



UNIVERSIDADE CATÓLICA PORTUGUESA

# Which are the determinant factors in EREITs performance in USA?

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Católica Porto Business School  
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Presented to *Universidade Católica Portuguesa*  
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by

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# Resumo

Apesar da sua relevância, os *Equity Real Estate Investment Trusts* (EREITs) têm sido pouco estudados pela literatura financeira devido a vários fatores. Em primeiro lugar, muitos investigadores consideram-nos empresas financeiras, pelo que são excluídos dos estudos sobre *Cash Flows*. Em segundo lugar, devido aos seus requisitos especiais e às suas exigências e vantagens fiscais únicas no sector imobiliário, são frequentemente excluídos dos estudos relativos ao desempenho e à estrutura de capital.

Além disso, a literatura existente centra-se sobretudo no mercado asiático, havendo muito poucos estudos sobre o mercado norte-americano.

Este estudo procura trazer informação relevante, examinando os fatores determinantes do desempenho dos EREITs nos EUA, proporcionando aos investidores e gestores de ativos uma melhor compreensão do desempenho dos REITs. Esta informação é crucial para compreender de que forma as diferentes variáveis afetam o seu desempenho e quais são, caso existam, as relações significativas entre as variáveis. Essa relação foi estudada utilizando uma análise de regressão de dados em painel com dados de 2013 a 2022.

Os nossos resultados parecem indicar que as variáveis Mercado, Dimensão, *CashFlow* e *Dividend Yield* têm uma relação positiva e significativa com o desempenho dos EREITs medido pelo *Market Net Asset Value*. Relativamente ao fator alavancagem não foi encontrada qualquer relação significativa.

Palavras-Chave: Performance; EREITs



# Abstract

Although its relevance, Equity Real Estate Investment Trusts (EREITs) have been barely studied by finance literature due to several factors. Firstly, many researchers considered them financial firms so they are excluded from studies regarding Cash Flows. Secondly, due to its special requirements and unique real estate tax requirements they are, frequently, excluded from studies regarding performance and capital structure.

Furthermore, the existing literature focus mostly, in the Asian market and there are very few studies focusing in the North American market

This study sheds some light in the field by examining the determinants factors in EREITs performance in USA, providing relevant investors and asset managers with a better understanding of the performance of REITs. Such information is crucial to understand how different variables effect their performance and which are, if there are, significant relationship between variables. Such relationship was studied using a panel data regression analysis with data from 2013 to 2022.

Our results seem to indicate that Stock Market, Size, Cash Flows and Dividend Yield variables have a positive significant relationship with EREITs performance measured by Market Net Asset Value. Regarding Leverage factor it was found no significant relationship.

Keywords: Performance; EREITs



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# List of Abbreviations

CAGR - Compound Annual Growth Rate

DY – Dividend Yield

EBIT- Earnings before Interest and Taxes

EREIT- Equity Real Estate Investment Trust

FFO - Funds from Operations

ICR – Interest Coverage Ratio

MREIT- Mortgage Real Estate Investment Trust

NAV- Net Asset Value

NOI- Net Operating Income

REIT- Real Estate Investment Trusts



# 1.Introduction

Real Estate Investment Trusts (REITs) represent a unique fusion of real estate and financial markets, offering investors means to access the real estate sector without direct ownership of physical properties. For this reason, REITs provide an opportunity for both institutional and individual investors to participate in the real estate market, in a different way from the traditional one. Furthermore, due to their unique tax advantages and distribution requirements, they become even more appealing to investors who seek for stable income streams and potential capital appreciation (NAREIT, 2023).

However, the complex nature of REITs needs a comprehensive understanding of their mechanics, risk factors and performance drivers. This study sheds some light in the field by examining the determinants factors in Equity Real Estate Investment Trusts (EREITs) performance in USA in last decade, providing to investors and asset managers a better understanding of the performance of EREITs. Such information is crucial to understand how different variables effect their performance and which are, if there are, significant relationship between variables.

Gathering information from previous empirical studies it was chosen five main determinants for EREITs performance: Stock Market, Leverage; Cash Flows; Size; Dividend Yield. As measure for EREITs performance was taken in consideration Market Net Asset Value (Market NAV). In order to evaluate the relationship between independent variables and dependent variable, it was applied a panel data regression model using an OLS Regression model.

From this study, it was found that four out of five factors (Stock Market, Size, Cash Flows and Dividend Yield) have a positive significant relationship with EREITs performance. Regarding Leverage factor it was found no significant relationship. Furthermore, it was done further research about other important topic in REIT financial literature regarding which cashflow measure has more significant information whether is Net Income or Funds from Operations. It was found that Funds from Operations explain more performance of EREITs using Book Net Asset Value as performance measure.



## 2. REIT's Framework and Literature Review

### 2.1. REIT's Framework

Real Estate Investment Trusts, mostly known as REITs, were introduced in United States market in 1960 and they are an asset class that enable investors to invest, indirectly, in real estate. Such investment can be done through ownership of equity shares in a company whose assets consist primarily of commercial properties or mortgages and whose revenues derive primarily through commercial property leases or mortgage payments (Case, 2013). So, REITs can be divided in two main classes, Equity REITs (EREITs) and Mortgage REITs (MREITs).

In order to better understand REITs, it is essential to analyse their evolution through history. Figure 1 presents the evolution of the number of Equity REITs, Mortgage REITs and Hybrid REITs (Revenues from properties and mortgages) since 1971 to 2022 in FTSE NAREIT Real Estate Index. It is relevant to mention that FTSE NAREIT Hybrid REITs Index was discontinued in 2010 justifying why there is not Hybrid REITs after that year.

## Evolution of number of REITs by class

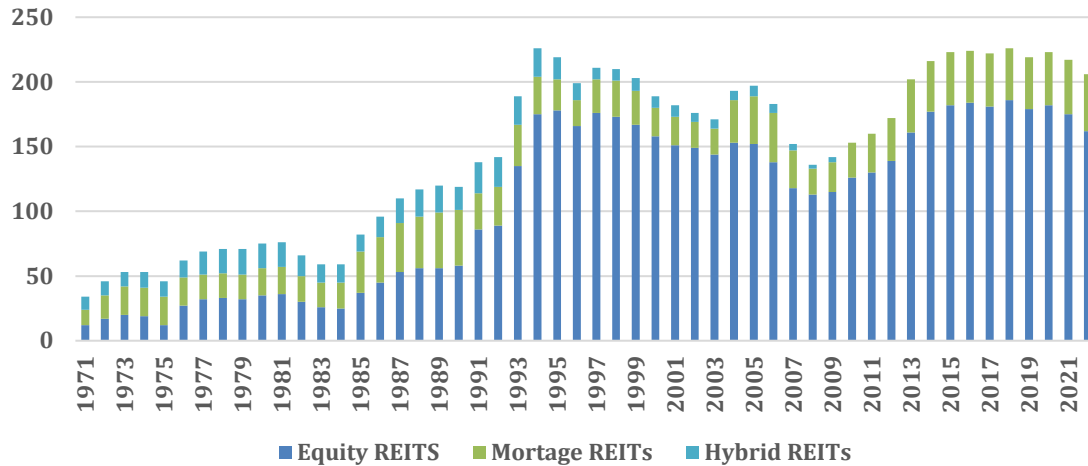


Figure 1 - Evolution of number of REITs by class  
Source: NAREIT (2023)

EREITs almost always have been the main prevalent REIT class but the gap to the others two major classes started to be appear in 1986 due to Tax Reform Act. According to Corgel et al (1995), the new legislation increased REIT attractiveness due to “changes in depreciation allowances and passive loss rules”.

Then as it can be observed in Figure 1, in the period 1991-1995 there was a massive growth in the number of Equity REITs, being this period addressed as the birth of “Modern Era of REITs”. It was during this short period of time that happened a considerable amount of REIT IPOs, precisely, 97 IPOs between 1991 and 1994. This notorious change in the industry was triggered by credit crisis created by the commercial real estate collapse in late 1980s. As a solution for the lack of credit through normal channels, privately held property companies decided to go public (NAREIT, 2013). Furthermore, in 1993, President Clinton signed into a law change to the “Five and Fewer” rule which simplified pension plan’s investments in REITs.

However, this has not been a constant growth industry as it can be seen a “dip” between 2006-2010 period which can be justified by subprime crisis that

had a tremendous negative effect on real estate market. Since then, this decade has been presented with considerable increase in this industry although a slower growth, in latest years, can be observed. At this day, there are registered 206 REITs: 162 EREITs and 44 MREITs.

Furthermore, regarding their performance it can be observed in Figure 2 that each class performed differently over time. Hybrid REITs, Mortgage REITs and Equity REITs had a CAGR of 4,3%, 5,37% and 11,8%, respectively (NAREIT, 2023).

