Macroeconomic Drivers of REIT Stock Prices

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Abstract:

This paper investigates several variables as potential drivers of REIT stock performance. The results show that four of the six independent variables, all of positively correlated ones, were significant. The combination of variables proved to be very predictive, yielding an R-squared of 0.9712. The two variables that were added in this study versus the benchmark Morgan Stanley study proved to be highly significant. The two negatively correlated variables proved to be insignificant.

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1.0 INTRODUCTION

The outbreak of covid-19 during the first quarter of 2020 and its ongoing effects have had a significant impact on most sectors of commercial real estate. Occupancies have plunged in the lodging industry, and have taken significant hits in many retail and multifamily markets. Multifamily rents in markets reliant on public transportation have dropped materially. The amount of available office space has risen sharply in the major markets as many tenants have put large blocks of space up for sublet. Significantly, as a prospective sales broker, transaction volume has fallen dramatically from pre-covid levels across all property types and markets. In reading the press and speaking with people in the business, there is a significant gap between what sellers and buyers see as the market value of assets in today's uncertain times. I know from studying economics that price is the market clearing mechanism. While the US equity markets make new all-time highs in anticipation of the re-opening of the economy, interest rates have moved sharply off of all-time lows on expectations of growth and the potential inflationary effects of the government relief efforts. Will rising interest rates be a new hurdle for commercial real estate values?

This study aims to enhance the understanding of what drives of the price of commercial real estate assets, and the role played by interest rates. Although most commercial real estate transactions are between private entities, we fortunately have the publicly traded Real Estate Investment Trust (REIT) sector of the equity market to look to for data. The value of a company that owns and operates real estate should bear a close resemblance to the value of the properties it owns. The study is highly relevant to a) me, as I decide on whether or not to become a sales broker, and b) to the US economy, as the health of many of our financial institutions is directly impacted by commercial real estate values through their lending operations.

This paper was guided by the research objective of explaining what drives the price of equity REIT stocks as a proxy for commercial property value. While the data set goes back to the early-1990s, I was most interested in the last 12+ months during which the pandemic has had significant negative impacts on the fundamentals of most of the

commercial real estate universe. In particular, I was curious to explain the mostly steady rise in REIT prices in the face of deteriorating fundamentals.

The rest of the paper is organized as follows: Section 2 discusses recent price action in the REIT market and property market fundamentals. Section 3 gives a brief literature review. Section 4 discusses the data and empirical methodology, including the empirical model. Section 5 presents and discusses the empirical results. This is followed by a conclusion in section 6.

2.0 TREND IN REIT PRICES AND REAL ESTATE FUNDAMENTALS

Between March 4, 2020 and March 23, 2020, as the covid-19 pandemic began to be felt in financial markets, the price of REIT stock as measured by FTSE NAREIT All Equity REIT Index fell 40%. On April 15, 2021, the Index closed at 801.68, 1.2% above the early March 2020 pre-covid peak.

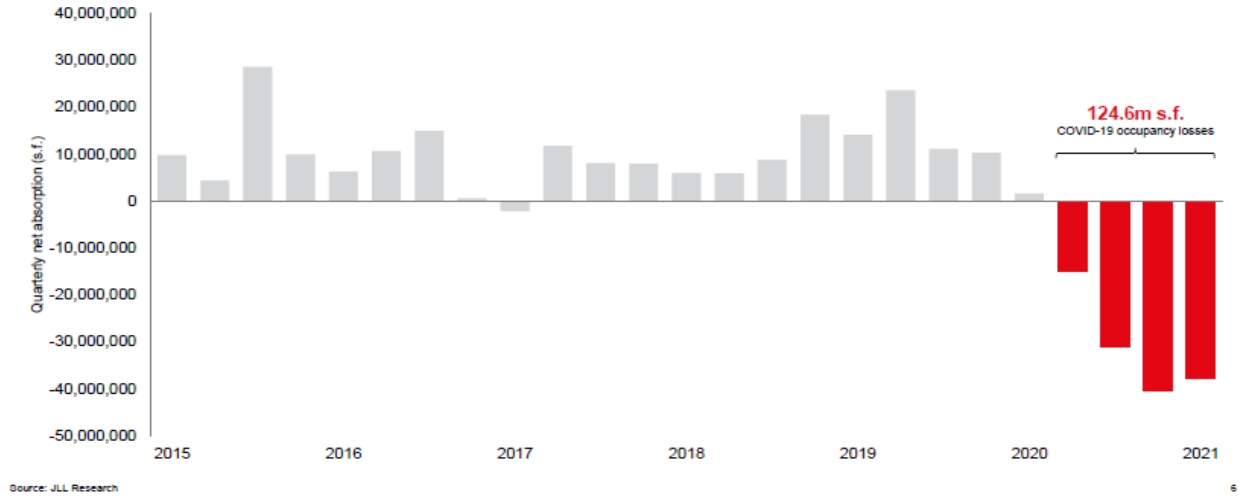
Figure 1: Covid Price Path for FTSE NAREIT Index

