YIELDS ON COMMERCIAL AND INDUSTRIAL REAL ESTATE VERSUS OTHER ASSETS

by James R. Webb and C. F. Sirmans

The freedom of professional investment managers to invest in alternatives to the normal common stock and bond portfolios has created a demand for information on yields of other types of investment. However, this yield information is often not readily available. Even for real property, which is undoubtedly the predominant alternative to financial assets, little empirical evidence is available on rates of return.

Even though the measurement of rate of return in real estate investments has been the subject of much theoretical literature over the past decade (3, 13, 23, 24), most returns studies analyze common stocks, maybe some form of bonds, and occasionally money market instruments (2, 6, 9, 10). The few available studies of real estate returns use a sample of few properties (15, 24), primarily a result of data limitations on real estate yields over time. It is generally believed that real estate returns are higher due to increased risk (16, 19).

In addition, there is even less empirical evidence on the relationship of investment yields in the money and capital markets to investment yields in the real estate markets. Kinnard, Messner, Boyce, Sprecher, and Starr (12, 19, 20) illustrate the descriptive approach generally utilized.

This study aims to alleviate both problems by adding to the meager empirical evidence on investment yields of commercial and industrial real property versus other assets and their relationships. The data for real estate yields come from a large institutional sample from the American Council of Life Insurance (1).

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This data set is a rich source of information on real estate yields that has largely been ignored.[1] Two annual rates of return on real estate are compared to annual returns on common stocks, long-term government bonds, long-term corporate bonds and U.S. Treasury Bills for the period from 1966 to 1976.

Measurement Of Rates Of Return

The latest and most comprehensive study done on rates of return in capital and money markets is that of Ibbotson and Sinquefield (9), who studied the returns on common stocks, long-term government bonds, long-term corporate bonds, and U.S. Treasury Bills from 1926 through 1974 with a later update through 1976 (10). Their estimates are used here in conjunction with two measures of return on real estate.

In the Ibbotson-Sinquefield study, the common stock return measure is based on the Standard and Poor's (S & P) Composite Index. Return measured is total return (appreciation plus dividends) and is calculated as:

$$R_{m,t} = [(P_{m,t} + D_{m,t})/P_{m,t-1}] - 1 \qquad [1]$$

where $R_{m,t}$ is the common stock total return during time t; $P_{m,t}$ is the value of the S&P Composite Index at the end of time t; and $D_{m,t}$ is the estimated dividends received during time t.

For long-term U.S. government bonds, a portfolio was constructed using bond data from the U.S. Government Bond File at the Center for Research in Security Prices (CRSP). Returns were calculated by:

$$R_{g,t} = [(P_{g,t} + D_{g,t})/P_{g,t-1}] - 1 \qquad [2]$$

where $R_{g,t}$ is the long-term government bond total return during time t; $P_{g,t}$ is the average between the bid and ask flat price (includes actual interest) of the bond at the end of time t; and $D_{g,t}$ is the coupon payment received during time t.

To measure returns for long-term corporate bonds, the high grade long-term Corporate Bond Index constructed by Solomon Brothers was utilized. Returns were calculated according to:

$$R_{c,t} = [(P_{c,t,19} + D_{c,t})/P_{c,t-1,20}] - 1 \qquad [3]$$

where $R_{c,t}$ is the bond return for a series during time t; $P_{c,t-1,20}$ is the purchase price at the end of time t − 1 for the yield series bond given a 20-year maturity; $P_{c,t,19}$ is the sale price of the yield series bond at the end of time t given in the example as 19 years to maturity, and $D_{c,t}$ is the coupon received.

U.S. Treasury Bill returns were measured with the U.S. Treasury Bill Index with data in the CRSP U.S. Government Bond File. An index was constructed that includes the shortest-term bills with maturities of not less than one month. Holding period returns for a one-bill portfolio were measured rather than compute yields. Actual calculations were done according to:

$$R_{f,t} = [P_{f,t}/P_{f,t-1}] - 1 \qquad [4]$$

where $R_{f,t}$ is the return for period t; $P_{f,t}$ is the price in period t; and $P_{f,t}$ is the price for period t − 1.

