AN ANALYSIS OF CENTRAL DRIVERS OF REIT RETURNS

by

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ABSTRACT

Much research has speculated on the ability of REITs to act as a hedge for inflation or whether REITs could act as a safe haven for investors in the event of economic downturn. However, much of these studies are lacking basic data analysis or timely data to determine the dependence of REIT returns on various economic factors. The goal of this study is to act as a meta-analysis to synthesize the relationship between REITs and several potential risk factors. This study will extend beyond the timeline of previous studies and will examine the relationship of several hypothesized risk factors. This information can be used as a component of future decisions to hedge REIT risk in a portfolio.

This study will use the historical returns from NAREIT as well as six indices. This study will use both univariate regressions and multivariate regressions to analyze the relationship between REITs and mortgage REITs and each representative index.

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INTRODUCTION

A real estate investment trust (REIT) is a company that owns, operates, or finances income-generating real estate. REITs were established in 1960 by Congress. The created provision allows investors to buy shares in commercial real estate portfolios. Prior to this 1960 provision, this was something only available to the wealthy through large financial intermediaries.

REITs have been modeled after mutual funds. Capital is pooled from numerous investors, making it possible for individual investors to earn dividends from real estate investments without the need to individually buy, manage, or finance a property. Through this structure, REITs generate a steady income stream for its investors, but offer little in the way of capital appreciation. An estimated 87 million U.S. investors own REITs through their retirement savings and other investment funds. Investors can purchase shares of REITS, REIT mutual funds, or REIT ETFs through a broker. There are more than 225 publicly traded REITs in the U.S. today.

Properties in a REIT portfolio may include anything from apartment complexes to healthcare facilities to office buildings, retail, and warehouses. In general, REITs tend to specialize in a specific real estate sector. However, they may choose to diversify and hold different types of properties in their portfolios. The three main categories of REITs include Equity REITs, Mortgage REITs, and Hybrid REITs. Most REITs are equity REITs, which own and manage income-producing real estate. The collection of rents is the primary way revenue is generated in Equity REITs. Mortgage REITs lend money to real estate operators and owners through mortgages and loans or through mortgage backs securities. Their earnings are generated primarily through the spread between the interest they earn on mortgage loans and the cost of funding the loans. Finally, Hybrid REITs combine the strategies of equity and mortgage REITs.

To qualify as a REIT, a company must meet certain provisions outlined in the Internal Revenue Code. Primarily, a company must derive 75% of its gross income from rents, interest on mortgages that finance real property, or real estate sales and a company must pay a minimum of 90% of taxable income in the form of shareholder dividends each year. Additionally, the company must invest at least 75% of total assets in real estate, cash, or U.S. Treasuries. The company must be an entity that is taxable as a corporation and be managed by a board of directors. The company must have at least 100 shareholders after its first year of existence. Finally, a company must have no more than 50% of its shares held by five or fewer individuals.

If an investor is looking for a strong, stable annual dividend, a REIT is a great option. Today, it is estimated that REITs collectively own about $3 trillion in gross assets, with publicly traded equity REITs accounting for $2 trillion. Further, REIT total return has outperformed the S&P 500 index for the last 20 years.

LITERATURE REVIEW

The effect of several factors and their correlation to REIT return has been the topic of many studies. Literature has identified a multitude of different potential return drivers for REITs. Further, it has been realized that the timeline during which these factors are analyzed has an impact on how correlated they are to REIT returns. This study will build on those before by narrowing the expansive risk factors and updating the timeline. The review of literature will explore key findings of previous studies.

REIT Returns

REIT total return in the combination of income returns from dividends and capital gains from share price appreciation. REITs are comparable to other assets, such as stocks and bonds, in their pricing structure. Many factors affect the value of a REIT's share price, with the foundation being the earnings from rental revenue and a price-earnings multiple assigned by the marketplace. Therefore, there are a number of potential factors that can affect REIT return behavior and the returns of REITs are no more easily predicted than the returns of stocks. The level and growth of rents are largely determined by the supply and demand in real estate markets, such as: population size, population growth, employment growth, construction, and the level of overall economic activity. The differences in these factors from region to region, project to project, and so on, has a direct impact on rents and occupancy rates, which affect projected earnings and property values. Idiosyncratic risk dominates the volatility of REIT returns and conditional idiosyncratic volatility impacts the cross-sectional returns of REIT stocks (Ledtin, 2019).

