Real Estate Risk and the Business Cycle: Evidence from Security Markets

*Lynne B. Sagalyn**

Abstract. **This study reports on the ex-post performance of survivor REITs and RECs over a 14.5-year period covering several business cycles. The results show that the systematic risk and risk-adjusted returns of REITs and RECs are quite different, especially during periods of low growth in real GNP. Relative to the overall stock market, survivor REITs, in particular, equity REITs, exhibited less volatility and higher returns than previous studies revealed. This can be explained by the higher returns, lower volatility, and lower systematic risk of REITs in periods of high growth in real GNP which have dominated the 1980s. The results expand our understanding of the true volatility of real estate, highlighting, at the same time, the need for further research to better understand the relationship between the performance of equity REIT securities and the underlying real estate assets in their portfolios.**

Introduction

In the past fifteen years real estate has emerged as a new and important component of institutional investment portfolios. Evaluating comparative attributes of asset groups, the case for real estate is made on the basis of its ability to hedge inflation and reduce portfolio risk through diversification [12, 13, 17, 21, 31]. Assessing real estate's historical performance, on a risk-adjusted basis, the case is further supported by simulations suggesting that most portfolios hold too few real estate assets; compared to stocks and bonds, real estate investments exhibit little volatility [2, 6]. Real estate's true volatility, however, is a source of continuing controversy. As measured by appraisal-based index data, the volatility of real estate is about one-fifth that of stocks, yet because of the well-known problems of appraisal bias and smoothing, these data series do not reflect price changes as rapidly as true values. Investment professionals, academics, and pension fund managers, in fact, do not believe the appraisal-based estimates of real estate are accurate. In a recent survey, when asked whether real estate's "one-fifth of stock risk" was accurate, only 18% of the 116 respondents said yes. As a group they believe that real estate risk is 57% of stock risk, or nearly three times the statistical level reported by the Frank Russell Company (FRC), the most widely used performance index for institutional-grade property [9].

*Department of Urban Studies and Planning, Massachusetts Institute of Technology, Building 7-338, Cambridge, Massachusetts 02139.
Date Revised—January 1990; Accepted—March 1990.

The volatility issue presents practical as well as empirical questions. Suppose you manage a portfolio of properties that must be priced regularly even though the individual assets in the portfolio are traded infrequently or not at all. What risk parameters do you use to guide allocation decisions and measure portfolio evaluation? Do you rely on periodic appraisals or look at transaction prices of actively traded securities even though the latter are not perfectly comparable assets? Posing the question another way: What can the market for publicly traded real estate securities—which records much higher variability based on transaction prices—tell us about the true volatility of real estate? In particular, real estate returns show little sensitivity to fluctuations in the economy, but are the appraisal-based data series not tracking something important about real estate's systematic risk over the business cycle?

When real estate is securitized and traded in liquid markets, it is likely to be quickly affected by macroeconomic factors that influence the pricing of other publicly traded securities. On the other hand, as portfolios of real estate assets with yields tied to multiyear leases, real estate investment trusts (REITs), for example, have a steady, contractual source of cash flow. Institutional factors reinforce this potential income-yield stability. Historically dividends have been a significant component of REIT returns because trusts must pay out 95% of their earnings. As a consequence, REIT returns may be less sensitive to declines in economic growth than industrial firms whose earnings are tied to manufacturing activity or real estate companies (RECs) whose earnings are tied to development and construction earnings.

The objective of this paper is to analyze the risk and return performance of two types of real estate securities, REITs and RECs, over the business cycle. The most current evidence to date indicates that equity REITs are about six times more volatile than direct investments [5, Part 2]. While these securities are not substitutes for direct real estate investments, Firstenberg, Ross and Zisler have suggested that because these two forms of real estate are priced differently, data on their volatility can be used to bracket the range of real estate's true volatility [5, Part 3]. Though the exact bounds are unknown, REITs and RECs can provide some evidence of the upper end. The next section of the paper reviews the relevant literature on the performance of real estate securities. It argues that because of changes in the REIT industry between the 1970s and 80s, less volatility and more stable returns than in the past can be expected. The third section discusses the research strategy and data used in the study. It is followed by a presentation of the empirical results. The final section summarizes the research.

REITs: A Changing Asset Group

Commercial real estate securitization has been a more popular topic for casual discussion than empirical study. Tarnished by a persistent negative image carried over from the 1970s, REITs have had little following among researchers in the academy or on Wall Street. In selected instances, financial economists interested in generic issues of stock behavior have looked at REITs as a special case [1, 16, 23]. In the field of real estate investment, the major thrust has been on the performance of directly held real estate, principally pension-investment holdings in commingled real estate funds (CREFs).

Historical performance studies of real estate securities cover different time periods and come to different conclusions. Early studies evaluating performance over the 1963–74 period found that REITs did not perform better than the overall market, as represented by

Exhibit 1
Aggregate Balance Sheet for REITs
(percent distribution)