As the Federal Reserve and the Treasury Department attempted various measures to stabilize the economy, the yield on the 10 year Treasury fell from an early March 2020

level of 1.16% down to a low of just 0.51% on August 4th. The yield made a full retracement to pre-covid levels by early February 2021 and stands at 1.58% on April 15. US Nonfarm Employment plunged by 14.7% between February and April 2020, a loss of over 22 million jobs. According to preliminary March 2021 figures, approximately 14 million of those jobs have been recovered, and the US employment stands about 5.5% below the February 2020 peak.

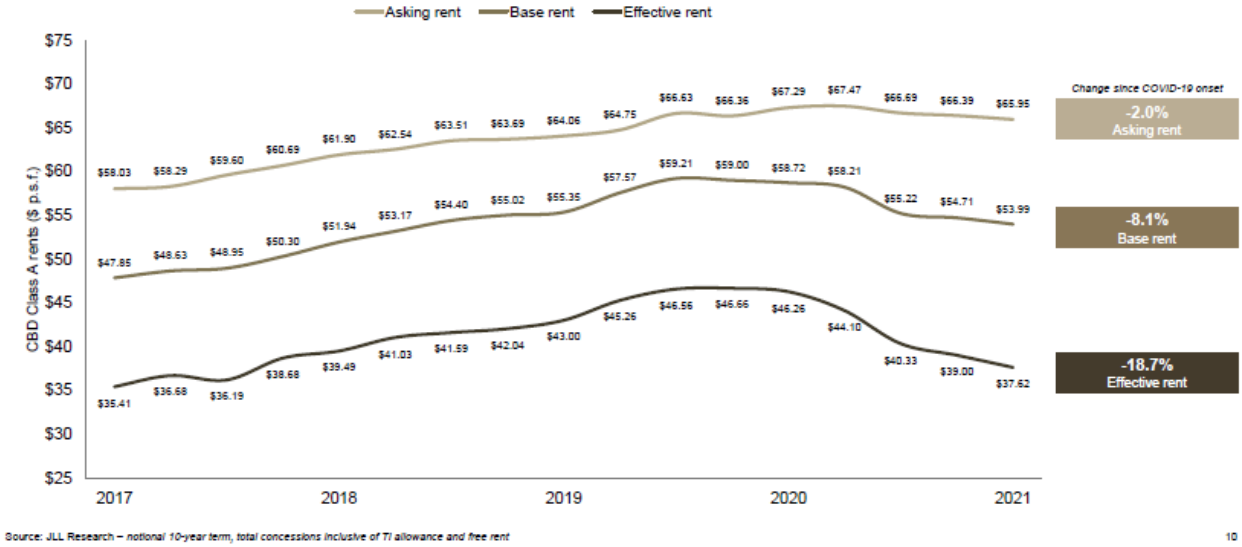
One might be tempted to interpret these figures and say that the negative impact on commercial real estate from the pandemic is behind us. The fundamentals on the ground tell a different story. While the pain in the hotel sector is most acute and gets the most attention in the press, other sectors are being impacted, including those with longer lease structures like office. Figures 2 through 4 depict the falling space demand, rent, and transaction volume in the U.S. office market.

Figure 2: Quarterly Net Absorption of Office Space



Source: JLL U.S. office market overview Q1 2021

Figure 3: Rent Trends for CBD Class A U.S. Office



Source: JLL U.S. office market overview Q1 2021

In the graph above, Asking Rent represents the advertised rent for the available space. Base Rent is the rent paid by the tenant. Effective Rent reflects the rent received by the Landlord after accounting for the impact of free rent periods and tenant improvement money given to the occupier.