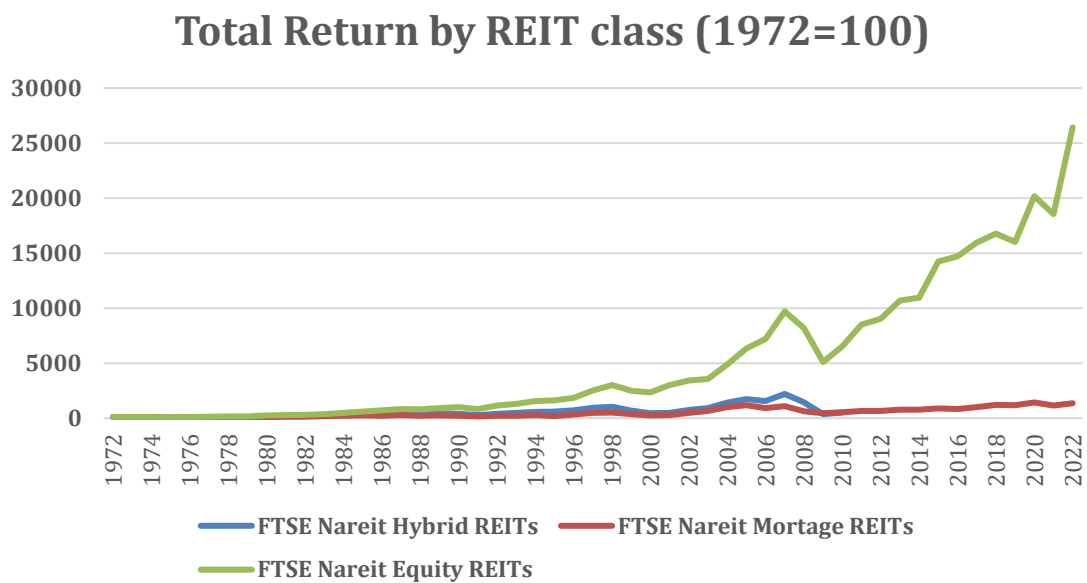


Figure 2 - Total Return by REIT class  
Source: NAREIT (2023)

### 2.1.1. Equity REITs

As Equity REITs represent most of the market, they are going to be the focus of this study.

This asset class has been increasing in last decades as investors are realizing the benefits to use them as vehicle to profit from real estate markets around the world. For instance, between 2005 and 2014, the S&P REITs index had an annualized growth rate of 10% comparing to an annualized growth of 8,27% from S&P 500 index (Bao et al., 2017). Regarding Equity REITs performance and S&P 500 from the beginning of its existence, FTSE NAREIT Equity REITs and S&P 500 had an annualized total return of 10,41% and 11,01%, respectively, between 1989 and 2022. Not only has a very close performance to the market, but also is attractive sector to investors who seek passive income by dividends as REITs have a special payout requirement, among other special requirements.

In order to be recognized as a REIT, these following requirements must be followed (NAREIT, 2021):

- Must be owned, at least, by 100 different shareholders and five or fewer individuals cannot own more than 50% of the company.
- Pay, at least, 90% of its taxable income in the form of dividends every year.
- Invest, at least, 75% of its total assets in real estate.
- 75% of its gross income must come from rents from real property or from sales of real estate.

Furthermore, there is a main difference between tax status of a REIT comparing to an ordinary company due to the special dividend payout requirement: deduction is allowed for dividends paid. The reasoning behind such accounting policy is that REITs “just serve as a pass-through entity so that earnings from property investments are only taxed with personal tax rate of the

individual investor like earnings from direct property investments.” (Widmann, 2007).

When discussing performance factors, it is relevant to mention that Equity REITs are also known for being very transparent firms comparing to non-REIT stocks. There are four main reasons for the little private information left with REIT management (Hayunga et al., 2009):

- (i) The ability to witness the holdings of REIT.
- (ii) Exists an active market for assets similar to those owned by REITs.
- (iii) REITs income is not based upon technologically advanced processes, investors have great insight into the investments in place, current cash flows and earnings.
- (iv) When assessing REIT value instead of discounting long-term dividend projections, REIT analysts estimate the aggregate net operating income of the REIT’s holdings for the next year. The aggregate net operating income is then capitalised by a weighted average capitalisation rate for the portfolio. The capitalisation rates for REITs are quite specific and standardised within each particular REIT subindustry.

## 2.1.2. EREIT subsectors

EREITs are subdivided in 14 categories according into the type of property they invest (NAREIT, 2023) (see appendix A). Table 1 shows information regarding the number of constituents and market capitalization for each EREIT subsector in FTSE All Equity REITs as of August 2023.

<b>Subsector</b>	<b>Number of constituents</b>	<b>Market Capitalization (M\$)</b>
Office	19	60
Gaming	2	43
Industrial	11	167
Retail	31	165
Lodging/Resorts	14	32
Residential	19	181
Timberland	3	32
Health Care	15	102
Self-storage	4	82
Infrastructure	4	153
Data center	2	111
Diversified	12	25
Speciality	7	33

Table 1 - Number and Market Capitalization by EREITs subsector  
Source: NAREIT (2023)

## 2.2. Literature Review

There is not much literature on the drivers of EREITs performance, as these instruments are often excluded from most empirical studies on financial instruments performance due to their special requirements (Smith et al., 2006) and tax status as it was presented above.

Past empirical studies identified five main determinants although their impact on performance is not consensual among different studies:

- Stock market (eg. Chan, 1990 ; Corgel, 1991; Damodaran, 2002)
- Leverage (eg. Shilling, 1988; Devos, 2014; Bao, 2017)
- Size (eg. Conover, 1998; Ambrose, 2005; Ali, 2006)
- Cash Flows (eg. Knight et al., 2000; Ukhov et al., 2011; Beracha et al., 2022)
- Dividend Yield (eg. Linter, 1956; Kau et al., 1987; Chan et al., 2003)

### 2.2.1. Stock Market

There is a question in literature which answer is not consensual regarding the fact whether REITs are real estate or stocks. This led to studies examining if REITs have more similarities with real estate funds or the stock market and, therefore, how behaves the relationship between REITs and both factors. One of earliest studies is from Chan et al. (1990) that indicates there are three majors' factors that drive REIT and stock market returns: Changes in risk; term structure of interest rates and unexpected inflation. Furthermore, this study show that Equity REITs are 60% less sensitive to these events than stock market in general. Such conclusion goes according to conventional wisdom that

real estate is less risky than common stocks. Ibbotson et al. (1990) compared timeseries of REITs with real estate funds as a proxy for direct real estate investments and they found low correlation. Then they compared it with the S&P 500 Index founding closer similarities. Only one year later, Corgel (1991) mentioned that in short term, REITs vary widely from stock market but, in long run, tend to be highly correlated. Damodaran (2002) found that REITs returns have more in common with stock market returns than real estate indexes as can be observed in Table 2.

	Period	Compound annual return	Arithmetic mean return	Standard Deviation
<b>CREF</b>	1969-87	10,80%	10,90%	2,60%
<b>I&amp;S</b>	1960-69	8,70%	8,70%	4,90%
<b>C&amp;S</b>	1970-89	8,50%	8,50%	3,00%
<b>S&amp;P 500</b>	1928-00	10,46%	12,38%	20,02%
<b>REIT</b>	1972-99	14,20%	15,70%	15,40%

Table 2 - Return and Standard Deviation from different indexes  
Source: Damodaran (2002)

As a last argument in favor of REITs being closer to stocks, Cheong et al. (2006) found that there is a long run cointegrative relationship with stock market.

In contrast, Conover et al. (2000) found no relationship between Equity REITs returns and a constant beta. Then Pagliari et al. (2005) proved that in long-run direct and listed real estate have similar risk-return characteristics due to the differences in liquidity and valuation that it is believed that converge over time. Thirdly, Kroencke et al. (2014) found that the correlation between listed and direct real estate is high. According to this study “the expected listed real estate premium consists of 36% stock market risk, 40% real estate risk and 24% business cycle risk.”.

### 2.2.2. Leverage

The relationship between leverage and returns is barely investigated in literature and how it behaves remains unclear. Due to the fact that REITs have to meet a special dividend payout requirement, they have to raise capital more frequently to ensure sufficient cashflow (Devos et al., 2014).

Furthermore, as firms that have very low tax rate, or even 0%, their tax savings are lower when using debt. Therefore, due to big tax savings, taxable firms can afford to outbid REITs in debt markets (Corgel et al., 1995) . Following this theoretical approach, Shilling et al. (1988) hypothesized that debt offering have a negative impact in stock price. However, they found out a “strong positive reaction to debt announcements”, mostly, with short-term ones.