	1973 %	1974 %	1975 %	1976 %	1977 %	1978 %	1979 %	1980 %	1981 %	1982 %	1983 %	1984 %	1985 %	1986 %	1987 %
Assets:															
Land, Development, and Construction Loans	54.0	46.2	32.1	20.3	16.2	14.3	14.9	11.9	10.0	9.6	9.4	6.0	6.2	5.9	4.8
Other Loans	20.8	33.1	27.3	27.5	27.7	27.9	25.7	27.0	27.3	27.6	26.1	43.4	46.1	51.7	57.2
Property Owned	16.5	19.8	39.5	52.4	55.1	54.9	53.9	53.9	55.0	55.1	53.8	38.7	37.5	36.9	31.2
Loss Reserve	0.0	–3.6	–6.3	–6.6	–4.8	–2.9	–1.9	–0.9	–0.7	–0.9	–0.5	–0.5	–0.5	–0.5	–0.3
Other Assets	8.7	4.4	7.4	6.4	5.8	5.8	7.5	8.1	8.3	8.6	11.3	12.4	10.7	6.1	7.2
TOTAL ASSETS	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Liabilities:															
Bank Borrowings and Commercial Paper	73.0	65.0	69.3	56.1	47.0	38.3	36.1	29.7	27.9	25.0	18.7	15.1	16.9	14.7	13.0
Mortgages on Property	10.3	10.0	17.1	28.3	35.6	42.0	44.2	46.8	48.5	50.5	54.6	36.4	32.2	19.8	13.8
Mortgage Backed Bonds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.2	26.3	47.4	57.8
Other Liabilities	16.7	25.0	13.7	15.6	17.5	19.7	19.7	23.5	23.6	24.5	26.6	18.2	24.6	18.2	15.4
TOTAL LIABILITIES	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: *NAREIT REIT Fact Book*

the S&P 500, or a closely related vehicle, the closed-end mutual stock fund [26, 27]. REITs were less diversified and less sensitive to market-wide fluctuations; they had low systematic risk. The results from another study, covering a shorter period from 1972 through mid-1977, were inconclusive; REITs outperformed the S&P 500 using the compound rate of return as a performance measure and underperformed the market using the arithmetic return. Relative to homebuilder RECs, equity REITs provided higher returns with lower volatility, and lower systematic risk [4].

More recent studies, however, provide quite different evidence. Covering longer time periods from 1973 through the mid-1980s, Firstenberg, Ross, and Zisler [5], Hartzell and Mengden [10], and Kuhle, Walter and Wurtzebach [15] found that equity REITs outperformed the S&P 500 by considerable margins. In particular, the results suggest significant differences in market risk and risk-adjusted returns between the 1970s and 80s. Other analysts studying interest-rate sensitivity [3] and the role of management incentives [28] similarly found significant changes in REIT performance between the 1970s and 80s.

Methodology and data samples might account for these differences, though a recent study by Titman and Warga which examines the risk-adjusted performance of REITs using both single-index capital asset pricing (CAPM) and multiple-index (arbitrage pricing theory, APT) models concludes that REIT performance rankings are not very sensitive to the risk-adjustment model [29].

A look at the changing profile of the REIT industry suggests that secular changes following the 1974–75 shake-out likely play an important role in explaining REIT performance over time. Consider Exhibit 1 which presents the aggregate balance sheet of the industry from 1973–87. By the early 1980s, property ownership as a proportion of total assets had more than tripled its 1973 share. Among financial assets there was a shift to long-term mortgages from short-term construction and development loans. Changes on the liability side mirrored those on the assets side. Debt capitalization shifted dramatically to long-term mortgages and mortgage-backed bonds from heavy short-term bank borrowings. Also, aggregate debt-equity ratios were lower than their 1974 high. Consequently, because the industry's sources of volatility have changed and its earnings have become less sensitive to short-term interest costs, we can expect greater performance stability.

Research Strategy and Methodology

Studying Survivors

Over the past fifteen years, when the national economy twice went into a deep recession, conditions in the nation's real estate markets were markedly different. The first major recession in 1974–75 came at a time when many real estate markets were generally over-built. The second, in 1981–82, occurred when many markets were tight, aggregate construction volumes were heavy, and demand across user-space markets was strong. To study the performance of real estate securities spanning these divergent conditions, "survivor" samples have been defined. For both publicly traded REITs and RECs, the sample includes all entities existing as of 1987 that had been continuously traded through at least those two recessions.

The REIT sample covers 20 REITs listed on the New York, American, or over-the-counter stock exchanges for the full 14.5-year period. From a larger group of 49 REITs

that met the initial criteria, 29 did not have continuous, historical share price and dividend data. The remaining sample of 20 represents approximately 14% of the 162 qualified REITs as of 1987, and roughly the same proportion in terms of asset size. In terms of sample composition, 12 are hybrid REITs, 3 are mortgage REITs, and 5 are equity REITs with more than 80% of their invested assets in the ownership of real estate assets or other in equity interests.[1]

A word on the 80% equity-REIT classification criterion. This is a tighter standard than that used in past studies, many of which did not explicitly state a definitional criterion [4, 15, 26, 29][2] or used a lower cutoff point, 60% in one case [13] and 67% in another [14]; it is also tighter than the 75% criterion currently used by the industry's group, the National Association of Real Estate Investment Trusts (NAREIT). Following Firstenberg, Ross and Zisler [5], it was imposed in this study in order to define a more homogeneous sample, one that would most closely represent pure equity real estate investment. Given the relatively small set of REIT survivors, using the 80% definition also makes for a stronger differentiation between the subsample of equity REITs and the all-REIT group.

Survivor status imparts a bias to the REIT sample, but the bias is helpful in examining cyclical performance because it abstracts from the secular changes taking place in the industry. By definition, the sample includes only the strongest REITs and excludes those that specialized in construction and development loans and experienced serious financial problems and poor performance during the 1974–75 recession. Apart from higher expected returns, however, the survivor REITs appear to differ little from the profile of REITs used for the NAREIT index, as judged by the near-perfect correlations of returns with the various samples.[3]. This is important in terms of the volatility issue.