Table 4: Transaction Volume by U.S. Office Market

Market	2017-2019 Avg. Volume ($B)	2021 Q1 TTM Volume ($B)	%Chg
Boston	$8.0	$10.7	+34.7%
San Francisco	$6.4	$4.3	-32.4%
Seattle	$6.5	$4.4	-33.3%
Silicon Valley	$5.5	$3.0	-45.3%
Los Angeles	$7.8	$3.5	-55.5%
Chicago	$4.4	$1.9	-57.5%
Washington, DC	$9.3	$3.3	-64.9%
New York	$18.5	$4.7	-74.3%
Primary markets	**$66.5**	**$35.8**	**-46.2%**
Raleigh-Durham	$1.4	$1.7	+19.7%
Philadelphia	$2.7	$2.6	-2.4%
Northern NJ	$2.5	$2.0	-21.1%
Miami / South FL	$2.8	$2.0	-29.3%
Nashville	$1.0	$0.6	-35.8%
Orange County	$2.5	$1.3	-48.7%
San Diego	$2.5	$1.2	-53.5%
Dallas	$5.1	$2.3	-54.5%
Charlotte	$2.2	$1.0	-56.6%
Phoenix	$2.9	$1.2	-57.0%
Oakland-East Bay	$2.1	$0.9	-57.2%
Minneapolis	$1.7	$0.7	-59.2%
Portland	$1.4	$0.5	-62.3%
Denver	$2.8	$1.0	-63.4%
Austin	$2.3	$0.7	-70.4%
Atlanta	$3.6	$1.0	-71.0%
Houston	$4.0	$1.0	-74.0%
Secondary markets	**$48.8**	**$24.7**	**-49.4%**

Source: JLL U.S. office market overview Q1 2021

The notable outliers of Boston and Raleigh-Durham that are experiencing transaction volume growth are benefiting from their exposure to the Life Science industry, which had been experiencing surging investor demand pre-covid and which has continued unabated. The average decline in sales activity for the other 23 markets is 51.3%.

So what is happening here? The fundamental drivers of property cash flow, occupancy and rent, are declining. Since property values are chiefly determined by discounting future cash flow, shouldn't they be declining as well? Furthermore, a key component of the discount rate, the 10 year Treasury yield, has been rising gradually since early August and more sharply in recent months. That would also seem to suggest falling values/prices.

3.0 LITERATURE REVIEW

REITs were formed in 1960 when the Real Estate Investment Trust Act was passed by Congress to provide small investors access to commercial real estate (CRE). It wasn't until the early 1990s however, in response to a substantial CRE recession, that the sector had explosive growth and gained wide investor acceptance. Many Wall Street Broker-Dealers provide research coverage of the REIT sector of the equity market, and it is these REIT "Primer" documents published to indoctrinate new investors that provide most of the material that I have reviewed as part of my study. The topic of REIT price sensitivity to interest rates is covered in all of the publications.

The most recent research I reviewed was from Morgan Stanley Richard Hill April (2020). They identify the three most important macro variables driving REIT return as the equity market, the level and slope of the yield curve, and crude oil. They found a strong negative sensitivity to the slope of the yield curve, a moderate sensitivity to the level of the yield curve, and a slight negative sensitivity to the crude oil price. Hill et al. also point out that corporate bond yields have an R-squared of 0.5647 with REIT FFO (Funds From Operations) Multiples (multiples increase as corporate bond yields fall).

The earliest-dated research that I reviewed was from Bank of America Merrill Lynch Spector et al., 2014. Spector describes the return profile for REITs as having

characteristics of both equities and bonds. The bond-like component comes from the long-dated lease structure that locks in rents for the full tenor of the lease. Unlike bonds however, REITs have the potential upside that comes with signing new leases and property acquisition and development activities. Perhaps surprisingly, and in contrast to some other analyst's comments, Spector's research shows that REIT shares don't have a negative correlation to interest rates that is material different from general equities. REITs do, however, underperform the S&P 500 during periods of rising interest rates. Spector speculates that investors prefer general equities to REITs due to their greater cyclical upside (assuming that rates are rising due to economic growth).

For their current income analysis, Spector et al. compare REIT dividend yield to four benchmarks over a 20 year period: 10-year US Treasury yield, US corporate BAA yield, and S&P 500 and S&P Utility yields. Long term average REIT yield spreads were in the upper 100s versus S&P Utilities and 10-year US Treasury, Upper 300s vs the S&P 500, and lower -100s vs BAA corporates.