The two measures of return on real estate used in this paper are an implied equity rate and an overall capitalization rate (OR is an annual percentage rate that expresses the relationship between net operating income and present worth or value for the entire investment or property).

Data used for this study are from "Mortgage Commitments on Multi-family and Nonresidential Properties Reported by 15 Life Insurance Companies," published by the American Council of Life Insurance. Aggregate data are shown in Table 1. Note that beginning in 1967 almost three billion dollars a year on the average were being committed to these loans and the average L/V (loan to value) increased from just over 70 percent in 1966 to about 74 percent in the 1970s. Life insurance companies represent the single most important source of institutional mortgage lending on multifamily and commercial real estate. In 1976 this institutional group had 38 percent of the total of this type of outstanding loan.

The 15 reporting companies represent a major portion of the lending of the life insurance industry. In the fourth quarter, 1977, the reporting companies represented 53 percent of nonfarm mortgages held by U.S. life insurance companies, which amounts to income-property mortgage loan commitments aggregating over $52 billion. The companies included are Metropolitan, Prudential, Equitable, New York Life, John Hancock, Connecticut General, Mutual of New York, Mutual Benefit, Connecticut Mutual, Penn Mutual, National Life (Montpelier), Provident Mutual, and Fidelity Mutual. It is believed that this is the most comprehensive and largest sample of commercial and industrial real estate information available anywhere. The specific figures given are aggregate by necessity.

TABLE 1
Real Estate Data: 1966-1976*

Year	L/V (average)	f (average)	Overall Rate (average)	Number of Loans	Amount Committed
1966	70.0	9.0	8.4	2,706	$2,515,720
1967	71.0	9.2	8.6	2,726	$3,027,200
1968	73.6	9.5	8.0	2,569	$3,244,300
1969	73.3	10.2	9.6	1,788	$2,920,690
1970	74.7	11.1	10.8	912	$2,341,120
1971	74.9	10.4	10.0	1,664	$3,932,550
1972	75.2	9.8	9.6	2,132	$4,986,500
1973	74.3	10.0	9.5	2,140	$4,833,270
1974	74.3	10.6	10.1	1,166	$2,602,990
1975	73.8	11.2	10.8	599	$1,717,010
1976	73.6	10.8	10.3	1,059	$3,570,530

*From the American Council of Life Insurance Report (1). These are aggregate figures for all property types. They offer an indication of the magnitude of the sample.

The best measure of rate of return on real estate would be to solve for y in:

$$E = \sum_{t=1}^{n} \frac{BTCF}{(1+y)^t} + \frac{BTER}{(1+y)^n} \qquad [5]$$

Where:

E = equity investment = total value less mortgage value

BTCF = before-tax cash flow = net operating income less debt service

BTER = before-tax equity reversion = selling price less selling expenses and unpaid mortgage

y = internal rate of return to equity or in Ellwood's terminology (4), the equity yield rate, and

n = holding period

Wendt and Cerf (23) argue that the cash flows should be on an after-tax basis. However, the other returns used are on a before-tax basis. Therefore, in order to be comparable, before-tax yields were used for the real estate returns also. Certain assumptions about reversion, holding period, taxes, could have been made [as Ricks (14) did in his study] and after-tax yields easily calculated.

However, since the data set does not provide details of reversion or holding period, the simple mortage equity concept is used to calculate the implied equity rate (ER). These rates would therefore be *ex ante* rates (expected in the future) whereas the money and capital market rates are *ex post* (actual).