Bao et al. (2017) took a completely different approach, taking in consideration a behavioural element, the reference-dependence concept, studying the influence of target capital structure. The study shows that observed leverage alone is not sufficient to support the relationship analysis because it is not able to determine the domain that firm is located. Authors state that in order to do a complete analysis of this relationship would require a combination between observed leverage and target leverage.

### 2.2.3. Size

The effect of size receives a considerable amount of attention on financial literature however REITs are often excluded from such studies. On existing literature, the relationship is not consensual although most of studies found out a positive relationship between size and returns.

On one hand, Conover et al. (1998) using more than 1200 observations from eleven years of foreign real estate regarding 20 countries found that large cap

companies have higher returns and lower risk than small firms. Posteriorly, Ali (2006) investigated 30 real estate shares randomly selected from Bursa Malaysia and using Sharpe Ratio and Coefficient of Variation, it was found that big capitalization REITs have a better performance and lower risk than small capitalization ones. Ambrose et al. (2005) studied the economies of scale in REITs and it was concluded large REITs increase growth prospects while reducing costs, leading to positive relationship between firm's profitability and firm size.

On the other hand, the main study was done by Tompkins et al. (1991) indicating that there is a negative relationship between size and return. Such research was done using US REITs data from 1974 to 1988.

It is interesting to notice that from past studies, results change depending on the country which sample belongs to. One of possible explanations was given by Conover et al. (1998) stating that institutional and market structure differences between United States and foreign real estate firms may justify such difference.

#### 2.2.4. Cash Flows

The financial statements and Cash Flows of a firm are crucial for investment decisions. Although when analysing financial statements and Cash Flows from REITs there must be more cautious due to two main reasons. On one hand, some of special requirements which were stated before have a significant impact on Cash Flows, mainly (NAREIT, 2021):

- i. Pay, at least, 90% of its taxable income in the form of dividends every year.
- ii. Invest, at least, 75% of its total assets in real estate and at least.

- iii. 75% of its gross income must come from rents from real property or from sales of real estate.

On average, REITs comply with the last two requirements with much higher percentages than legal required, holding 98,6% of their assets in form of real estate and 86,7% of their revenue from rental (Beracha et al., 2022) showing a long-term holding strategy.

On the other hand, REITs have a higher level of non-cash items, mainly, depreciation so, it is important to choose which Cash Flows measures are more accurate in Real Estate sector. So, when accessing REITs, it is widely used a metric called Funds from Operation (FFO) as Cash Flow generated from a REIT. Such metric will be explored later.

Firstly, it was studied if these Cash Flows have a significant impact on REIT returns. On one hand, Linneman et al. (2001) found that higher FFO growth rates lead to higher return on capital ratios. On the other hand, Ukhov et al. (2011) confirm the results from Srinivasan et al. (2003) in which they demonstrate that REIT prices do not move too much relative to REIT Cash Flows.

Secondly, there is a discussion about which Cash Flow measure have a more significant impact on REIT returns, if there is net income or FFO. There is very little literature review on it but one author who studied was Knight et al. (2000) finding that FFO contain higher information content than net income. This topic will also be addressed in this study on section “Complementary Research”.

## 2.2.5.Dividend Yield

There is a lot of financial literature regarding dividend policy where it is highlighted the research done by Lintner (1956) that showed dividends are sticky, proving that companies are reluctant in cutting dividends. Although,

once again, REITs are often excluded from these studies. As an example, in a famous study in residual dividend policy by Smith et al. (2006), they were excluded because “REITs have a little discretion in setting dividend policy”. To exemplify the differences regarding dividend subject, for instance, dividend payouts in REITs are, usually, measured differently from ordinary stocks because as mentioned before when assessing REITs, we use FFO as cashflow measure so their dividend payout it is calculated by Dividends paid on FFO and not Dividends on Net Income. This happens because non-cash charges in REITs are expected to have a substantial weight in financial statements therefore REITs cashflow is expected to be higher than its taxable earnings. This was demonstrated by Gau et al. (1993), Srinivasan et al. (2003) and Sirmans et al. (2006) in which it was shown that report average dividend payments by US REITs excess their earnings. During the 1980–2000 period, REITs distributed on average 110% of taxable income (Chan et al., 2003). Kau et al. (1987) found high dividend payouts increase investors rate of return and therefore reduce their company’s market values.

Regarding relation between dividend yield and performance, Zolkifli et al. (2014) found Dividend Yield is positive associated with Net Asset Value as performance measure in Asian markets. Consistent with such results, Chiang (2015) showed that between 1993-2011, 33% of the variation in aggregate US REIT returns is forecastable from dividend yield. He found a “positive predictive relation from dividend yields to REIT return emerges”.



# 3. Hypothesis Development

## 3.1. Stock Market

Regarding stock market impact on REITs, there are two main debates in literature as presented above. Firstly, if REITs performance is more driven by the stock index or house prices. Damodaran study showed that REITs returns have more in common with stock market during his test period. However, the study was done almost three decades ago, and it is not known if results persist. So, it was decided to apply it in this last decade, using S&P 500 index as proxy for stock market and S&P Case-Shiller Home Price as proxy for house price performance (Figure 3). It is relevant to note that there is some multicollinearity between our sample and S&P 500 due to the existence of EREITs in S&P500. As the time of this study, 16 EREITs from our sample are included in S&P500 so the multicollinearity is not significant.

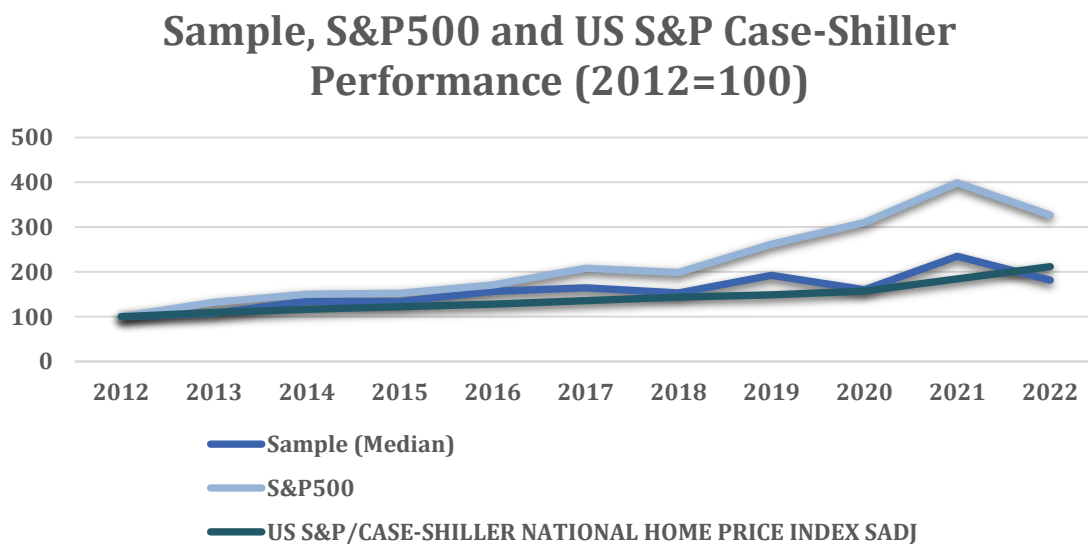


Figure 3 - Sample, S&P 500 and US Case-Shiller performance  
Source: S&P Global

	<b>Sample (Median)</b>	<b>S&amp;P500</b>	<b>US S&amp;P/CASE-SHILLER</b>
<b>Annualized Return</b>	6,1%	12,6%	7,8%
<b>Standard Deviation</b>	21,1%	16,6%	4,6%

Table 3 - Annualized return and standard deviation  
Source: S&P Global

Table 3 provides ambiguous results. Regarding compound annual return, our sample is closer to US S&P Case Shiller index however, on other hand, standard deviation from these returns is closer to S&P 500. Due to the ambiguous conclusion, it was decided to apply the Sharpe Ratio in order to allow comparison regarding the risk-return for each one. For the calculation, it was assumed average 10-year US treasury Yield during test period as risk free rate: 2,15%.

	<b>Sample (Median)</b>	<b>S&amp;P500</b>	<b>US S&amp;P/CASE-SHILLER</b>
<b>Sharpe Ratio</b>	18,9%	62,8%	123,6%

Table 4 - Sample, S&P 500 and S&P Case-Shiller Sharpe Ratio  
Source: S&P Global

Once again, results from Table 4 were not concrete. For the purpose of this study, it was assumed that EREITs are more influenced by stock market than house prices for two main reasons. Firstly, although results do not show a clear relationship, apart from annual return, all sample metrics are closer to S&P500 than to US S&P Case Shiller. Secondly, if we take in consideration previous empirical studies as Chan et al (1990) and common knowledge, real estate is less volatile than general stock market and our sample show a standard deviation much higher than S&P Case Shiller and even higher than S&P 500. So, it is a sensitive approach to consider the influence of stock market than house prices.