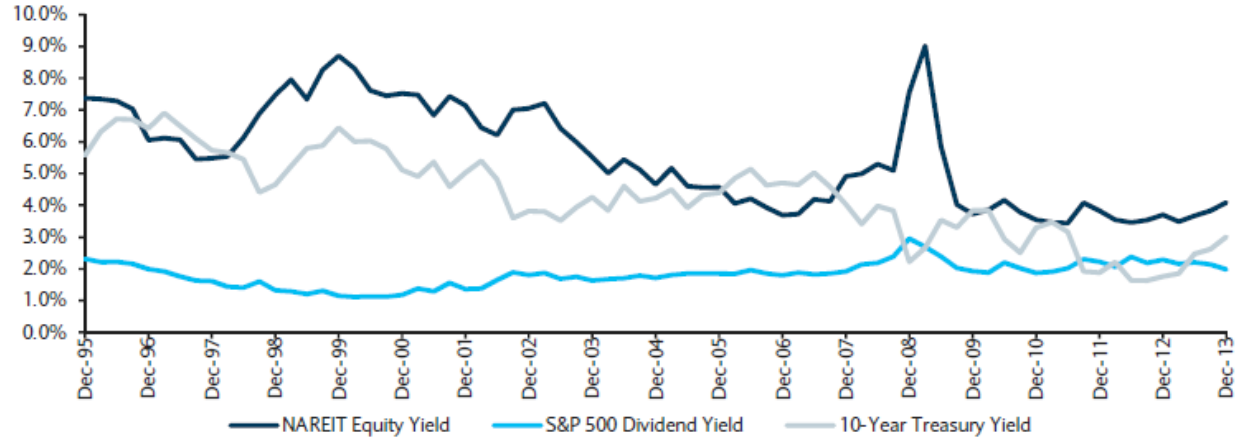
In Bank of America's U.S. REITs Primer 2018 update, Spector et al. states that evidence about the influence of interest rates on REIT performance is inconclusive over the course of a full Fed tightening cycle, with REITs outperforming the S&P 500 in one tightening cycle and underperforming in two. They came up with a +0.15 correlation between REIT returns and changes in the yield on the 10-year US Treasury since 1986. They also comment in this update that REITs have become more correlated with the broader equity markets in the last ten years, climbing from 0.55 over the last 25 years to 0.76 vs the S&P 500.

In October 2016 Evercore ISI (Sakwa et al.) published Bricks & Sticks REIT Primer IV. Similar to Spector's 2018 findings, ISI stated that REITs had underperformed the S&P 500 over six of the last seven periods of significant yield increases in the 10-year Treasury, covering a period of 15 years. The underperformance averaged 13%. Sakwa et al. do point out however, that REIT returns were positive in three of those seven periods.

Barclays' September 2014 REITs 101: An Introduction, Smotrich and Tsai state upfront that "The negative correlation between interest rates and REIT stocks is well documented, but assuming interest rates rise for the "right reasons", i.e., stronger economic growth, we think REITs continue to benefit." While price appreciation is always

welcomed, the study does state that two-thirds of REIT equity total returns have historically come from the dividend. It further comments that since 1995 the average REIT dividend of 5.5% tripled the 1.8% yield of the S&P 500, and have exceeded the yield of the US 10-year Treasury yield average of 4.3%.

Figure 4: REIT Dividends vs. S&P500 and 10-Year Treasury



Source: Thomson, Barclays Research

Smotrich and Tsai present the total return performance of REIT equities as represented by the NAREIT Equity REITs in comparison to other equity indices including S&P 500, Dow and NASAQ. Performance time periods ranged from trailing three years to trailing 15 years. NAREIT returns underperformed all alternative equity indices considered over the past three years, but outperformed all over the longest 15 year period considered. They do point out that starting in May 2013 when interest rates spiked (the so-called taper tantrum driven by the Fed's comments about tapering quantitative easing), NAREIT severely underperformed the S&P 500 (+ 2.5% vs +32.4%). They also discuss more broadly the fact that the economy usually expands during periods of low interest rates and generally contracts when rates are high, causing real estate values to likewise expand and contract respectively.

4.0 DATA AND EMPIRICAL METHODOLOGY

4.1 Data

The study uses quarterly time series data from 1999 to 2021. Data were obtained from Bloomberg and the U.S. Bureau of Labor Statistics. Summary statistics for the data are provided in Table 1.