The REC sample includes twenty-six companies separated into two subsamples of fifteen homebuilders and eleven commercial property investment/development companies. These publicly traded companies were identified from the *1986 Moody's Bank and Finance Manual* and included in the sample if they had a total capitalization exceeding $40 million and continuous, historical share price and dividend data.

Measuring Performance

Performance is measured several ways. First, the analysis presents real total returns and volatility statistics for the four sample groups: all survivor REITs, equity REITs, homebuilder RECs, commercial RECs. Returns for all portfolios are calculated on an equally-weighted basis[4] using quarterly data on share prices and dividends from 1973:3 through 1987:4 collected from Tradeline, an on-line financial information source [30]. Comparative data are compiled for a broader industry group of REITs as represented by the NAREIT index, the stock market as represented by the S&P 500, and unsecuritized real estate as represented by the Prudential Realty Investment Separate Account (PRISA) index. Second, market-risk betas and risk-adjusted returns are estimated using a Capital Asset Pricing Model (CAPM) as defined below:

$$R'_{jt} = \alpha_j + \beta R'_{mt} + \varepsilon_{jt} \tag{1}$$

where:

R'_{jt} = the excess rate of return, or $R_{jt} - R_{ft}$ on the real estate security portfolio j in period t;

R_{ft} = the risk-free rate of return as measured by the 90-day Treasury bill in period t;
R'_{mt} = the excess rate of return, $R_{mt} - R_{ft}$ on the market portfolio j in period t;
$\alpha_j\beta$ = the intercept and slope terms, respectively, of a least square regression line;
ε = the random error term with $E(\varepsilon_{jt}) = 0$.

Specifically the hypotheses tested will determine: (1) whether the systematic risk of REITs and RECs is significantly different from the overall market, as represented by the S&P 500; and (2) whether the systematic risk and risk-adjusted returns of REITs and RECs are significantly different during periods of high growth versus low growth in real GNP.

Tracking Economic Fluctuations

To study performance over the business cycle, changing economic conditions are tracked two ways. First, components of the cycle are defined in reference to peaks and troughs as established by the National Bureau of Economic Research (NBER). During the fifty-eight-quarter study period, there were three *upswing* periods (1975:2–1978:2; 1980:3–1981:1; 1982:2–1984:2) when the economy was pulling out of a trough and moving up to a peak. There were three corresponding *downswing* periods (1973:3-1975:1; 1978:3-1980:2; 1981:2-1982:2) when the economy was sliding down from a peak into a trough.

Second, the business cycle is divided into periods of relatively *high growth* versus periods of relatively sluggish or *low growth*. There were two periods of generally sluggish or negative growth:(1) the 1973:3-1975:1 period associated with the first oil crisis, and (2) the 1979:1-1982:4 period associated with the second oil crisis and tight monetary policy. These sluggish growth periods (which were longer than "recessions" when defined as negative growth for two or more consecutive quarters), were also characterized by high inflation. The subsequent periods, 1975:2–1978:4 and 1983:1–1987:4, were recessionless periods of generally strong economic growth and modest inflation.

Comparing Active and Passive Securities

All real estate securities are not alike. Consider the asset characteristics of equity real estate investment trusts and commercial real estate companies such as the Rouse Company or Koger Properties, Inc. Each consists of a portfolio of equity interests in income-producing property that is held for current cash flow and long-term appreciation in value. A prime difference between equity REITs and RECs, however, is passive versus active management. Intended by statute to be a mutual-fund investment for small investors, REITs exist under a special set of IRS regulations intended to make them passive investments.[5] For example, by requiring most assets to be held for at least four years, IRS restrictions inhibit a REIT from actively developing or holding property for sale. In contrast, development can be an on-going part of a public commercial real estate firm. These and other institutional differences are likely to influence performance [20].

Performance Results

Security Market Pricing

The performance of real estate securities is driven by security market pricing. When apartments, shopping centers, office buildings, or hotels are bundled together into mutual fund-type portfolios whose shares are traded publicly, real estate behaves much the same way as other publicly traded securities. Prices react quickly to changes in the economy, and, compared to direct investments in real estate, real estate security returns are very volatile. This volatility can be explained by differences in the way values for these investments are established. In securities markets, expectations about future interest rates and business activity are stated and restated through continuous trading by numerous investors, in contrast to periodic estimates captured by private appraisal valuations of direct holdings (which are infrequently traded) made by knowledgeable professionals. As a result, the liquidity provided by securitization involves a trade-off in increased volatility.

Exhibit 2 presents a comparative profile of real total returns and volatility for real estate securities and other investments. Over the 14.5-year period of analysis, real returns for NAREIT-indexed REITs were only slightly higher than for directly held real estate (PRISA); for equity REITs, they were about 0.9% higher on a quarterly basis. Real returns to survivor REITs were especially strong, outperforming the stock market by 1.2% on a quarterly basis. Not unexpectedly, survivor equity REITs provided significantly higher real returns, outperforming the S&P 500 and PRISA by 2.7% quarterly.[6] Total volatility, as

Exhibit 2
Returns to Real Estate Securities and Other Investments
Quarterly Real Total Returns
(1973:3–1987:4)

	Mean %	Standard Deviation %	Coefficient of Variation %
REITs:			
NAREIT Index data:			
All	1.41	10.39	7.37
Equity	2.24	8.08	3.61
Mortgage	0.52	11.91	22.95
Survivor Sample:			
All	2.61	11.11	4.25
Equity	4.10	8.52	2.08
RECs:			
Commercial	3.26	17.99	5.51
Homebuilder	4.42	26.32	5.95
Common Stocks (S&P 500)	1.41	9.50	6.73
PRISA	1.35	1.30	0.96

