

Evaluating European Public Real Estate Association (EPRA) Metrics for Benchmark Outperformance

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Abstract

A study of five EPRA (European Public Real Estate Association) reporting indicators (EPRA cost ratio, EPRA net initial yield, EPRA topped-up net initial yield, EPRA vacancy ratio, EPRA leverage ratio), one proprietary indicator, market-implied yield, calculated on the basis of an EPRA net asset value measure (EPRA net reinstatement value), and two factor indicators, momentum and mean reversion, is conducted to evaluate their utility in predicting individual REIT outperformance relative to the selected benchmark (iShares STOXX Europe 600 Real Estate UCITS ETF). AUTHOR found that over the 2018-2022 period, the momentum factor, low EPRA leverage ratio REITs, and REITs with a low topped-up EPRA net initial yield produced the highest alpha. The lowest alpha was delivered by selecting REITs based on a low EPRA vacancy ratio, a high market-implied net initial yield, and high leverage. Author further found the EPRA cost ratio to be less useful in selecting REITs to achieve alpha over the ETF benchmark, with inefficient REITs with a high EPRA cost ratio consistently outperforming highly efficient REITs with a low EPRA cost ratio (with the underlying driving factor being the nature of the real estate the REITs securitize). Finally, author conducted a correlation analysis between the evolution of EPRA reporting indicators and REITs' outperformance relative to the ETF benchmark. Correlation analysis of EPRA indicators and ETF outperformance was less conclusive, with a wide range of results among the nine REITs in my sample.

Keywords: Alpha, Benchmark, EPRA, Indicator, Outperformance, REIT.

Introduction

The European Public Real Estate Association (EPRA) was founded in 1999 and is based in Brussels. The non-profit organisation's guidelines (EPRA Best Practices Recommendations Guidelines, currently latest edition February 2022) (1) for calculating and reporting the various EPRA metrics serve as a valuable tool for all participants in the real estate market - analysts, appraisers, investors, the general public, etc. The gradual unification in EPRA reporting indicators, achieved by the wide availability of EPRA reporting metrics in European REITs' annual reports, arguably puts Europe ahead of the other major REIT market in the world - the United States, where the unification of real estate performance standards is much more limited. This in context together with the applicable accounting standards requiring investment property evaluation every six months, has made European REITs much more transparent and investor-friendly.

From a historical perspective, the current set of EPRA standards arguably completes all key real

estate reporting indicators with the addition of the EPRA loan-to-value ratio (LTV). The new ratio comes with detailed disclosure tables and allows investors to quickly examine the effect minority interests and hybrid debt have on leverage. For most European REITs, these have a negligible or non-existent impact on leverage, while for others the difference relative to leverage as reported under International Financial Reporting Standards is quite significant. Indeed, given the distress caused by the ECB rate hiking cycle of 2022-2023 to the real estate sector, the timing of the new EPRA LTV indicator could not have been better.

In the previous set of EPRA Guidelines the major change was the introduction of three net asset value, or NAV, measures, namely the EPRA Net Reinstatement Value (NRV), the EPRA Net Tangible Assets (NTA), and the EPRA Net Disposal Value (NDV). They replaced the two previous NAV measures, EPRA Net Asset Value and EPRA Triple Net Asset Value. Author think the three current NAV measures serve an excellence purpose in the

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ever changing public real estate world, with some REITs issuing shares to expand their asset base while others are forced to downsize with asset sales to address liquidity issues. Author addresses the different use cases of EPRA NAV measures in the methodology section. This research is motivated, on the one hand, by the need to popularize and familiarize the Bulgarian public with EPRA indicators (given that no Bulgarian REITs to my knowledge report performance under the EPRA guidelines), and on the other hand, to examine the relevance of EPRA indicators for company valuation and portfolio allocation. This research timeline focused primarily on data available in the 2017-2022 annual reports of large capitalization European REITs. In current study the sample consists of nine components of the iShares STOXX Europe 600 Real Estate UCITS ETF (2). For the empirical analysis, Author divided the nine companies into three tertiles, based on the relevant EPRA indicator, market-implied yield, or examined factor - momentum and mean reversion. The tertiles were rebalanced annually to maintain adherence to the selected strategy. Author found that over the 2018-2022 period, the momentum factor, low EPRA leverage ratio REITs, and REITs with a low topped-up EPRA NIY produced the highest alpha relative to the benchmark ETF. The lowest alpha was delivered by selecting REITs based on a low EPRA vacancy ratio, a high market-implied net initial yield, and high leverage. Author further found the EPRA cost ratio to be less useful in selecting REITs to achieve alpha over the ETF benchmark, with inefficient REITs with a high EPRA cost ratio consistently outperforming highly efficient REITs with a low EPRA cost ratio (with the underlying driving factor being the nature of the real estate the REITs securitize). Correlation analysis of EPRA indicators and ETF outperformance was less conclusive, with a wide range of results among the nine REITs in my sample.