Table 1 Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
date	0				
sp500	89	2931.681	1656.377	1163.04	8238.48
nareit	89	9830.634	5581.28	2371.43	21944.84
yr	89	3.336588	1.402566	0.6561	6.442
jobs	89	137007.2	6563.8	128227	151919
oil	89	59.45472	27.13774	16.76	140
ycurve	89	1.221499	0.8994686	-0.475	2.8099
gdp	89	15276.81	3575.133	9417.26	21747.39

Source	SS	df	MS	Number of obs=	88	
Model	2.56E+09	6	425920354	F(6, 81) =	455.41	
Residual	75754971.8	81	935246.566	Prob > F =	0	
Total	2.63E+09	87	30244564.3	R-squared =	0.9712	
				Adj R-squared =	0.9691	
				Root MSE =	967.08	
nareit	Coef.	Std. Err.	t	P>|t|		[95% Conf. Interval]
sp500	1.256873	0.2013723	6.24	0	0.8562053	1.657541
gdp	0.5984216	0.1919851	3.12	0.003	0.2164316	0.9804117
jobs	0.156192	0.0569897	2.74	0.008	0.0428004	0.2695837
oil	12.41778	6.089942	2.04	0.045	0.3007036	24.53485
yr	-341.8858	204.7902	-1.67	0.099	-749.354	65.58244

ycurve	-148.0323	171.5592	-0.86	0.391	-489.3813	193.3167
_cons	-23843.47	5872.887	-4.06	0	-35528.68	-12158.27

Table 2 Regression

4.2 Empirical Model

Following Hill (2020) this study highlighted the predictive powers of oil prices, the level of stock prices and interest rates, and the shape of the yield curve on REIT total returns. I added gross domestic product and NonFarm Payroll Employment as additional independent variables.

The model could be written as follow:

$$NARIET = \beta 0 + \beta 1sp500 + \beta 2gdp + \beta 3jobs + \beta 4oil + \beta 5yr + \beta 6ycurve$$

NAREIT is the National Association of Real Estate Investment Trusts All Equity REITs Total Return Index. *NAREIT* is used as the dependent variable. It represents the total return, comprised of both price change and current income, for the index components, which include all equity REITs listed in the New York Stock Exchange (NYSE), American Stock Exchange (AMEX), and NASDAQ National Market (but excludes mortgage REITs). It is a free float adjusted market capitalization-weighted index.

Independent variables consist of six variables obtained from various sources. Appendix A and B provide data source, acronyms, descriptions, expected signs, and justifications for using the variables. First, *sp500* is the S&P 500 Total Return Index, calculated by Standard & Poors and based on the price changes and reinvested dividends of index components. Second, *gdp* is the U.S. Gross Domestic Product, which is the final market value of all goods and services produced in the U.S. It is presented in Nominal Dollars as a seasonally adjusted annual rate (SAAR). Third, *jobs* is the U.S. NonFarm Payroll Employment seasonally adjusted by the U.S. Bureau of Labor Statistics. Fourth, *oil* is Bloomberg's spot crude oil price, which uses benchmark West Texas Intermediate (WTI) crude at Cushing, OK. Fifth, *10yr* is the yield on the 10 year U.S. Treasury Note.

Sixth, *ycurve* is the difference between the yield of the 10 year U.S. Treasury Note and the 2 year U.S. Treasury Note.

5.0 EMPIRICAL RESULTS

The empirical estimation results are presented in Table 3. A multiple linear regression was run to predict *NAREIT* as a function of *sp500, gdp, jobs, oil, 10yr,* and *ycurve.* Results indicated that there was a collective significant effect between *sp500, gdp, jobs, oil, 10yr, ycurve,* and *NAREIT* stock performance. ($F(6, 81) = 455.41$, $P< 0.001$, $R2= .97$). The individual predictors were examined further and showed that *sp500* ($t= 6.24$, $p<0.001$), *gdp* ($t= 3.12$, $p=.003$), *jobs* ($t= 2.74$, $p=.008$), and *oil* ($t= 2.04$, $p =.045$), were statistically significant and accurately predicted the model for *NAREIT*. The predictor variable of *sp500* has a positive effect on the dependent variable of *NAREIT*, in that for each 1 unit increase in *sp500* the dependent variable of *NAREIT* increases by about 1.26. The predictor variable of *gdp* has a positive effect on the dependent variable of *NAREIT*, in that for each 1 unit increase in *gdp, NAREIT* increases by about .60. *Jobs* has a positive effect on the dependent variable of *NAREIT*, in that for each 1 unit increase in jobs, the dependent variable increases by about .16. The predictor variable of *oil* has a positive effect on the dependent variable of *NAREIT*, in that for each 1 unit increase in oil the dependent variable of *NAREIT* increases by about 12.42. The predictor variables of *yr* ($t= -1.67$, $p =.099$) and *ycurve* ($t=-0.86$, $p=.391$) had an inverse effect on the dependent variable of *NAREIT*, but were not statistically significant predictors of this model.