TABLE 2
Equity Rates of Return on Real Estate†

Property Type	Year											Mean
	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	
Commercial warehouse	4.39	4.51	4.73	6.32	6.42	8.04	7.24	6.77	8.67	10.34	7.53	6.81
Other commercial	7.46	6.44	7.43	6.98	17.52	9.29	12.57	12.05	12.64	*	9.44	10.18
Industrial warehouse	7.00	6.54	6.72	6.79	8.68	7.90	7.57	7.25	6.85	8.13	8.19	7.42
Manufacturing plant	5.80	5.85	5.76	6.26	8.29	7.82	8.27	6.56	7.42	7.50	7.20	6.98
Other industrial	6.30	6.50	7.61	*	7.04	10.60	8.94	9.99	7.51	7.51	9.17	8.12

†Derived using equation [7]
*Insufficient data available

TABLE 3
Overall Annual Rates of Return on Real Estate†

Property Type	Year											Mean
	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	
Commercial warehouse	7.90	8.20	8.43	9.63	10.75	9.95	9.45	9.23	10.33	10.90	10.00	9.52
Other commercial	8.85	8.40	9.80	10.30	12.60	10.70	10.85	10.90	11.40	*	10.30	10.11
Industrial warehouse	8.80	8.75	9.43	9.48	10.93	10.08	9.68	9.65	9.88	10.60	10.30	9.78
Manufacturing plant	8.40	8.55	8.85	9.50	11.20	10.13	9.78	9.48	9.97	10.50	10.30	9.70
Other industrial	8.05	8.80	9.15	*	11.05	10.60	9.70	10.40	9.75	10.30	10.20	9.80

†Net stabilized earnings divided by the property value (from the American Council of Life Insurance Report)
*Insufficient data available

The simple mortgage-equity concept defines the overall rate as:

$$OR = (L/V)(f) + (1\text{-}L/V)(ER) \qquad [6]$$

Where:

OR = the average overall rate
L/V = the average loan to value ratio
f = the average annual mortgage constant
1-L/V = the average equity to value ratio (E/V), and
ER = the average equity rate

Thus, the implied equity rate (ER) is:

$$ER = \frac{OR - (L/V)(f)}{(1 - L/V)} \qquad [7]$$

It can be easily shown that this measure of rate of return is equal to y in equation [5] if it is assumed that the reversion is equal to the present value of the equity, that is, if selling price = (1 − L/V) value and if the BTCF is constant throughout the holding period of n years.[2]

The assumption that the value of the property declines to the present value of the equity is probably a pessimistic assumption given the appreciation in property values. If this were true, then the equity rate, calculated from the simple mortgage-equity equation [7], would tend to understate the true rate of return on equity. This is seen in the rates of return on equity in Table 2 since they are consistently less (using leverage) than the overall rate. This technique for developing the overall rate for valuation purposes, however, has enjoyed widespread acceptance among appraisers (7, 8, 18).

Since average L/V, f, and OR are given in the data set, ER is then derived by using equation [7], as in Table 2. It is this ER that is used as the first measure of return to real estate. Note that it is an "implied" rate and is derived, not given in the data. The equity rate is that rate desired by the equity investor on his/her investment (the equity portion) and is, by definition, related to the overall rate but may differ significantly since leverage is used.

The overall rate is the second measure of returns to real estate that is used. It is given in the data set and is defined as net stabilized earnings divided by the property value, as shown in Table 3. The overall rate is a measure of return to the total property assuming debt-free ownership. That is, if there is no leverage involved, the owner's return would be the overall rate.[3]

All rates of return for common stock, long-term government bonds, long-term corporate bonds, Treasury Bills, and real estate (overall rate and equity rate) are shown in Table 4 for the years from 1966 to 1976. Note the rates on all items. Common stock varies from − 26.5 percent in 1974 to 37.2 percent in 1975, a sample range of over 63 percent.