Second debate in literature is how behaves the relationship between stock market and REITs performance. Past studies prove that there is some

correlation, but real estate is less volatile. Once again, it was decided to run the test for our test period.

	Annual Returns	
	S&P500	Sample (Median)
<b>2013</b>	32,39%	7,73%
<b>2014</b>	13,69%	25,04%
<b>2015</b>	1,38%	-0,49%
<b>2016</b>	11,96%	16,84%
<b>2017</b>	21,83%	5,05%
<b>2018</b>	-4,38%	-7,01%
<b>2019</b>	31,49%	25,88%
<b>2020</b>	18,40%	-16,67%
<b>2021</b>	28,71%	46,30%
<b>2022</b>	-18,11%	-22,73%

Table 5 - S&P 500 and Sample annual returns

From the test done with Table 5 data, it was proven that there is positive significant correlation between the variables of 66%.

These tests were done between our sample total returns and S&P 500 total returns. As mentioned before, in this study our performance measure is Market Net Asset Value so it was analysed relationship between S&P 500 points and our sample's Market NAV.

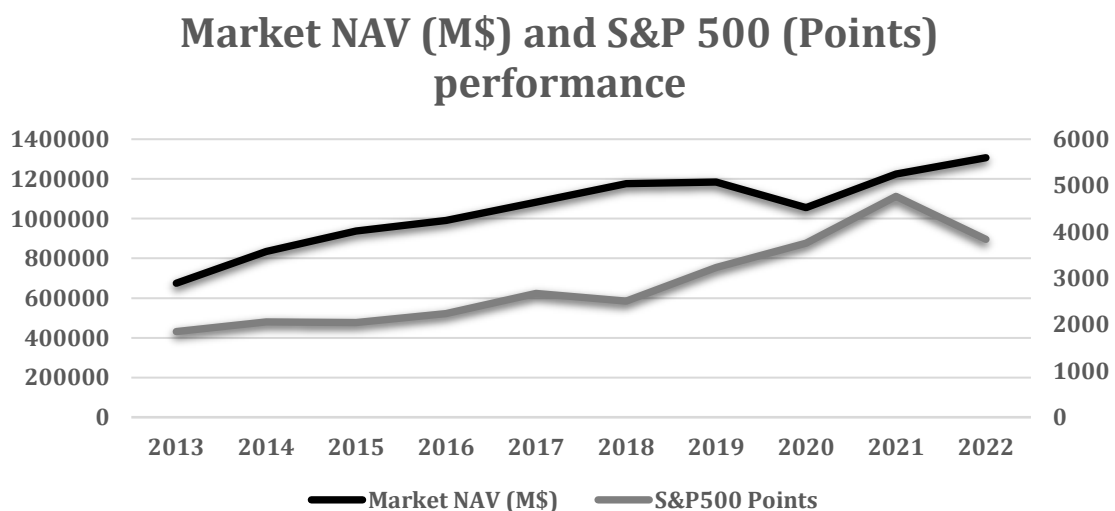


Figure 4 - Market NAV and S&P 500 performance

As it can be observed in Figure 4 and confirmed in the Table 5, there is a high moderate correlation between variables. However, it is relevant to mention that this correlation had been lower in latest years.

**Hypothesis 1:** Stock market will have a significant positive impact on REIT's performance.

### 3.2. Size

From past empirical studies concludes that REIT's size is, definitely, one significant factor when explaining their performance. The question it is if there is a negative relation or a positive one. So, it was decided to analyse the performance between Market NAV and Market Capitalization from our sample.

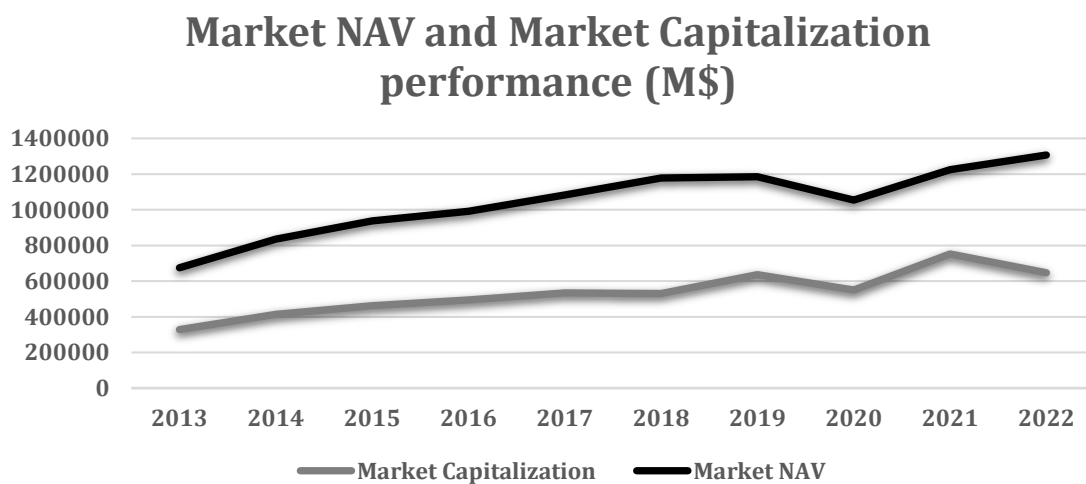


Figure 5 - Market NAV and Market Capitalization performance

It is clear from the Figure 5 the close relationship existing between variables that is confirmed by a 91,4% level of correlation between them.

**Hypothesis 2:** Market Capitalization will have a significant positive impact in REIT's performance.

### 3.3. Leverage

Real Estate is known for being a high leverage business due to the fact that it can have a lower interest rates because it has real assets to back the loan. The question is if a higher leverage is seen by investors has a growth opportunity or more financial risk to the company.

Although, firstly, it is relevant to study how REITs leverage have been evolving this last decade. In order to do so, it was done the mean and median Market Debt/Equity for our sample during our test period. Book debt was used as proxy for market debt.

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Debt/Equity Mean	92%	90%	96%	95%	93%	115%	134%	344%	123%	188%
Debt/Equity Median	69%	68%	66%	60%	59%	71%	61%	92%	63%	77%

Table 6 - Debt/Equity Mean and Median

Table 6 indicates an increase in leverage levels over the years which can be justified by low interest rates environment during this period. Although, this ratio is easily affected by market capitalization of firms as it can be seen in 2020 that due to a bear market, Debt/Equity ratio went to an outrageous value. So it was decided to use another measure of firm leverage to confirm previous results, EBIT interest coverage ratio ( EBIT/ Interest Expenses).

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Interest Coverage Ratio Mean	1,50	1,77	3,62	2,29	2,17	2,26	2,30	0,89	2,20	2,39
Interest Coverage Ratio Median	1,41	1,77	2,06	2,23	2,13	2,12	2,18	1,45	1,92	2,30

Table 7 - Interest Coverage Ratio Mean and Median

Table 7 results in a contrast conclusion, a downtrend in leverage levels.

As there was a contrast between previous conclusion, it was decided to apply a third test, that is an extension from previous one, where it will be analysed the percentage of EREITs which had interest expenses higher than their EBIT.

	Number of EREITs	Interest Expenses > EBIT	
		Number	Percentage
<b>2013</b>	113	32	28%
<b>2014</b>	118	32	27%
<b>2015</b>	117	26	22%
<b>2016</b>	116	19	16%
<b>2017</b>	113	19	17%
<b>2018</b>	115	25	22%
<b>2019</b>	109	15	14%
<b>2020</b>	110	41	37%
<b>2021</b>	108	32	30%
<b>2022</b>	103	25	24%

Table 8 - Percentage of EREITs with Interest Expenses higher than EBIT

Table 8 concludes that, apart from 2020 and 2021 (Covid-19 effect), leverage level has been presenting a downtrend, going along with second test done. Now to construct the hypothesis around the impact of leverage in REIT's performance, it was gathered median interest coverage ratio and compare it to Market NAV's performance to verify if we can find some correlation.