Risk Factors

Literature has suggested macroeconomic variables such as inflation rate, industrial production growth, interest rates, US stock market returns, consumer sentiment, policy uncertainty, market uncertainty, and leverage could play a role in REIT returns. The factors appearing most frequently in literature are inflation and interest rates.

Interest Rates

Many studies have examined the influence of interest-rate changes on REITs. This may appear to be the most obvious risk factor due to the fact that the investment in real estate relies heavily on borrowed funds. Therefore, the general value of real estate can be influenced by the cost of financing. Rising interest rates may result in reduced demand for real estate and therefore lower values. An increase in interest rates may cause a higher rate of debt financing and a higher required rate of return by real estate investors. Further, the cost to develop real estate during a cycle of climbing interest rates results in higher costs. All of this leads to suggest that an increase in interest rates would lead to the fall of REIT returns.

Studies on the effect of interest rates on REIT returns lead to two differing pools of thought. One grouping tends to find REIT returns more sensitive to interest rate changes, while the other finds little correlation between movement in interest rates and REIT returns. A large majority of these studies were conducted before the early 2000s and they tend to cover different time periods and REIT characteristics. In a more recent study, it was concluded that interest rates impact REITs, though unevenly depending on the particular time frame (Swanson, 2002).

Inflation

REITs are commonly investigated as a hedge for inflation throughout literature. This is due the underlying real estate asset. It can be observed that housing prices tend to rise with inflation. Thus, the assumption is that REIT values would appreciate with inflation. However, because REITS combine characteristics of unsecuritized real estate and common stock, the evidence on the ability of REITs to hedge inflation is mixed.

Empirical evidence tends to illustrate REITs as an irrational inflation hedge. Generally, the coefficients on expected inflation are positive or near 1, especially in the case of mortgage REITs, however REITs perform poorly when measured against unexpected inflation. (Yobaccio, 1995). It could be considered that REITs move with inflation due to shifts in corresponding monetary policy (Chiuling, 2001). Thus, making REITs loosely tied to inflation, but likely unexplained by its changes.