The other items have much smaller ranges. Long-term government bonds have a range of 26 percent (16.8 in 1976 to − 9.2 in 1967); long-term corporate bonds, 26.8

TABLE 4

Annual Rate of Return on Various Assets: 1966-1976

Year	Common Stocks*	Govt. Bonds*	Corp. Bonds*	T-Bills*
1966	−10.1	3.7	.2	4.8
1967	24.0	−9.2	−5.0	4.2
1968	11.1	−.3	2.6	5.2
1969	−8.5	−5.1	−8.1	6.6
1970	4.0	12.1	18.4	6.5
1971	14.3	13.2	11.0	4.4
1972	19.0	5.7	7.3	3.8
1973	−14.7	−1.1	1.1	6.9
1974	−26.5	4.4	−3.1	8.0
1975	37.2	9.2	14.6	5.3
1976	23.8	16.8	18.7	5.1
Mean	6.7	4.5	5.2	5.6
Range	63.7	26.0	26.8	4.2
Standard Deviation	19.6	8.0	9.4	1.3

*Rates of return used are from (10).

percent (18.7 in 1976 to −8.1 in 1969); U.S. Treasury Bills, 4.2 percent (.038 in 1972 to 8 in 1974).

Relationships Between Rates of Return

The expectations are that rates of return evidenced in real estate markets for commercial and industrial property should be strongly related to rates of return in the money and capital markets. T-Bills, being a short-term instrument, should perhaps be less related than long-term assets such as stocks and bonds, since real estate is usually regarded as a long-term asset. Table 6 is the correlation matrix between the returns on commercial and industrial property and the money market and capital market returns. Generally, the previous expectations are confirmed.

Long-term government (L-T GOVT) and long-term corporate (L-T CORP) bond returns are significantly correlated (at $\alpha = .10$) with the overall rate for all commercial and industrial property types. L-T GOVT and L-T CORP returns are also significantly correlated with every equity rate except other industrial. Common stock returns were not significantly correlated to either measure of return to real estate for any property type. T-Bill returns were significantly correlated with equity rate for every property type.

The lack of significant correlation for returns to commercial and industrial property and T-Bills is not surprising since T-Bills are short-term whereas real estate is usually a long-term investment. Real estate returns will, of course, adjust eventually if T-Bill rate changes persist. However, the lack of significant correlation for stock market returns and either measure of return to commercial and industrial property is more difficult to explain since common stock is often touted as a long-term investment. However, the wide fluctuations of common stocks in the last decade (in 1974, down 26.5 percent; in 1975, up 37.2 percent) may have altered this relationship and therefore explain the lack of significant correlation.

TABLE 5

Correlation Coefficient (r) Matrix for Money and Capital Market Rates of Return: 1966-1976

	Common Stocks	L-T Govt. Bonds	L-T Corp. Bonds	T-Bills
Common Stocks	1.000			
L-T Govt. Bonds	.279	1.000		
L-T Corp. Bonds	.552*	.891*	1.000	
T-Bills	−.672*	−.061	−.188	1.000

*Significant at 10 percent level of confidence. The critical value of the correlation coefficient, r, was calculated using

$$r = \frac{t}{\sqrt{t^2 + n - 2}}$$

where the t-statistic has n-2 degrees of freedom.

TABLE 6

Correlation Coefficient (r) Matrix for Overall Rates: 1966-1976

Property Type	Common Stocks	L-T Govt. Bonds	L-T Corp. Bonds	T-Bills
Commercial warehouse	.135	.625*	.586*	.458*
Other commercial	−.276	.535*	.503*	.542*
Industrial warehouse	.248	.764*	.806*	.327
Manufacturing plant	.190	.733*	.744*	.332
Other industrial	.132	.605*	.694*	.365

Correlation Coefficient (r) Matrix for Equity Rates: 1966-1976

Property Type	Common Stocks	L-T Govt. Bonds	L-T Corp. Bonds	T-Bills
Commercial warehouse	.205	.554*	.451*	.319
Other commercial	−.206	.493*	.546*	.404
Industrial warehouse	.412	.863*	.945*	−.035
Manufacturing plant	.203	.711*	.668*	.051
Other industrial	.045	.390	.300	−.067

*Significant at 10 percent level of confidence. The critical value of the correlation coefficient, r, was calculated using

$$r = \frac{t}{\sqrt{t^2 + n - 2}}$$

where the t-statistic has n-2 degrees of freedom.