## Market NAV (M\$) and Interest Coverage Ratio performance

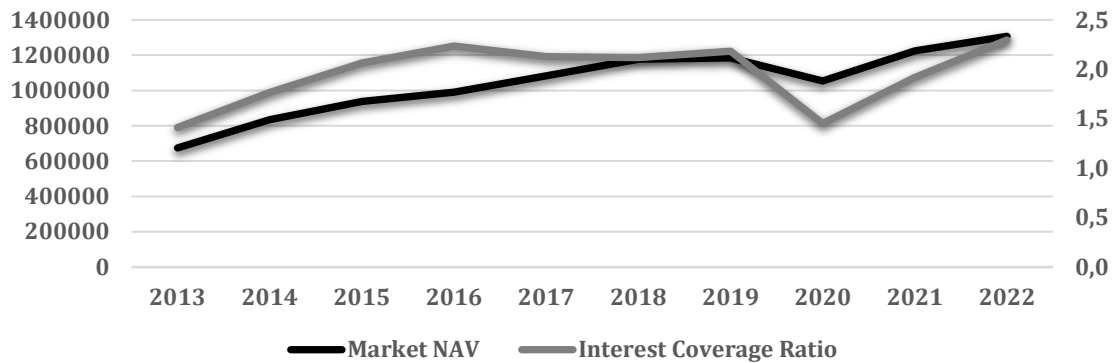


Figure 6 - Market NAV and Interest Coverage Ratio performance

From the Figure 6 results, it can be observed a moderated positive correlation between variables, which is confirmed by a 64% correlation level.

**Hypothesis 3:** Interest Coverage Ratio will have a significant positive impact in REIT's performance.

### 3.4. Cash Flows

For Cash Flows variable, it will be used Net Income (NI) as metric. Although previous empirical studies show that FFO contains more significant information than NI, FFO cannot be used due to multicollinearity. FFO is used to calculate Market NAV so there is a multicollinearity problem that was confirmed through a Variance Inflation Factor (VIF) of 9,32. A VIF higher than 10 is considered to be a significant high multicollinearity, so it was decided to not use such metric. For the purpose of the study, it was analyzed the performance of Market NAV and Net Income over the test period.

## Market NAV and Net Income performance (M\$)

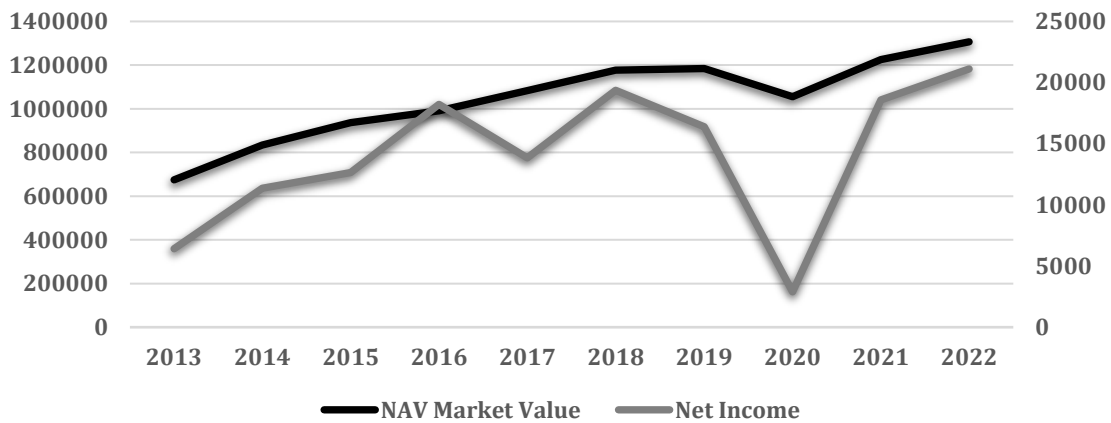


Figure 7 - Market NAV and Net Income performance

From the Figure 7, it can be observed a positive relationship between both variables resulting on 67% correlation level. However, it can be seen that although both reacts on the same direction, net income is much more volatile than Market NAV.

**Hypothesis 4:** Net income will have a positive relationship with REIT's performance but beta will be lower than one.

### 3.5. Dividend Yield

REITs are known for their dividends payments as they must pay, at least, 90% of their taxable profit as dividends. This becomes an appealing factor for those investors who seek passive income. For instance, average dividend yield for our sample over our test period was 4,3%.

Following past empirical studies, it is believed that a higher dividend yield will lead to a higher NAV performance. Although I do not believe that is a linear relationship, the more dividend yield increases, the marginal impact on NAV performance should decrease because too high dividends lead to unsustainable payout ratio. This would lead to a higher financial risk, and, at

last instance, a dividend cut that would have a significant negative impact on NAV.

So, first of all, it was analysed, if in order to keep this dividend yield, EREIT's have been increasing their financial risk or not. This was done by analysing the mean and median FFO payout ratio (Proper payout ratio for REITs) and Earnings payout ratio from our sample so we can take conclusions. Our attention it is more focused on median value given the fact that as can be negative values, using average values would distort results.

	FFO Payout Ratio		Earnings Payout Ratio	
	Mean	Median	Mean	Median
<b>2013</b>	43%	59%	-137%	105%
<b>2014</b>	61%	62%	120%	112%
<b>2015</b>	38%	59%	129%	112%
<b>2016</b>	63%	60%	136%	112%
<b>2017</b>	61%	63%	-98%	115%
<b>2018</b>	78%	65%	1583%	108%
<b>2019</b>	71%	67%	-136%	126%
<b>2020</b>	43%	61%	104%	94%
<b>2021</b>	64%	62%	79%	86%
<b>2022</b>	46%	59%	7%	82%

Table 9 - FFO Payout Ratio and Earnings Payout Ratio

We can conclude from the Table 9 results that EREITs have not increased their financial risk in order to keep paying their dividend and maintain the dividend yield. It is relevant to mention that the average median earnings payout ratio over test period was 105%, very close to the 110% mention by S. H. Chan et al. (2003).

Another way used to access the risk taken, was to analyse the percentage of EREIT's that paid more dividends than FFO and more dividends than earnings.

	Number of EREITs	Dividends > FFO		Dividends > Earnings	
		Number	Percentage	Number	Percentage
<b>2013</b>	113	6	5,3%	35	31,0%
<b>2014</b>	118	4	3,4%	30	25,4%
<b>2015</b>	117	4	3,4%	25	21,4%
<b>2016</b>	116	3	2,6%	25	21,6%
<b>2017</b>	113	1	0,9%	23	20,4%
<b>2018</b>	115	1	0,9%	30	26,1%
<b>2019</b>	109	3	2,8%	23	21,1%
<b>2020</b>	110	17	15,5%	46	41,8%
<b>2021</b>	108	3	2,8%	30	27,8%
<b>2022</b>	103	2	1,9%	29	28,2%

Table 10 - EREITs with dividends higher than FFO and Earnings

Tabel 10 results goes along with previous one concluding that EREIT's are actually slightly decreasing their financial risk regarding dividends payments. Furthermore, from these analyses we can also understand why we should use FFO payout ratio to access EREIT's ability to pay dividends and not the traditional Earnings payout ratio.

Regarding the relationship between dividend yield and EREIT's performance it was graphed the performance of both variables.

## Market NAV (M\$) and Dividend Yield Performance

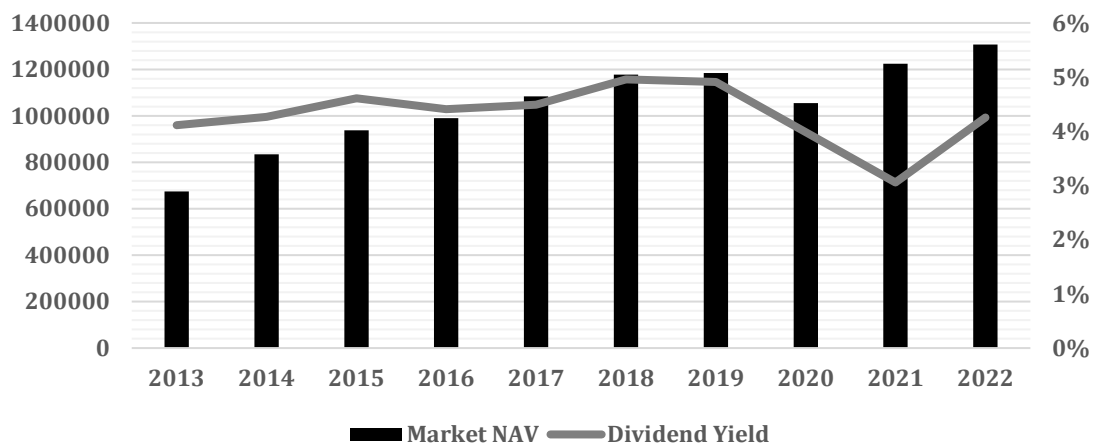


Figure 8 - Market NAV and Dividend Yield

From Figure 8, it cannot be observed any clear relationship between variables as they do not seem correlated. As a second test, it was done the correlation between them and as expected it was gotten a low negative correlation: -2,4%.

**Hypothesis 5:** Dividend Yield will have non-significant negative relationship with NAV performance.



# 4. Model

## 4.1. Methodology

For the methodology used, in order to find the relationship between dependent variable and independent ones, it was applied a panel regression analysis between variables during the period 2013-2022, using an OLS Regression. This method helps to understand the relationship among variables and how strong is the relationship, allowing to control for unobservable, firm specified, or time-variant characteristics. The choice of test period was due to two main reasons: Use the latest data possible and have a significant amount of data from different years and 10 years seemed adequate.