Source: NAREIT and author's sample data

Exhibit 3
Performance of Real Estate over the Business Cycle—Income and Appreciation Returns

Time Period*	Quarterly Returns									
	Survivor REITs				Survivor RECs				PRISA			
	Income		Appreciation		Income		Appreciation		Income		Appreciation	
	Mean %	STD %	Mean %	STD %	Mean %	STD %	Mean %	STD %	Mean %	STD %	Mean %	STD %
Whole: 73:3–87:4	2.21	0.54	2.06	11.55	0.37	0.40	5.64	22.20	2.05	0.25	0.99	1.54
Business Cycle Components:												
Upswing—Trough to Peak	1.99	0.36	5.12	7.55	0.24	0.13	9.26	18.56	2.22	0.22	1.83	1.70
Downswing—Peak to Trough	2.24	0.62	−0.53	16.43	0.57	0.64	2.54	30.32	1.84	0.15	0.33	1.12
Recession	2.75	0.54	−0.35	17.91	0.43	0.12	3.91	32.95	2.05	0.09	0.38	2.98
GNP Trend Periods:												
High Growth	2.05	0.49	2.22	7.48	0.26	0.11	4.42	17.52	2.00	0.27	0.66	1.20
Low Growth	2.47	0.53	1.78	15.35	0.54	0.58	6.55	28.29	2.13	0.20	1.51	1.84

* Upswing: 75:2–78:2, 80:3–81:1, 82:2–84:2 ($n=25$)
Downswing: 73:3–75:1, 78:3–80:2, 81:2–82:1 ($n=19$)
Recession: 74:1–75:1, 81:2–82:4 ($n=12$)

High Growth: 75:2–78:4, 83:1–87:4 ($n=35$)
Low Growth: 73:3–75:1, 79:1–82:4 ($n=23$)

Source: calculated from author's sample data; PRISA

measured by the standard deviation, was more than six times that for PRISA. Homebuilder and commercial RECs also outperformed the S&P 500, but both exhibited considerably greater variability which supports the widely held belief that homebuilding firms are among the market's most volatile stocks.

The volatility of real estate security returns comes from the variability of share prices. This is clear from the data in Exhibit 3 which breaks out the returns for the income and appreciation components of return (in nominal terms). For REITs, income returns paid out as cash dividends are relatively stable, even in recessions. For RECs, income returns are relatively unimportant as a source of return because, as growth stocks, they pay negligible dividends.

While securitization results in more price volatility than can be measured for direct real estate appraisals, the income generated by equity REITs does reflect underlying real estate market trends.[7] Because equity REITs are a hybrid investment—part stock, part real estate their income returns can be expected to move closely with those of other real estate investments such as PRISA. When correlations of returns are run, the income component of return for equity REITs is negatively correlated to PRISA income returns. That result, however, reflects the variability of share prices. When the actual dividend distributions for the survivor equity REIT portfolio are correlated against the actual cash flows from PRISA, the correlation (0.67) is strong and positive.[8]

One implication drawn from these performance results is that equity REITs offer potential benefits when included in investment portfolios—as substitutes for stocks. This is consistent with Kuhle's findings that equity REITs offer diversification benefits in mixed-stock portfolios [13]. Because they perform more like stocks than real estate, REITs are not a substitute for direct real estate investments. The security is not a good inflation hedge, though the underlying real estate assets benefit from inflation-hedging cost-pass through provisions, overage rents, and lease escalations. The problem is that the underlying appreciation value is not always fully valued by the market. Real estate securities typically trade at a discount because information to correctly value assets is insufficient, trading volumes are thin, and management-agency factors influence marketability. When individual assets are sold, appreciated values are realized through higher dividend payouts, but investors may not capture all the appreciation in a portfolio without liquidation of the REIT or REC.

Cyclical Volatility

Securitization amplifies real estate risk over the business cycle. As the statistics in Exhibit 4 show, all real estate stocks, like the S&P 500, performed best when the economy was on the upswing or growing robustly and performed worse when the economy was on the downswing or in a sluggish growth period. Quarterly real returns for survivor REITs, for example, ranged from a high of 5.5% in upswing periods to a low of −0.55% during downswing periods, and showed small positive returns of 0.6% during recessionary quarters. For commercial RECs, real returns ranged from a high of 7.5% during upswings to a low of −1.3% during downswings; recession period returns averaged −3.5%.

Differences in how the business cycle was tracked proved to be important in measuring the performance of real estate securities. The range of average quarterly returns with the upswing/downswing classification periods for equity REITs, for example, was almost three

Exhibit 4
Performance of Real Estate Securities and the S&P 500 over the Business Cycle
Quarterly Real Total Returns

Time Period*	All REITs		Equity REITs		Commercial RECs		Homebuilder RECs		S&P 500	
	Mean %	STD %	Mean %	STD %	Mean %	STD %	Mean %	STD %	Mean %	STD %
Whole Period: 73:3–87:4	2.61	11.11	4.10	8.52	3.26	17.99	4.42	26.32	1.41	9.50
Business Cycle Components:										
Upswing—Trough to Peak	5.54	7.91	6.14	6.29	7.50	15.73	7.85	22.29	2.42	7.63
Downswing—Peak to Trough	−0.55	16.05	0.63	10.52	−1.31	23.99	2.29	35.61	−1.93	10.43
Recession	0.57	18.27	2.33	13.54	−3.49	26.35	7.96	42.16	−0.71	13.68
GNP Trend Periods:										
High Growth	3.06	7.50	4.83	6.57	4.16	14.09	2.66	20.47	2.24	8.68
Low Growth	1.93	15.24	2.99	10.92	1.90	22.98	7.11	33.69	0.16	10.71