Table 7 is the result of ordinary least squares (OLS) estimates of the simple linear relationship between the before-financing measure of investment yield to commercial and industrial real property used in this study, overall capitalization rate (OR), and the rates in the money and capital markets. The results are quite homogeneous. Common stock yields were never significant (at $\alpha = .10$) with the OR of any type of commercial or industrial real property. T-Bills yields were significant with ORs for only commercial warehouses and other commercial.

In contrast to these results are those for L-T GOVT and L-T CORP where bond yields were significant with both measures of return to real estate for every type of commercial and industrial real property. R^2 terms

TABLE 7

OLS Estimates of Overall Capitalization Rates of Return on Other Asset Returns: 1966-1976

Dependent Variable *Overall Capitalization Rate (OR) by Property Types	Independent Variable (Return on)			
	Common Stocks	L-T Govt. Bonds	L-T Corp. Bonds	T-Bills
Commercial warehouse	.0069 (.430)	.079◊ (1.991) [.037]**	.063◊ (1.867) [.035]**	.354◊ (1.459) [.133]**
Other commercial	−.019 (1.002)	.078◊ (1.940) [.030]**	.065◊ (1.826) [.027]**	.478◊ (1.968) [.256]**
Industrial warehouse	.0086 (.533)	.065◊ (1.647) [.030]**	.058◊ (1.733) [.031]**	.171 (.703)
Manufacturing plant	.0083 (.515)	.078◊ (1.986) [.036]**	.068◊ (2.016) [.037]**	.218 (.898)
Other industrial	.0060 (.362)	.071◊ (1.653) [.039]**	.072◊ (1.896) [.048]**	.251 (.997)

*See text for definition of dependent variable.

◊Significant at the 10 percent level of confidence; t-values in parentheses.

**These are point elasticities. See text for definition.

TABLE 8

OLS Estimates of Equity Rates Return on Other Asset Returns: 1966-1976

Dependent Variable *Equity Rate (ER) by Property Types	Independent Variable (Return on)			
	Common Stocks	L-T Govt. Bonds	L-T Corp. Bonds	T-Bills
Commercial warehouse	.019 (1.194)	.127◊ (3.228) [.084]**	.089◊ (2.627) [.069]**	.451◊ (1.858) [.368]**
Other commercial	−.041◊ (2.150) [−.015]**	.208◊ (5.163) [.082]**	.204◊ (5.716) [.086]**	1.027◊ (4.227) [.560]**
Industrial warehouse	.015 (.934)	.077◊ (1.954) [.047]**	.073◊ (2.139) [.051]**	−.019 (.079)
Manufacturing plant	.010 (.623)	.086◊ (2.187) [.055]**	.069◊ (2.054) [.052]**	.038 (.157)
Other industrial	.0033 (.197)	.074◊ (1.723) [.050]**	..051◊ (1.385) [.041]**	−.075 (.296)

*See text for definition of dependent variable.

◊Significant at the 10 percent level of confidence; t-values in parentheses.

**These are point elasticities. See text for definition.

for L-T GOVT and L-T CORP bonds are as follows respectively:

Commercial warehouse	.391	.344
Other commercial	.286	.253
Industrial warehouse	.583	.649
Manufacturing plant	.538	.554
Other industrial	.366	.481

The relationship between the first measure of yield to commercial and industrial property (OR) and both types of bonds is definite and strong. However, the rate of return for commercial and industrial real property is obviously influenced by other factors such as liquidity and risk.

The figures in brackets are point elasticities which indicate a percentage change in the dependent variable (investment yields to real property) that result from a percentage change in the independent variable. The point elasticity is equal to OR/ LTGB • LTGB/OR for long-term government bonds, where OR = overall capitalization rate and LTGB = long-term government bond yield.