In order to examine the impact of each independent variable, it will be used the following model:

$$\begin{aligned} \ln NAV_{i,t} = & \alpha + \beta_1 \ln S\&P\ 500_t + \beta_2 \ln Market\ Capitalization_{i,t} \\ & + \beta_3 Interest\ Coverage\ Ratio_{i,t} + \beta_4 \ln Net\ Income_{i,t} \\ & + \beta_5 Dividend\ Yield_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (4.1)$$

$\ln NAV$  is the natural logarithm of Market Net Asset Value of EREIT that is used as a proxy of EREIT Performance,  $\alpha$  is the constant,  $\ln S\&P\ 500$  identifies the natural logarithm of S&P 500 points,  $\ln Market\ Cap$  stands for the natural logarithm of Market Capitalization of EREIT, ICR represents Interest Coverage Ratio,  $\ln NI$  is for the natural logarithm of EREIT's Net Income,  $DY$  represents the dividend yield and, finally,  $\varepsilon$  is the error term.

Regarding Net Income variable, for some years this value took negative values in some EREITs so logarithm could not be applied. In order to overpass this issue without losing observations, this variable was transformed as showed below:

$$\ln \text{Net Income}_{i,t} = \ln (\text{Net Income}_i - \text{Min} (\text{Net Income}_t) + 1) \quad (4.2)$$

Before this study proceeded with the regression analysis, it was measured multicollinearity for the data set by using the Variance Inflation Factors (VIF). If values of VIF exceed 10, it means that there is a significant multicollinearity issue that needs to be solved. VIF is calculated by:

$$VIF = \frac{1}{1 - R^2} \quad (4.3)$$

$R^2$  - Unadjusted coefficient of determination for regressing independent variable on dependent ones

Table 11 summarize the results.

<b>Variables</b>	<b>VIF</b>
S&P500	1,01
Market Cap	2,77
Interest Coverage Ratio	1,01
Net Income	1,07
Dividend Yield	1,00

Table 11 - VIF between dependent and independent variables

As there was no significant multicollinearity problem, we proceeded to regression analysis. To determine if there is a significant relationship between the independent variables and the dependent variables the null hypothesis is rejected when the p-value is less than the level of significance which is considered 10% in this study.

## 4.2. Data

On one hand, dependent variable in regression is the EREITs performance that was measured using Market NAV's performance, which calculation is explained below.

On the other hand, regarding independent variables, firstly, it was used the S&P 500 points as a proxy for stock market in United States. Secondly, market capitalization as proxy for the size of EREIT. Thirdly, in order to measure leverage levels, it was used EREIT's interest coverage ratio. Fourthly, cashflow measure was done using Net Income generated by each EREIT as a proxy for cashflow generated by them. Fifty, regarding dividend policy effect, it was tested using dividend yield for each year.

The main data source for this study is from Eikon Refinitiv Datastream. From this database, it was collected information regarding United States Equity REITs for the 2013-2022 time period. Sample is constituted by 159 Equity REITs listed in New York Stock Exchange and NASDAQ (Table 12).

<b>Subsector</b>	<b>Number</b>
Office	3
Gaming	2
Industrial	17
Retail	46
Lodging/Resorts	20
Residential	35
Timberland	2
Healthcare	3
Self-Storage	1
Infrastructure	2
Data Center	3
Diversified	17
Specialty	8

Table 12 - Number of EREITs in sample by subsector

The annual observations include market and accounting data. Regarding market data, it was collected market capitalization and S&P 500 points. Then,

from financial statements, it was gathered information such as Funds from Operations, Net income, Earnings Before Interests and Taxes, Total Interest Expense, Selling, General and Administrative Expenses, Cash and Short-Term Investments, Accounts Receivable, Dividends paid and dividend yield. Furthermore, it was collected information regarding real estate capitalization rates from surveys done by CBRE (global leader in commercial real estate services and investments).

As the objective is to analyse the performance of EREITs, first, performance measure must be chosen. It was decided to use NAV for two reasons. According to Ying (2004), there is a close relationship between stock prices and net asset values in short and long run. Furthermore, this study also found out that the NAV based property stock valuation is, empirically, one proxy to fundamental value. Although most of previous studies that use NAV as performance measure, it was used book value of NAV, by other words, total assets minus total liabilities. When using accounting metrics to access market value of REITs has different drawbacks. One of the main is due to depreciation, properties owned by a long period of time will have a substantial smaller accounting value than their market value (Beracha et al., 2022). So, for this study, it is proposed to use Market Value NAV which according to (Widmann, 2007) “all of the companies explicit disclosing their valuation techniques (Morgan Stanley, Bear Stearns and A.G. Edwards) apply NAV approach”. It is expected when using this approach to get more realistic values. Nevertheless, such approach also has weaknesses, mainly, on its calculation because it is hard to determine their normalized net operating income and an appropriate capitalization rate for each real estate category. In order to calculate NAV, it will be used the approach suggest by (Widmann, 2007):

$$\text{Gross Real Estate Value}_{i,t} = \frac{\text{Net Operating Income}_{i,t}}{\text{Capitalization Rate}_{i,t}} \quad (4.4)$$

$$\text{Total Assets}_{i,t} = \text{Gross Real Estate Value}_{i,t} + \text{Current Assets}_{i,t} \quad (4.5)$$

$$\text{Market Net Asset Value}_{i,t} = \text{Total Assets}_{i,t} - \text{Total Debt}_{i,t} \quad (4.6)$$

Net Operating Income (NOI) stands for the profitability from a real estate investment, by other words, it is revenue generated by the property minus all property expenses. It is not consensual how to determine it when it is not disclosed by firms. For this study. NOI will be calculated following Formula 4.7 and its historic performance can be seen in Figure 9.

$$\begin{aligned} \text{NOI} = & \text{Funds from Operations} \\ & + \text{Selling, General and Administrative Expenses} \\ & + \text{Total Interest Expenses} \end{aligned} \quad (4.7)$$

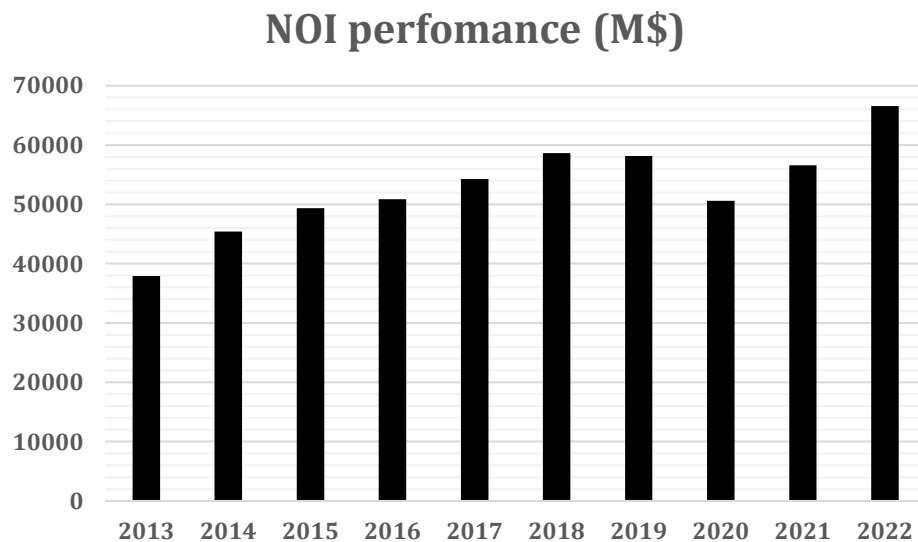


Figure 9 - NOI performance

Funds from Operations (FFO) is the actual amount of cashflow generated by a REIT, adjusting net income for non-cash items, extraordinary transactions, and accruals. FFO can be calculated by adding to net income, depreciation and

Amortization and losses on property sales and subtracting gain on sales of properties and interest income. FFO and NOI performance and relationship can be observed in Figure 10.