* Upswing: 75:2–78:2. 80:3–81:1. 82:2–84:2 (n=25)
Downswing: 73:3–75:1, 78:3–80:2, 81:2–82:1 (n=19)
Recession: 74:1–75:1, 81:2–82:4 (n=12)

High Growth: 75:2–78:4, 83:1–87:4 (n=35)
Low Growth: 73:3–75:1, 79:1–82:4 (n=23)

Source: calculated from author's sample data

times that of the high-growth and low-growth GNP-trend periods. This occurred, in part, because price fluctuations of real estate securities like other stocks lead changes in GNP growth by about two quarters [24]. Correlations of security returns and changes in GNP for the current and subsequent four quarters revealed relatively strong leading relationships: in the second quarter, these were as follows: S&P 500 (0.374), REITs (0.410), and RECs (0.314).

Business cycles are commonly described by the NBER's upswing/downswing classification; this study, however, uses the high/low growth classification for hypothesis testing, for a couple of reasons. First, it is a better conceptual descriptor because business cycles refer more appropriately to fluctuations in economic activity than precise repetitive cycles of similar length. Second, it is better suited to forecasting. With a GNP-based definition, the business cycle can be tracked as the data are released, independent of an agency's ex-post dating of cycle swings; as a result, the results have greater applicability for security analysts and professionals in the field.

Just how sensitive are REITs to macroeconomic changes when measured against the stock market at large? As shown in Exhibit 5 which presents the results of the CAPM regressions, the returns to survivor REITs were significantly more sensitive during low-growth periods and less sensitive during high-growth periods than a broad index of blue-chip stocks such as the S&P 500. For the full 20-REIT portfolio, the betas are 1.15 and 0.45 respectively; using a Chow test they are statistically different at a 99% level of confidence, as shown in Exhibit 6.

The shake-out of REITs during the 1974–75 recession is often cited as the cause of high volatility in real estate securities, but data covering several business cycles reveal comparatively high volatility for all low-growth periods and the systematic risk estimates reported above are significantly greater in low-growth versus high-growth periods. While the results of other studies reveal lower risk and higher returns in the 1980s than in the 1970s, the above results suggest that those findings may be an artifact of high-growth conditions that prevailed for most of the 1980s in both stock and real estate markets, not a shift in risk-return fundamentals. There was no statistically significant difference between the betas for either the all-REIT or equity-REIT sample for these two time periods. The same result was evident when NAREIT index data were used; however, in contrast, the betas for mortgage REITs were found to be significantly different.[9] These findings, unlike others [14], do not indicate that REITs have become less sensitive to business cycles.[10]

Not all REITs are expected to respond similarly to macroeconomic factors. It is well accepted that the performance of mortgage REITs, for example, is likely to be most sensitive to changes in interest rates. Hartzell et al. [11] lay out the argument and Mengden [18] and Chen and Tzang [3] provide empirical evidence of such differences. The results of this study also indicate that certain types of REITs will respond differently to business cycle conditions. Breaking out the survivor equity REITs using the tighter definitional criterion reveals that in periods of low GNP growth they have significantly lower systematic risk. As shown in Exhibit 5, the betas are 0.86 (equity REITs) and 1.15 (all REITs). Using NAREIT index data, similar results are evident.[11] As a type, equity REITs are less sensitive to general economic conditions than the stock market as a whole at all times over the cycle.

Further, equity REITs are the only real estate security with a record of statistically significant risk-adjusted excess returns during both high-growth and low-growth periods (though the difference is not significant). Exhibit 5 shows that the quarterly excess return during high-growth periods was 3.6%, and 2.9% during low-growth periods. Such large

Exhibit 5
CAPM Performance Results for Real Estate Securities for GNP Growth Trend Periods (quarterly data)

	Whole Period	High Growth	Low Growth
All REITs:			
alpha	0.014	0.018	0.018
	(1.30)	(1.59)	(0.94)
beta	0.794	0.449	1.155
	(6.85)**	(3.49)**	(6.22)**
R	0.456	0.270	0.648
Equity REITs:			
alpha	0.031	0.036	0.029
	(3.99)**	(3.85)**	(2.37)*
beta	0.648	0.435	0.863
	(7.94)**	(4.08)**	(7.43)**
R	0.530	0.335	0.725
Commercial RECs:			
alpha	0.014	0.018	0.018
	(0.89)	(0.96)	(0.71)
beta	1.487	1.116	1.874
	(9.20)**	(5.39)**	(7.70)**
R	0.602	0.468	0.738
Homebuilder RECs:			
alpha	0.020	−0.006	0.072
	(0.81)	(−0.22)	(1.66)
beta	2.034	1.583	2.583
	(7.86)**	(5.15)**	(6.28)**
R	0.525	0.445	0.653

t-values in parentheses
* significantly different from zero at the 95% level of confidence
** significantly different from zero at the 99% level of confidence

Time Period Definitions:
Whole Period: 73:3–87:4 (n=58)
High Growth: 75:2–78:4, 83:1–87:4 (n=35)
Low Growth: 73:3–75:1, 79:1–82:4 (n=23)

Source: calculated from equation (1).

excess returns are at variance with prevailing evidence about the efficiency of stock markets. They have persisted from the late 1970s throughout the 1980s, well after the market seemed to have adjusted for the 1974–75 REIT problems [15]. This again suggests that these survivor equity REITs are distinguished by something other than longevity. Superior management is one factor.

