. Committee on Ways and Means. Tax Reform Act of 1985. 99th Cong. 2d sess., 1985. H.R. 3838.

U.S. Office of the President. The President's Tax Proposals to the Congress for Fairness, Growth, and Simplicity. Washington, D.C., 1985.

Weidenbaum, Murry L. 1986. Tax Reform, Politics and Economics, in a lecture to the Center for the Study of Public Affairs, Washington University, St. Louis, Missouri, February 13, 1986. Printed in Vital Speeches of the Day 52 (February 15): 402-404.

# APPENDIX A

## List of Companies Included in the Study

| No. | Company Name |
|-----|--------------|

1. Americana Hotel & Realty Corp.
2. B R T Realty Trust
3. Beverly Investment Properties, Inc.
4. California Real Estate Investment Trust
5. Cenvill Investments, Inc.

6. Copley Property, Inc.
7. Countrywide Mortgage Investments, Inc.
8. Del Val Financial Corp.
9. Duke Realty Investment, Inc.
10. E Q K Realty Investments, 1

11. Eastgroup Properties
12. Federal Realty Investment Trust
13. First United Real Estate Eq. & Mtg. Investments
14. Gould Investments Trust
15. Gould Investments, LP

16. Guild Mortgage Investments, Inc.
17. H R E Properties
18. Hallwood Group, Inc
19. Harris Teeter Properties, Inc.
20. Health Care REIT, Inc.

21. Health Care Property Investments, Inc.
22. Healthvest
23. Hmg/Courtland Properties, LTD.
24. Hotel Properties, Inc.
25. Hotel Investments Trust

26. Hovnanian Enterprises, Inc.
27. I C M Property Investors, Inc.
28. International Income Property, Inc.
29. IRT Property Co.
30. Johnstown Consolidated Realty Trust

31. Koger Properties, Inc.
32. Koger Company
33. La Quinta Motor Inns, Inc.
34. Leisure & Technology, Inc.
35. Lennar Corporation

36. Levitt Corporation
37. Lincoln N C Realty Fund, Inc.
38. Linpro Specified Properties
39. Lomas & Nettleton Financial Corporation
40. Lomas & Nettleton Mortgage Investments

41. M D C Holdings, Inc.
42. M S A Realty Corp. Lomas Mortgage Corp.
43. Massmutual Mortgage and Realty Investments
44. Mission West Properties
45. Mony Real Estate Investments

46. Mortgage Growth Investments
47. Mortgage Investments Plus, Inc.
48. Mortgage & Realty Trust
49. National Enterprises, Inc.
50. New Plan Reality Trust

51. Newhall Investment Properties
52. One Liberty Properties, Inc.
52. Oriole Homes Corporation
54. Oriole Homes Corporation, II
55. Painewebber Residential Reality

56. Patten Corporation
57. Pennsylvania Real Estate Investment Trust
58. Perini Investment Properties, Inc.
59. Pittsburgh & W Va RR
60. Presidential Realty Corp.

61. Presidential Realty Corp., New
62. Property Capital Trust
63. Prudential Realty Trust
64. Punta Gorda Isles, Inc.
65. Radice Corporation

66. Realty Refund Trust
67. Realty South Investments, Inc.
68. Redman Industries, Inc.
69. REIT America, Inc.
70. Residential Mortgage Investments, Inc.

71. River Oaks Industries, Inc.
72. Rockefeller Center Properties, Inc.
73. Ryan Homes, Inc.
74. Ryland Group, Inc.

74. Ryland Group, Inc.
75. Santa Anita Reality Enterprises
76. Security Capital Corporation, Del
77. Skyline Corporation
78. Southwest Reality, Ltd.
79. Standard Pacific Corporation
80. Starrett Housing Corporation

81. Storage Equities, Inc.
82. Toll Brothers, Inc.
83. Trammell Crow Real Estate Investments
84. Turner Equity Investments, Inc.
85. Unicorp America Corporation, New

86. Union VY Corporation
87. United States Home Corporation
88. Vyquest, Inc.
89. Washington Homes, Inc.
90. Washington Real Estate Investment Trust

91. Webb Del E Investment Properties, Inc.
92. Wedgestone Financial
93. Weingarten Realty, Inc.
94. Wells Fargo Mortgage & Equity Trust
95. Western Investment Real Estate Trust

96. Winthrop Insured Mortgage Investors, II
97. Zimmer Corporation

VITA

Evelyn Caldwell Hume was born April 30, 1945 to Richard and Ruth Caldwell in Maryville, Tennessee, and received her primary and secondary education in public schools in East Tennessee. In 1983, she received her Bachelor of Arts degree in Accounting and in 1984, a Master of Arts in Accounting Information Systems, both from the University of West Florida. While at West Florida, she received the Florida Institute of C.P.A.'s Scholarship Award.

Evelyn began her doctoral studies at Louisiana State University in the College of Business Administration in 1984. During the course of the program, she majored in Accounting and minored in Economics. While at LSU, she served as a teaching assistant, teaching Financial and Managerial Accounting, and as a research assistant. Evelyn received the Richard D. Irwin Foundation Award for her doctoral dissertation. She also has had her co-authored work published in The Tax Advisor and has conducted seminars for small business groups in Baton Rouge, La. In 1988, Evelyn joined the accounting faculty at Georgia State University in Atlanta as an assistant professor.

132

Evelyn belongs to a number of professional organizations including the American Accounting Association, the National Association of Accountants, and the National Tax Association. She also is a member of Omicron Delta Kappa National Leadership Society, Phi Theta Kappa National Honor Society, and The Honor Society of Phi Kappa Phi. She has two adult daughters, Angela and Dianne. Evelyn and her husband, Clair, reside in the Atlanta metropolitan area.
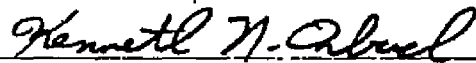
# DOCTORAL EXAMINATION AND DISSERTATION REPORT

**Candidate:** Evelyn C. Hume

**Major Field:** Accounting

**Title of Dissertation:** The Effects of the Tax Reform Act of 1986 on the
Real Estate Capital Markets and Its Differential
Effects on Entity and Functional Forms:   An
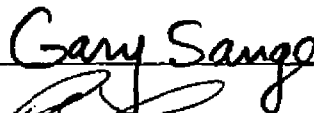Empirical Investigation
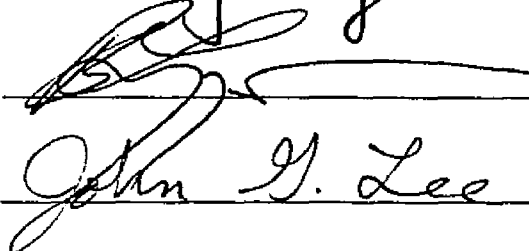
**Approved:**

_____
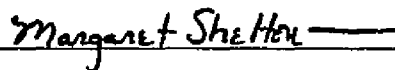Major Professor and Chairman

_____
Dean of the Graduate School

**EXAMINING COMMITTEE:**

_____

_____

_____

_____

_____

_____

**Date of Examination:**

_____     _____

November 28, 1988