Table 3: Regression results for FTSE NAREIT

	(1) nareit
sp500	1.257***
	(6.24)
gdp	0.598**
	(3.12)
jobs	0.156**
	(2.74)
oil	12.42*
	(2.04)
yr	-341.9
	(-1.67)
ycurve	-148.0
	(-0.86)
_cons	-23843.5***
	(-4.06)
N	88

t statistics in parentheses

$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

The significance of *sp500* as a predictor was in line with Hill's results. While Hill also found oil significant, his study found a small negative correlation to REIT prices. In contrast, my regression revealed a positive correlation. This outcome makes intuitive sense to me. I would explain this result by saying that a strong economy would likely lead to rising oil prices and commercial property values simultaneously, subject to conditions on the supply side of each product. Like Hill, *yr* and the *ycurve* showed a negative correlation in the regression. Neither, however, was significant in my study. This was somewhat surprising given the comments in some of literature about the "well known" relationship between interest rates and REIT prices. Otherwise, the regression results were generally what I had expected and aligned with the theories that I read about throughout my research.

6.0 CONCLUSION

The analysis shows that the macro variables of the broad stock market (*sp500*), U.S. Gross Domestic Product (*gdp*), and Non-Farm Employment (*jobs*) are most significant in explaining the performance of REIT stocks. Oil prices (*oil*) were also shown to be positively correlated to *NAREIT*, but were less significant than the variables previously discussed. Because of the long-dated nature of the leases in some REIT property types, REIT stocks are frequently thought to behave like bonds. While the regression did reveal a bond-like negative correlation between *NAREIT* and both a) the level of interest rates and b) the shape of the yield curve, these variables proved not to be significant. In summary, REIT equities (*NAREIT*) are stocks, not bonds. With the three most predictive variables having already had significant recoveries from the pandemic lows, the significant recovery in *NAREIT* that has occurred makes sense. Due to data constraints, I was not able to analyze the strength of the correlation between *NAREIT* and actual commercial property valuations (which, as a prospective investment sales broker is most important to me). Market arbitrage between REIT stock prices and their underlying net asset have kept the relationship close in the past. With that hope in mind, my analysis has made me more

confident about the outlook for commercial property values and hence transaction volumes. This is a timely realization as I make my choice of career in the coming weeks.

Appendix A: Variable Description and Data Source

Bloomberg	Description	Data source
NAREIT	National Association of Real Estate Investment Trusts All Equity REITs Total Return Index	Bloomberg
SP500	S&P 500 US Equity Total Return Index	Bloomberg
Jobs	NonFarm Payroll Employment Seasonally Adjusted	US Bureau of Labor Statistics
Oil	Bloomberg spot crude oil price using West Texas Intermediate (WTI) crude at Cushing, OK	Bloomberg
gdp	GDP US Nominal Dollars Seasonally Adjusted Annual Rate (SAAR)	Bloomberg
10YR = yr	Yield on the US 10 year Treasury Note	Bloomberg
Ycurve	Yield differential between the 2 year and 10 year US Treasury Notes	Bloomberg

Appendix B- Variables and Expected Signs

Acronym	Variable Description	What it captures	Expected sign
S&P500	S&P 500 US Equity Total Return Index	Trend in broad US Equity Markets	+
JOBS	NonFarm Payroll Employment Seasonally Adjusted	Number of users of commercial real estate	+
OIL	Bloomberg spot crude oil price using West Texas Intermediate (WTI) crude at Cushing, OK	Commodity inflation	+/-
GDP	GDP US Nominal Dollars Seasonally Adjusted Annual Rate (SAAR)	Value of all goods and services produced within a country	+
10YR	Yield on the US 10 year Treasury Note	Discount rate for future corporate earnings	-
YCURVE	Yield differential between the 2 year and 10 year US Treasury Notes	Inflation expections/anticipated Fed tightening	+

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