With respect to RECs, the results in Exhibit 5 indicate high systematic risk though it is not counter-cyclical to the business cycle. For the portfolio of fifteen homebuilders, for example, the beta is 1.58 for high-growth periods and 2.58 for low-growth periods; for commercial companies, the respective betas are 1.11 and 1.87. Davidson and Palmer's

Exhibit 6
Chow Tests of Significant Differences in CAPM Results for High and Low GNP Trend Growth Periods

	alpha	*beta*
All REITs	0.000	5.323**
Equity REITs	0.115	3.747*
Commercial RECs	0.000	2.917
Homebuilder RECs	1.305	2.023

The above statistics have degrees of freedom of 2 and 54.
* significantly different at the 95% level of confidence
** significantly different at the 99% level of confidence

Source: author's calculations based on data in Exhibit 5

study of homebuilders reported similar betas for the 1972–77 periods [4]. The risk-adjusted return for the homebuilders shows counter-cyclical behavior (7.2% and significant at the 90% level of confidence for low-growth periods compared to −0.6% for high-growth periods), but these parameters are not statistically different. Though suggestive, the results cannot confirm the notion that homebuilding stock returns, being counter-cyclical, would reduce portfolio risk.

The systematic differences in REIT performance over the business cycle strongly suggest that real estate risk is not only more volatile than existing statistics indicate, but that when measured by appraisal-based data, it is likely to be especially underestimated during recessions, and more generally, in periods of low growth in real GNP. Firstenberg, Ross and Zisler [5, Part 3] have suggested that equity REIT volatility can be used as an upper-bound estimate of real estate's true volatility, after adjusting downward to account for discount pricing and the influence of management. The results presented above further suggest that when used in portfolio asset-allocation models, adjusted risk estimates would lower substantially the very high target allocations for real estate that are typically generated with published real estate risk data.

A Note on Recession Performance

The empirical results indicate that it is difficult to generalize about the recessionary performance of real estate securities because economic cycles in the recent past have not run in tandem with construction cycles [7]. When real returns for all recession quarters are averaged, for example, survivor REITs (0.6%) outperform the S&P 500 (−0.71%). This average figure, however, obscures major differences in REIT performance between the 1974–75 and 1981–82 recessions that undoubtedly relate to the market's perceptions of divergent real estate fundamentals during these periods. During 1974–75, the average real quarterly return to the survivor REITs was −5.2% compared to 4.7% during 1981–82; the standard deviation dropped from 25% to 12.1%. For the latter recession, equity REITs recorded similarly strong returns, 5.2%, and comparatively modest volatility, 12.4%. Clearly, some part of the poor performance in 1974–75 can be attributed to the industry's

problems at the time. Survivors, mostly hybrid and equity REITs, did not suffer from the underlying collateral problems that mortgage REITs experienced, but even so investors did not immediately distinguish between different types of REITs and share prices of both declined dramatically.

The income component of return tells a different story, however. For both cycles, the average income return, which accounts for more than half of the total return for survivor REITs, has shown very little volatility. Though there are very few quarterly data points for these recessions, the data suggest that the returns from the underlying assets of established REITs holding large, diversified portfolios are relatively insensitive to recessionary downturns.

Why then should the true returns to real estate be volatile when income streams are stable? Consider an analogy with bonds.[12] The income component of return is like the cash yield from a bond; the contractual nature of a property's lease revenues produces a predictable and steady cash flow independent of macroeconomic conditions. In the case of a bond, its price will vary with changes in interest rates and the creditworthiness of the issuer. The degree of variability ultimately is determined by its coupon, its pay rate, and its term-to-maturity. Real estate valuations should also vary with interest rates for the same reasons. Buildings with long-term leases that are slow to adjust to inflationary pressures should be more interest-rate sensitive to their valuations than buildings with short-term leases. Unlike a bond, however, a building's income return is not fixed for the life of the property. Rents are readjusted periodically to market rates at the end of the lease term. Therefore, the capital value of the income stream is similar to a series of options on future income streams whose value fluctuates with changing expectations of future market conditions, including rental rates, anticipated absorption rates, and projections of future supply and demand. They are volatile in product markets that have volatile construction cycles such as offices and shopping centers. Consequently, real estate's true volatility can be expected to be greater than that recorded by appraisal-based returns. Current income, however stable, accounts for only a small portion of the total return on a long-lived asset such as real estate.

Summary and Conclusions

Real estate securities are a small but important part of the real estate capital market. Traded in public markets, REITs and RECs offer individual and institutional investors liquidity and an opportunity to build diversified real estate portfolios more readily than through direct holdings. There is a trade-off, however. When securitized, real estate returns become highly volatile, much like other publicly traded stocks despite stable underlying cash flow streams. Whether and how this well-known volatility varies over the business cycle has not been examined.

This study reports on the ex-post performance of survivor REITs and RECs over a 14.5-year period covering several business cycles. The results show that the systematic risk and risk-adjusted returns of REITs and RECs are quite different, especially during periods of low growth in real GNP. Relative to the overall stock market, survivor equity REITs, in particular, exhibited less volatility and higher returns than previous studies revealed. This can be explained by the higher returns, lower volatility, and lower systematic risk of REITs in periods of high growth in real GNP which have dominated the 1980s. Using this research to gain insight about real estate's true volatility, one implication is that real

estate's systematic risk, when measured with appraisal-based data, is most likely to be most underestimated in periods of low economic growth.