For example, suppose the yield on long-term government bonds increases from 10 to 11 percent. This is a 10 percent increase. Thus, from the estimated equations, the OR for commercial warehouses, other commercial, industrial warehouses, manufacturing plants and other industrial would be expected to increase 3.7 percent, 3 percent, 3 percent, 3.6 percent, and 3.9 percent, respectively. The same reasoning would be applied to long-term corporate bonds. Since most of the common stock and T-Bill coefficients were insignificant, the point elasticities were calculated for only significant coefficients. The point elasticities are more useful in forecasting how a change in yields for bonds, etc. should affect investment yields on commercial and industrial real property rather than the estimated coefficients.[4]

Table 8 is the result of OLS estimates of the simple linear relationships between the after-financing measure of real property investment yields (the equity rate) and the yield rates in the money and capital markets. The results are almost identical with those for the OR with one exception.

The coefficient for common stocks with other commercial property was significant at the $\alpha = .10$ level. No explanation can be offered except that it may simply be a Type I error. All other common stock coefficients were insignificant. All L-T GOVT and L-T CORP bond coefficients were significant. T-Bill coefficients were significant for only commercial warehouses and other commercial. All other T-Bill coefficients were insignificant. R^2 terms were more varied than those using the overall rate. They are as follows for L-T GOVT and L-T CORP bonds, respectively:

Commercial warehouse	.306	.203
Other commercial	.243	.299
Industrial warehouse	.744	.892
Manufacturing plant	.506	.446
Other industrial	.152	.090

Table 9 displays the mean investment yields, range and standard deviation for both measures of return to commercial and industrial real property.

TABLE 9

Return Measure	Property Type	Percent Mean	Percent Range	Percent Standard Deviation
Overall Capitalization Rate	Commercial warehouse	9.52	3.00	1.01
	Other commercial	10.11	4.20	1.21
	Industrial warehouse	9.78	2.18	.68
	Manufacturing plant	9.70	2.80	.86
	Other industrial	9.80	3.00	.91
Equity Rate	Commercial warehouse	6.81	5.95	1.84
	Other commercial	10.18	11.08	3.49
	Industrial warehouse	7.42	2.14	.72
	Manufacturing plant	6.98	2.53	.97
	Other industrial	8.12	4.30	1.47

Neither the range nor the standard deviation for the OR ever exceed that for either the money or capital market yields. The range and standard deviation for the equity rate exceed the range and standard deviation of only T-Bill yields, and only for both types of commercial property and other industrial. The range and standard deviation for both measures of return to commercial and industrial real property never exceed the range and standard deviation for long-term government bonds, long-term corporate bonds or common stocks for the same period.

Summary And Implications

A significant positive relationship has been demonstrated between two measures of return to commercial and industrial real property and investment yields of long-term government and long-term corporate bonds. No significant systematic relationship was found with common stock yields. A significant relationship, however, was found for commercial property and T-Bills, indicating a special sensitivity of investors in commercial property to money market yields for whatever reason.

Although the results are not unexpected, this is, nevertheless, the first study to estimate yields for a large sample of commercial and industrial real property that can be used by professional portfolio managers.

Caveats

The results of this study must be viewed relative to the data which are not representative of all real estate. A random sampling procedure was not used. The data are from large life insurance companies where people skilled in analyzing real estate have reviewed and accepted these specific properties. Others not included in these data were rejected.

Since the policy changes at the Federal Reserve Board, due to the installation of Paul Volker as chairman in 1979 and especially since the passage of the Depository Institutions Deregulation and Monetary Control Act of 1980, numerous structural changes in the economic system have occurred and more will follow. Therefore, these results must be regarded as preliminary and will have to be confirmed or modified through additional future research in this area. It is hoped that this study will stimulate such research.

NOTES

1. Gettel and Ricks (7, 14) are the only exceptions that could be found prior to 1979.
2. It is also equal to the "equity dividend rate." See (11), 257-258.
3. See Ricks (13); his Table 5 on before-tax, before-financing is simply the overall rate.
4. See Ferguson and Gould (5), 97-102, for a mathematical derivation and a more detailed explanation of point elasticities.

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