### FFO and NOI performance (M\$)

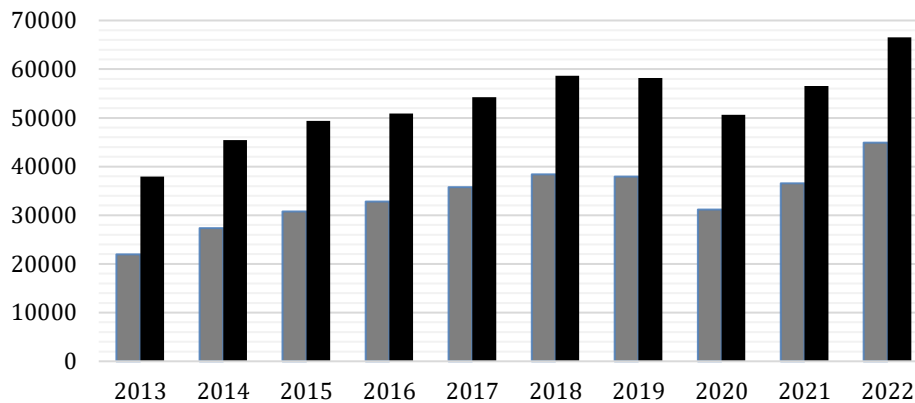


Figure 10 - FFO and NOI performance

Capitalization Rate stands for the yield of a property over one year. It varies from property to property and sector to sector (Figure 11). In general, higher capitalization rates means greater risk, and therefore, greater return. Capitalization rate as said before is hard to define and to get and for this purpose, it was used information from CBRE surveys that are done every six months to investors. From these surveys it is possible to have the perspective of investors on capitalization rates each semester. I collected data from 2013 to 2022 regarding capitalization rates for Retail, Industrial and Residential sector. There is no information regarding the other sectors, so it was used all-property capitalization rates as proxy.

## Capitalization Rates by Sector

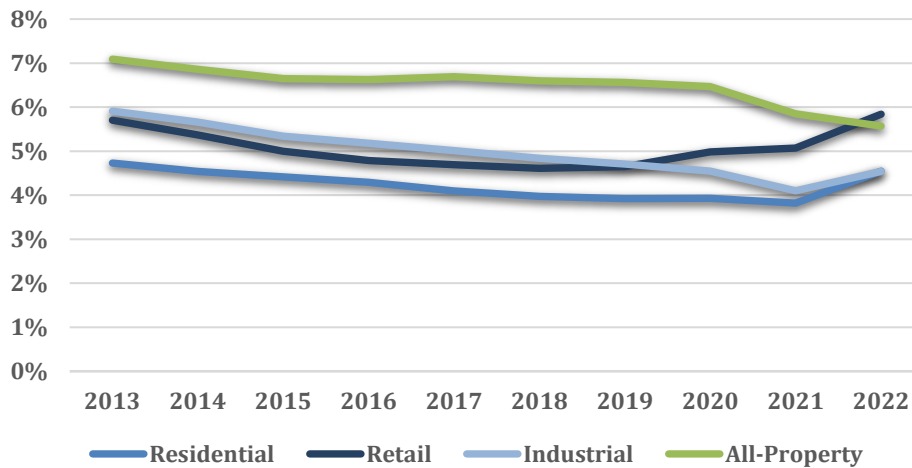


Figure 11 - Capitalization rates by sector Source: CBRE

Observing the Figure 11, it can be seen that capitalization rates followed a negative trend until 2021 and an inversion in 2022. As seen before capitalization rate can be calculated by dividing NOI by Gross Real Estate Value. If NOI has been increasing for the last years, apart from 2020, and capitalization rates decreasing, this leads to the conclusion that the value of real estate has been increasing in a faster pace than profitability from properties. This goes along with common knowledge that real estate price have been increase in an impressive pace last years (Figure 12).

### Gross Real Estate Value and NOI performance (M\$)

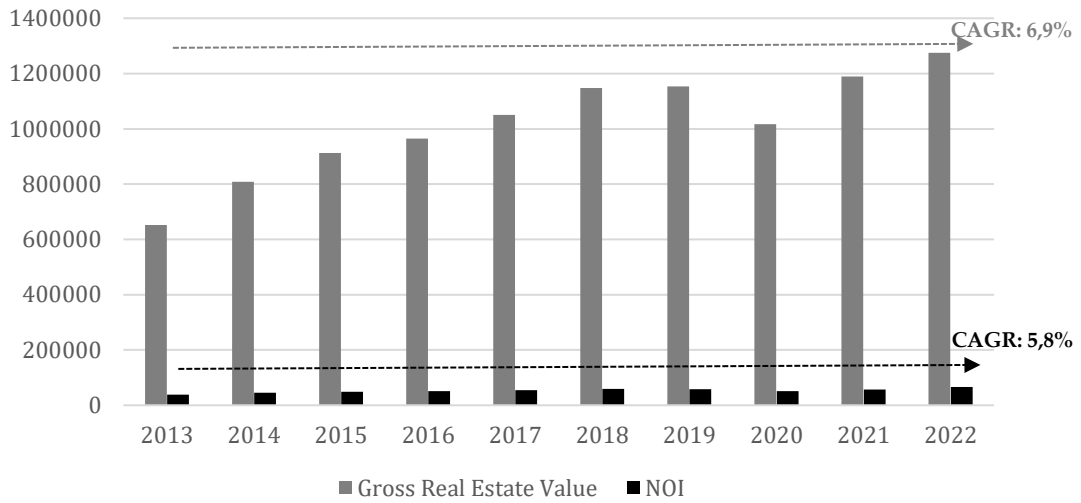


Figure 12 - Gross Real Estate Value and NOI performance

In conclusion, a considerable growth in past decade in market net asset value of Equity REITs in our sample (Figure 13).

### Market NAV performance (M\$)

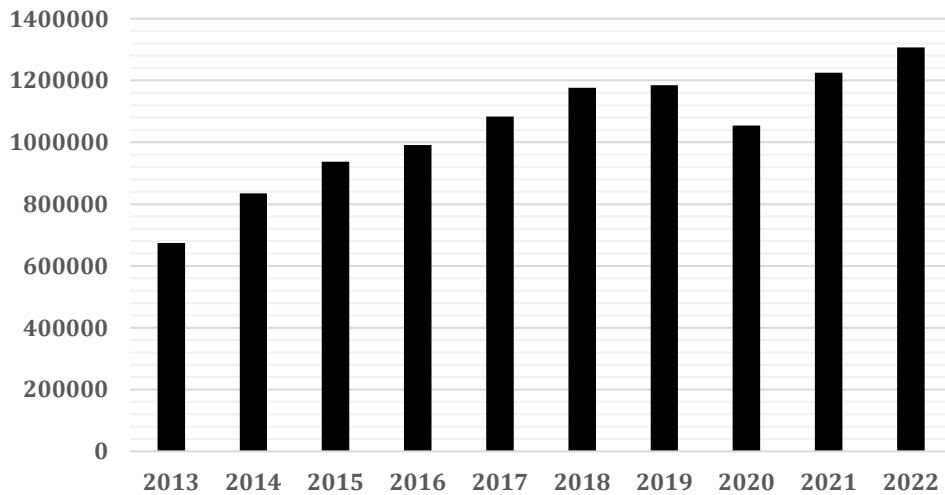


Figure 13 - Market NAV performance



## 5. Results

Variable	Coefficient	t-stat
Constant	2,481*** (0,000)	4,556
Ln S&P 500	0,189*** (0,000)	4,225
Ln Market Cap	0,404*** (0,000)	43,353
ICR	-0,003 (0,221)	-1,225
Ln NI	0,250*** (0,000)	4,736
Dividend Yield	0,026*** (0,000)	5,170

Regression Statistics	
Ajusted R-Squared	0,658
Standard Deviation	0,447
Observations	1122

Table 13 - OLS Regression results

Note: \*\*\* represents p-values < 0,01, \*\* represents p-values < 0,05 and \* represents p-values < 0,1

Table 13 shows that model explains 65,8% of the observations. All independent variables have a significant impact on EREIT's performance apart from Interest Coverage Ratio to 10% level of significance.

Firstly, S&P 500, Market Capitalization, Net Income and dividend yield have a p-value lower than 10% and a positive coefficient. This means that there is a positive significant relationship between independent variable and these dependent ones. It is relevant to mention that for all variables their coefficient is always lower than one.

On the other hand, Interest Coverage Ratio has a negative coefficient but a p-value of 0,22083 which leads to the conclusion of non-significant impact for REITs' performance for the 10% level of significance.

Regarding first variable, stock market, result goes along with our hypothesis and with previous literature. Stock market has a significant positive impact, for 1% of level of significance, on Market NAV and its coefficient is lower than one showing a lower volatility as expected.

Secondly, size also shows a positive significant impact which goes along with our hypothesis but against past empirical studies done with US REITs. It is believed that this linear relationship is justified by the economies of scale that bigger EREITs have as described by B. W. Ambrose et al. (2005). Furthermore, if a EREIT is bigger and has more assets than other EREIT in the same financial risk level, the first is expected to get a loan cheaper than the second one because it has more assets to back the loan. This is an advantage for having a bigger size and justify results gotten. It is relevant to note that size variable is the one with higher coefficient and lower p-value among independent variables.

Interestingly, regarding leverage measured by interest coverage ratio as previous literature, result is not clear, there is no significant relationship between leverage and EREITs' performance. It is believed that this happens because investors at the same time feel that more leverage equal more financial risk but at same time more growth opportunities.