When comparing REIT and REC performance, the empirical results suggest that the market offers no premium for "active" real estate management. Just the opposite: "passive" equity REITs have yielded excess returns. Differences in the portfolios of REITs and RECs might account for this result as some RECs maintain sizeable inventories of development property. More to the point, the data suggest what professionals who manage REITs acknowledge: the distinction between active and passive investments is more academic than real. Though REITs operate under specific restrictions, many actively manage the real estate assets in their portfolios. Also, not all investments are passive in nature. Some REITs, for example, pursue investment strategies focused on acquisition, capital improvement, and tenant upgrading of existing properties. Others engage in new development activity through joint venture partnership arrangements, thereby investing in the higher-return higher-risk end of the real estate activity spectrum. At both the portfolio and property level, therefore, performance is influenced by actions of management. And this implies that the performance of equity REITs cannot be tracked as a pure measure of the true return on a passive buy-and-hold strategy for a portfolio of real estate assets.

The contrasting performance of equity REITs and RECs indicates that the market views these real estate securities as distinctly different. Equity REITs have comparatively low volatility and systematic risk which is not surprising given that they represent portfolios of real estate assets. The REC volatilities seem particular high when one considers that the figures are portfolio volatilities, which must be less than many individual company volatilities due to the diversification effect. RECs are clearly not viewed by the market as simply portfolios of existing real estate assets, but rather as businesses whose profit and loss depend on conditions in the construction and development industry.

This study points out the need for further research to better understand the relationship between the performance of REIT-type securities and the underlying real estate assets in their portfolios. The evidence from several studies now shows clearly that we cannot track equity REITs as a pure return series for equity real estate. The differences in performance between securitized and unsecuritized real estate can only partially be explained by the well-known smoothing problem of appraisal-based portfolios such as PRISA. If we are to understand real estate's true volatility, we need to closely explore why existing securities perform as they do, how REIT portfolios differ in important ways from commingled fund portfolios, and the role of management in influencing superior performance.

Notes

[1]A review of portfolio composition through 10 K reports indicates that these classifications (with one or two exceptions) remained stable throughout the period of analysis. Because the 95% payout rule inhibits the growth of retained earnings and the market generally discourages large amounts of balance-sheet debt, individual REITs generally grow slowly. Further, it is difficult for REITs to make major changes in investment strategy because, in the short-term, such changes often negatively impact earnings and subsequently depress share prices. As a result, REIT investment strategies change infrequently.

[2]A review of these studies indicates that in the three earliest [26, 27, 4], the implicit definitional criterion appears to have been 50%.

[3]These correlations are as follows: All-REIT sample with NAREIT All REITs, (0.962); and Equity-REIT subsample with NAREIT Equity REITs, (0.901).

[4]Equally weighted returns are used so that the results would not be dominated by a few large REITs or RECs. This is particularly important in light of the choice of a survivor sample, which by definition would not purport to represent the current composition of the industry even though each REIT is an equally valid representative.

[5]REITs are a conduit for corporate earnings and pay no federal tax on income or gains passed through to shareholders if they meet certain provisions of the IRS code. The principal provisions require that a REIT: must have at least 100 shareholders; must have no more than 50% of its shares owned by five or fewer individuals; must be managed by a board of trustees or directors; must distribute 95% of its net annual taxable earnings; derive 75% percent of its annual gross income from real estate activities; and hold at least 75% of its total invested assets in real estate (including fee interests, leaseholds, options, loans secured by real property, and shares in other REITs. See S. P. Jarchow, *Real Estate Investment Trusts; Tax, Securities, and Business Aspects* (New York: John Wiley & Sons, 1987).

[6]A comparison between our REIT samples and the NAREIT index indicates that the superior performance on the part our REIT sample is, in part, a "survivor effect." NAREIT index returns are little more than half those of the survivor sample returns, though NAREIT equity returns still outperform the S&P 500 by 0.83% on a quarterly basis.

[7]The income return component is a reasonable proxy for the performance of underlying REIT cash flows because of the 95% payout mandate. Further, the dividend/cash flow ratio is likely to close to one because REITs cannot accumulate large reserves of earnings with which to support dividend payouts in the long term.

[8]My thanks to Anne Mengden for clarifying this point reported otherwise in an earlier draft of this paper. There is still an unresolved ambiguity to the issue because the results differ (no correlation) when the Frank Russell Company Index data are used. Also see [10].

[9]Results are available on request.

[10]Survivor bias is not a factor here as these findings hold for the industry's NAREIT index data as well. An earlier analysis by Smith and Shulman also indicates similar differences in systematic risk between rising and declining markets during the 1964–74 period [27].

[11]The beta for NAREIT equity REIT for low-growth periods (0.83) is notably higher than that for high-growth periods (0.47) *and* less than that for mortgage REITs during low-growth periods (1.23).

[12]Gyourko and Linneman [8] also use the bond analogy, although they conclude that "the changes in property values (which reflect discounted real cash flows) should be relatively stable" (page 14).

References

[1] Paul R. Allen and C. F. Sirmans. An Analysis of Gains to Acquiring Firm's Shareholders: The Special Case of REITs. *Journal of Financial Economics* 18 (March 1987), 174–84.