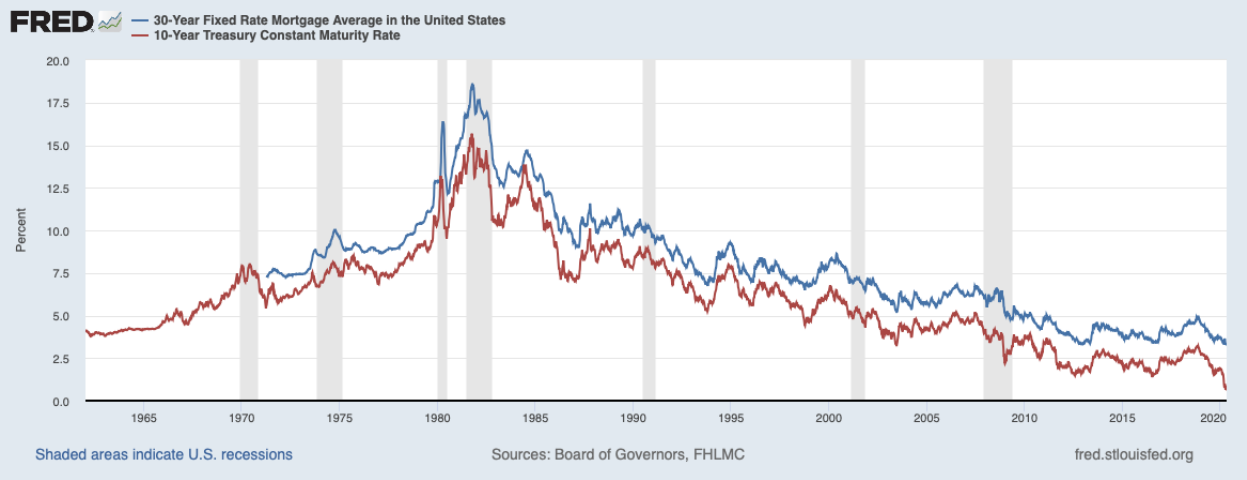
Data & Methodology

Data

This paper gathered monthly historical REIT return data dating back to 1972 from the National Association of Real Estate Investment Trusts. Monthly data on the 10-year treasury rate, crude oil prices, unemployment rate, and industrial production was collected from Federal Reserve Economic Data. Data on the Consumer Price Index was collected from the U.S. Bureau of Labor Statistics.

Because there is no perfect measure of interest rates, I chose to use the 10-year treasury rate for this study. My preferred rate would have been the 30-year fixed rate mortgage due to its direct correlation to real estate. However, there was no updated or accessible historical, monthly data for this rate. So, the 10-year treasury rate was used as a proxy. It is an acceptable proxy

because it tends to closely follow the 30-year fixed rate mortgage over the relevant range.



Consumer Price Index was chosen to represent inflation because it is commonly equated to a measure of inflation through the measure in the average change in prices over time. The consumer price index is the most widely watched and used measure of the U.S. inflation rate and is used to determine real domestic gross product. Thus, CPI is a often considered an appropriate proxy for inflation.

Methodology

From the data collected, I ran univariate regressions with the percentage change of each variable as the Input X Range and the percentage return of all REITs as the Input Y Range. This process was repeated for each risk factor as the Input X Range. Then, this process was repeated with mortgage REITs as the Input Y Range. The data was analyzed monthly over the period of November 1, 2009 to January 1, 2020. For each regression summary, I analyzed the R squared to determine the relationship between the variable and the REIT. Then, I analyzed the beta and p-value to determine if this relationship was significant.

To further verify the significance of each risk factor, I ran a multi-variate regression for both all REITs and mortgage REITs. This allowed each factor to be compared over the same timeline. I verified significance based on the returned p-value.

Results and Discussion

All REITs Regressed Against Risk Factors

	R Square	Beta	*P-value*
10 Year Treasury	0.01293389	-0.1040755	0.00615267
SPY (Market Index)	0.32451786	0.7187334	1.9294E-29
Consumer Price Index	0.24859364	2.4573975	3.2713E-09
Oil Index	0.00390908	0.03478396	0.20646029
Unemployment Rate	0.00764735	0.06146991	0.03540272
Industrial Production	0.00038826	0.13255371	0.63610428

The above chart summarizes the relevant results of six univariate regressions. To identify which variables are significant in regard to REITs, I determined which variables had a P-value less than 0.05. The variables that are deemed statistically significant are the 10-year treasury rate, market index, and consumer price index. All other variables can be disregarded as random.

The most significant variable identified is the market index. Per this analysis, one-third of the total movement in REITs is explained by the market. If the market does well, REITs will follow suit.

Consumer Price Index is the next most significant factor in the analysis of all REITs. Per this analysis, if inflation goes up, REITs go up. In this regression, inflation explains 25% of the movement of REITs.

Finally, the 10-year treasury representing interest rates is the last significant risk factor to REITs. This regression confirms intuition that as interest rates rise, REIT returns decline. Only around 1% of the movement of REITs is explained by interest rates.

Mortgage REITs Regressed Against Risk Factors

	R Square	Beta	*P-value*
10 Year Treasury	0.00014136	-1.307104	0.77527624
SPY (Market Index)	0.19034666	0.66771922	1.398E-16
Consumer Price Index	0.3197691	3.71511756	6.3819E-12
Oil Index	0.00811468	0.06037216	0.06843238
Unemployment Rate	0.01640898	0.10817032	0.00201232
Industrial Production	0.00088805	0.24083114	0.47419187

The significant risk factors for mortgage REITs varies slightly from those for all REITs. Interest rates are no longer statistically significant. The market does not explain movements in the mortgage REITs as much as it does all REITs. However, it is still a significant factor. Inflation becomes slightly more significant, increasing to 32% of explained movement.