Fourthly, as expected Net Income has a significant positive impact (1% level), the higher the profitability of a firm, the more value is seen in it. Relevant to mention that as hypothesised coefficient is lower than 1, more precisely, 0,25 showing that REITs performance behave in the same direction as net income but not so widely.

Lastly, dividend yield has a positive significant impact (1% level) but it has the lower coefficient among significant variables. That can be justified with what was explained before. Investors seek passive income, a higher dividend is seen as positive for investor, but too high dividend can be seen as "dividend trap".

## 5.1. Complementary Research

In order to complement the work done and to test previous empirical studies, it was decided to apply this panel data regressions but using as EREIT's performance measure Book Value NAV. There will be applied two different regressions.

On one hand, one using, exactly, the same variables as the ones used previous, this will allow to understand if variables can explain better or worse the performance and if its used Book NAV instead of Market NAV.

On the other hand, second regression will be done with same variables apart from cashflow measure that will be used FFO instead of net income as there is no multicollinearity issue between Book NAV and FFO. This regression will help us to reach a conclusion about what cashflow measure contains more significant information.

Regarding first regression, Table 14 reflects the results from it:

Variable	Coefficient	t-stat
Constant	2,538*** (0,000)	3,772
Ln S&P 500	0,253*** (0,000)	4,587
Ln Market Cap	0,516*** (0,000)	44,873
ICR	-0,009*** (0,001)	-3,282
Ln NI	-0,129** (0,048)	-1,978
Dividend Yield	0,013** (0,031)	2,157
Regression Statistics		
Ajusted R-Squared	0,659	
Standard Deviation	0,552	
Observations	1122	

Table 14 - Results from first OLS Regression

Note: \*\*\* represents p-values < 0,01, \*\* represents p-values < 0,05 and \* represents p-values < 0,1

Curiously, this model has just a slightly ability to explain the variables (65,9%) as the one using Market NAV (65,8%). Although there are two main differences in the results from this model.

Firstly, all variables are significant for the stipulated 10% level of significance and, even for, 5% level of significance.

Secondly, there was a change in the coefficient signal in Ln Net Income variable that presents a negative one unlike in the first model. A possible explanation to this can be due to the calculation of Book NAV (Total Assets – Total liabilities) and payout special requirement that ends up diminishing total assets in EREIT. If a EREIT increased its net income, it means that its taxable profit also gone up, *ceteris paribus*. Due to the special requirement, EREIT must pay more dividends and as it was shown previously, dividends paid are usually higher than earnings. So only taking in consideration cash generated by earnings and cash paid in dividends, an increase in net income means a higher gap between both which lead to the reduction of cash available and, finally, reduction of total assets.

Regarding second regression, Table 15 reflects the results from it:

Variable	Coefficient	t-stat
Constant	2,248 (0,620)	0,496
Ln S&P 500	0,239*** (0,000)	4,381
Ln Market Cap	0,447*** (0,000)	27,681
ICR	-0,010*** (0,000)	-3,688
Ln FFO	0,294*** (0,000)	5,456
Dividend Yield	0,006 (0,342)	0,950
Regression Statistics		
Ajusted R-Squared	0,667	
Standard Deviation	0,546	
Observations	1122	

Table 15 - Results from second OLS Regression

Note: \*\*\* represents p-values < 0,01, \*\* represents p-values < 0,05 and \* represents p-values < 0,1

From the results can be observed this model has a higher adjusted R Square (66,7%) from previous one although such difference is minimal.

Although it is not a clear conclusion, it can be stated that FFO has more significant information than Net Income as this model has a higher explanatory factor and FFO is significant for 1% level and NI, in previous regression, was significant for 5% level. Another relevant difference is the signal of the coefficient which is positive for FFO and negative for NI when using Book NAV as performance measure.

Furthermore, it is relevant to mention that in this model, dividend yield is no longer significant for a 10% level of significance. When comparing p-values of Dividend Yield from these two models using Book NAV as performance measure to the main model using Market NAV, it is reached to the conclusion that dividend yield loses explanatory capacity when using Book NAV instead of Market NAV.

As a last conclusion from comparing models, it can be observed that these last two models confirm the coefficient signal of interest coverage ratio variable. In the first model, it was negative but not significant and in these two last model it is negative and significant. It should represent that investor see leverage more as a growth opportunity than as an increase of financial risk. Although as it can been seen the value of coefficient is extremely low so as a more preferred conclusion is that investors due to the binomial effects of leverage, interest coverage ratio has a minimal impact in performance of EREITs whatever is the performance measure used.



## 6. Conclusion

The aim of the paper is to examine the determinants of EREIT performance in United States of America in last decade. The key resolution of the study was to investigate both internal and external factors simultaneously, studying which ones have significant effects on EREITs performance measured by Market NAV metric.

In order to accomplish the research objective, data has been gathered from the annual reports of the listed EREIT in NYSE and NASDAQ from the period 2013 to 2022. Regarding analysis between variables, it was applied a panel data regression which is a combination of cross-sectional observations and time series. From this study, it was found that four out of five factors (Stock Market, Size, Cash Flows and Dividend Yield) identified have a positive significant relationship with EREITs performance. Furthermore, Leverage variable was not found significant.

These results have the purpose to contribute for the knowledge of investors and asset managers to better understand the determinant factors in this asset class that has a growing importance in capital markets in last decade.

Although its relevance and accuracy, the present study still has some limitations that future researchers may find a way to remove them and improve the study. Firstly, on calculation of NAV, it was taken many assumptions for the NOI calculation and capitalization rates used. It would improve the study if it would be only used EREITs which publish NOI in their annual reports. Regarding capitalization rates, it would improve the study's accuracy if it was used specific capitalization rates for each EREITs subsector.

As a point of improvement, it could be done a study regarding performance of each subsector because effects may differ from sector to sector. For instance,

it is expected that during Covid-19, the impact on HealthCare EREITs to be different from Gaming EREITs.

Furthermore, I would suggest taking in consideration macro variables such interest rates and inflation to observe if they have an effect and how is it.



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# 8. Appendix

## Appendix A- Subcategories of EREITs

**Office REITs-** Own and manage office real estate and rent space in those properties to tenants. Those properties can range from skyscrapers to office parks. Some office REITs focus on specific types of markets, such as central business districts or suburban areas. Some emphasize specific classes of tenants, such as government agencies or biotech firms.

**Gaming REITs-** Concentrate on owning experiential real estate assets in the form of casino and entertainment properties, and leasing them through long-term, triple net lease structures.

**Industrial REITs-** Own and manage industrial facilities and rent space in those properties to tenants. Some industrial REITs focus on specific types of properties, such as warehouses and distribution centers. Industrial REITs play an important part in e-commerce and are helping to meet the rapid delivery demand.

**Retail REITs-** Own and manage retail real estate and rent space in those properties to tenants. Retail REITs include REITs that focus on large regional malls, outlet centers, grocery-anchored shopping centers and power centers that feature big box retailers.

**Lodging/resorts REITs-** Own and manage hotels and resorts and rent space in those properties to guests. Lodging REITs own different classes of hotels based on features such as the hotels' level of service and amenities. Lodging REITs' properties service a wide spectrum of customers, from business travellers to vacationers.

**Residential REITs-** Own and manage various forms of residences and rent space in those properties to tenants. Residential REITs include REITs that specialize in apartment buildings, student housing, manufactured homes and single-family homes. Within those market segments, some residential REITs also focus on specific geographical markets or classes of properties.

**Timberlands REITs-** Own and manage various types of timberland real estate. Timberland REITs specialize in harvesting and selling timber.

**Health Care REITs-** Own and manage a variety of health care-related real estate and collect rent from tenants. Health care REITs' property types include senior living facilities, hospitals, medical office buildings and skilled nursing facilities.

**Self-storage REITs-** Own and manage storage facilities and collect rent from customers. Self-storage REITs rent space to both individuals and businesses.

**Infrastructure REITs-** Own and manage infrastructure real estate and collect rent from tenants that occupy that real estate. Infrastructure REITs' property types include fiber cables, wireless infrastructure, telecommunications towers and energy pipelines.

**Data Center REITs-** Own and manage facilities that customers use to safely store data. Data center REITs offer a range of products and services to help keep servers and data safe, including providing uninterruptable power supplies, air-cooled chillers, and physical security.

**Diversified REITs-** Own and manage a mix of property types and collect rent from tenants. For example, diversified REITs might own portfolios made up of both office and industrial properties, making them ideal for investors looking to gain exposure to a variety of real estate asset types.

**Speciality REITs-** Own and manage a unique mix of property types and collect rent from tenants. Specialty REITs own properties that don't fit within

the other REIT sectors. Examples of properties owned by specialty REITs include movie theatres, farmland, and outdoor advertising sites.