[2] W. B. Brueggeman, A. H. Chen and T. G. Thibodeau. Real Estate Investment Funds: Performance and Portfolio Considerations. *AREUEA Journal* 12 (Fall 1984), 333–54.

[3] K. C. Chen and Daniel D. Tzang. Interest-Rate Sensitivity of Real Estate Investment Trusts. Working Paper 57, University of Illinois, Urbana-Champaign, College of Commerce and Business Administration, Office of Real Estate Research, March 1988.

[4] Harold A. Davidson and Jeffrey E. Palmer. A Comparison of the Investment Performance of Common Stocks, Homebuilding Firms, an Equity REITS. *The Real Estate Appraiser* (July August 1978), 35–39.

[5] Paul B. Firstenberg, Stephen A. Ross and Randall C. Zisler. Managing Real Estate Portfolios. Goldman Sachs Real Estate Research, November 16, 1987.

[6] H. Russell Fogler. 20% in Real Estate: Can Theory Justify It? *Journal of Portfolio Management* 10 (Winter 1984), 6–13.

[7] Leo Grebler and Leland S. Burns. Construction Cycles in the United States Since World War II. *AREUEA Journal* 10 (Summer 1982), 123–51.
[8] Joseph Gyourko and Peter Linneman. Analyzing the Risk of Income-Producing Real Estate: A New Perspective. Draft, February 1988.
[9] David Hartzell. Real Estate Risks and Returns: Results of a Survey. Salomon Brothers, Inc. Bond Market Research, March 23, 1989.
[10] ——— and Anne Mengden. Another Look at Equity Real Estate Investment Trust Returns. Salomon Brothers, Inc. Bond Market Research Real Estate, September 22. 1987.
[11] David J. Hartzell, David G. Shulman, Terence C. Langetieg and Martin L. Leibowitz. A Look at Real Estate Duration. Salomon Brothers, Inc. Bond Market Research, December 1987.
[12] Roger G. Ibbotson and Laurence B. Siegel. Real Estate Returns: A Comparison with Other Investments. *AREUEA Journal* 12 (Fall 1984), 219–42.
[13] James L. Kuhle. Portfolio Diversification and Return Benefits—Common Stocks vs. Real Estate Investment Trusts (REITs). *The Journal of Real Estate Research* 2 (Winter 1987), 1–9.
[14] ——— and Carl H. Walther. REIT vs. Common Stock Investments: An Historical Perspective. *Real Estate Finance* 3 (Spring 1986), 47–52.
[15] ——— and Charles H. Wurtzebach. The Financial Performance of Real Estate Investment Trusts. *The Journal of Real Estate Research* 1 (Fall 1986), 67–75.
[16] Cheng F. Lee and James B. Kau. Dividend Payment Behavior and Dividend Policy on REITs. *Quarterly Review of Economics and Business* 27 (Summer 1987), 6–19.
[17] Meyer Melnikoff. The Attractiveness of Real Estate Investments for Pension Funds. In *Real Estate Investing*. Proceedings of a Conference Sponsored by The Institute of Chartered Financial Analysts. April 19, 1985. Homewood, Ill.: Dow Jones-Irwin, 1986.
[18] Anne E. Mengden, Real Estate Investment Trusts—Sensitivity of Dividend Yields to Changes in Interest Rates. Salomon Brothers, Inc. Stock Research, January 21, 1988.
[19] ——— and David Hartzell. Real Estate Investment Trusts—Are They Stocks or Real Estate? Salomon Brothers, Inc. Bond Market Research, August 27, 1986.
[20] Mike Miles and Tom McCue. Historic Returns and Institutional Real Estate Portfolios. *AREUEA Journal* 10 (Summer 1982), 184–99.
[21] ———. Commercial Real Estate Returns. *AREUEA Journal* 12 (Fall 1984), 355–77.
[22] *REIT Fact Book*. Washington, D.C.: NAREIT, 1974, 1977, 1986.
[23] Raman C. Patel and Robert A. Olsen. Financial Determinants of Systematic Risk in Real Estate Investment Trusts. *Journal of Business Research* 12 (1984), 481–91.
[24] Joe Peek and Eric S. Rosengren. The Stock Market and Economic Activity. *New England Economic Review* (May June 1988), 39–50.
[25] Stephen Roulac. Can Real Estate Outperform Common Stocks? *Journal of Portfolio Management* 2 (Winter 1976), 26–43.
[26] Keith V. Smith. Historical Returns of Real Estate Equity Portfolios. In *Investment Manager's Handbook*, Homewood, Ill.: Dow Jones-Irwin, 1980.
[27] ——— and David Shulman. The Performance of Equity Real Estate Investment Trusts. *Financial Analysts Journal* (September October 1976), 61–66.
[28] Michael E. Solt and Norman G. Miller. Managerial Incentives: Implications for the Financial Performance of Real Estate Investment Trusts. *AREUEA Journal* 13 (Winter 1985), 404–23.
[29] Sheridan Titman and Arthur Warga. Risk and the Performance of Real Estate Investment Trusts: A Multiple Index Approach. *AREUEA Journal* 14 (Fall 1986), 414–31.
[30] Tradeline. IDD Information Services, 1988.
[31] Robert H. Zerbst and Barbara R. Cambon. Real Estate: Historical Returns and Risks. *Journal of Portfolio Management* 10 (Spring 1984), 5–20.

The author acknowledges the assistance of Citicorp Real Estate Inc. and the MIT Center for Real Estate Development. Appreciation is also extended to David Geltner for his research assistance.