All REITs Multivariate Regression

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.6913
R Square	0.4779
Adjusted R Square	0.4509
Standard Error	0.0304
Observations	123.0000

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	6.0000	0.0981	0.0164	17.6952	0.0000
Residual	116.0000	0.1072	0.0009		
Total	122.0000	0.2053			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.0030	0.0030	0.9799	0.3292	-0.0030	0.0090	-0.0030	0.0090
10Y Treasury	-0.1109	0.0435	-2.5468	0.0122	-0.1971	-0.0246	-0.1971	-0.0246
SPY	0.8474	0.0999	8.4860	0.0000	0.6496	1.0452	0.6496	1.0452
CPI	-0.1516	0.4172	-0.3633	0.7170	-0.9778	0.6747	-0.9778	0.6747
Oil	-0.0275	0.0417	-0.6591	0.5111	-0.1101	0.0551	-0.1101	0.0551
Unemployment	0.0719	0.0442	1.6256	0.1067	-0.0157	0.1595	-0.0157	0.1595
Industrial Productior	0.3356	0.5732	0.5855	0.5593	-0.7996	1.4708	-0.7996	1.4708

To further test the validity of the relationships between the risk factors and REITs I performed a multi-variate regression. This resulted in the re-emphasis of the statistical significance of the market and interest rates on REIT returns. However, inflation was no longer recognized as significant. The combination of market influences and interest rate changes accounted for nearly 48% of REIT returns.

Mortgage REIT Multivariate Regression

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.5482							
R Square	0.3005							
Adjusted R Square	0.2643							
Standard Error	0.0308							
Observations	123.0000							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	6.0000	0.0472	0.0079	8.3048	0.0000			
Residual	116.0000	0.1100	0.0009					
Total	122.0000	0.1572						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.0044	0.0031	1.4159	0.1595	-0.0017	0.0104	-0.0017	0.0104
10Y Treasury	-0.0540	0.0441	-1.2244	0.2233	-0.1413	0.0333	-0.1413	0.0333
SPY	0.4034	0.1011	3.9890	0.0001	0.2031	0.6038	0.2031	0.6038
CPI	0.9079	0.4225	2.1488	0.0337	0.0710	1.7448	0.0710	1.7448
Oil	0.0024	0.0422	0.0575	0.9542	-0.0813	0.0861	-0.0813	0.0861
Unemployment	0.0077	0.0448	0.1712	0.8644	-0.0810	0.0964	-0.0810	0.0964
Industrial Production	-0.1842	0.5805	-0.3173	0.7516	-1.3339	0.9656	-1.3339	0.9656

As for Mortgage REITs, the market was the only remaining statistical significance after performing the multi-variate regression. It explains 30% of mortgage REIT returns.

Conclusion

This study focused on examining six risk factors commonly mentioned in literature over a current time period. The data I analyzed suggested that the only statistically significant factors to REITs are most certainly market influences and secondarily interest rates. Mortgage REITs are only found to be impacted by the market index.

This study largely supports the idea that REIT returns are not predictable, as their return structure is similar to that of stocks and bonds. It was analyzed only over a specific period of time. Future studies could identify how to hedge the residuals of such regressions or expand on

the risk factors tested. These studies could run hundreds over regressions using daily, monthly, and yearly data over several spans over time to determine the strength of these findings and confirm a true relationship between REIT returns and these risk factors.

Conducting this study taught me to question the headlines I constantly read about this asset class. Some of the most common assertions about factors that drive REIT returns I could not prove to be factual through this study. I look forward to continuing in the real estate finance field with a newfound healthy cynicism.

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