The contribution of this article is in examining the practical applicability of EPRA indicators for portfolio composition. The introduction continues with a literature review, followed by the methodology of my study in the next section. The latter part of the article shows the observed results from the nine large-capitalization European REITs

in my sample, followed by results, discussion, and conclusion.

Real estate is the largest asset class in the world. While a person can spend his life without interacting with financial assets such as stocks or bonds, he runs into real estate every day, from the apartment he lives in to the various commercial buildings providing everyday services. In his 2023 book "REITs for Dummies" Brad Thomas (3) notes that all property in the world is worth \$228 trillion, surpassing other major asset classes such as U.S. banks (\$19.6 trillion), Gold (\$9.3 trillion), and Oil (\$1.7 trillion). Real estate is even bigger than all stocks, with the website companiesmarketcap.com (4) reporting a total market capitalization of all stocks of about \$93 trillion as of December 2023. Brad Thomas further breaks down the value of real estate into residential property, at \$169 trillion (74.1% of total real estate value), and commercial real estate, at \$35 trillion (15.4% of total real estate value). Author imply that the remaining \$24 trillion in world real estate value (10.5% of total real estate value) is attributable to farmland and forests. The interest in the sphere of REIT valuation has grown in tandem with the proliferation of the REIT structure around the world. Researchers in Malaysia (5) cite a positive relationship between three indicators, namely earning per share, price-to-book value, and dividend yield, and the REITs' annual return. Furthermore, the authors did not establish a significant relationship between debt to assets and REITs' performance. This finding indicates that despite leverage having a positive long-term effect on equity returns, it also causes significant financial distress in the short term. The researchers in the paper also found a negative effect between two factors, specifically market capitalization and return on equity and Malaysian REITs' annual returns. The researchers conclude that "earnings per share and return on equity should be used by investors and management to assess the profitability and operational efficiency of REITs". Finally, the authors highlight dividend yield as "one of the key investment criteria when assessing REIT investment decisions." While non-REIT-specific valuation indicators are commonly used to assess the financial prospects of a given REIT (as exemplified by earnings per share, price-to-book, debt to assets, and dividend yield utilized

in (5), REIT-specific indicators play a vital role when it comes to the finer details of REIT valuation. Case in point, Olgun Sahin (6) made the conclusion in his "REIT Valuation Multiples" article that "REIT-specific multiples such as price-to-funds from operations, price-to-adjusted funds from operations, and price-to-NAV produce valuation errors less than that of earnings based multiples". Indeed, author fully agree with Olgun Sahin's conclusion - the nature of REIT reporting and their business specifics demand that analysts and investors utilize REIT-specific as much as possible. That said, non-REIT-specific indicators have their place under the sun - they are most appropriately utilized to compare REITs with other sectors of the stock market. In a sense, non-REIT-specific valuation indicators provide a common benchmark utilisable across the whole investment universe. Once we have the broad picture and need to focus on a specific stock market sector, it is best to revert back to sector-specific valuation indicators which will provide the greatest level of valuation detail within the given sector. REIT-specific valuation indicators have been used in novel and unexpected ways. For example, Astrakhanseva and Smirnova wrote a paper (7) titled "Commercial real estate valuation based on machine learning models". To arrive at a commercial real estate valuation, the authors targeted REIT-specific valuation indicators such as "price per sq.m." and "rental rate". With the advancement of artificial intelligence and its ability to gain expert-level knowledge in many spheres of human intelligence, the importance of industry-specific valuation indicators will only increase. Real estate investment trusts are somewhat unique because they are publicly traded companies investing in real estate - and as we know, there is a centuries-old private market in real estate. As a result, unlike other public corporations operating outside real estate, REITs can draw on private market analysis to forecast trends and changes in consumer behaviour. The link between REIT performance and private market fundamentals was confirmed by Han-Soo Yoo (8) in his article "The Relationship between Real Estate Price Index and REIT Price Index - Focused on Fundamental Value and Transitory Value". Comparing Federal Housing Finance Agency Housing Price Index (FHFA Index), an index used for the private unsecuritized real estate

market, and FTSE NAREIT Equity Residential Index (NAREIT Index), a proxy for the REIT market, Yoo found that the "FHFA Index is closely related with NAREIT Index and REIT prices reflect real estate market fundamentals". Furthermore, he stipulated that the "FHFA Index could be used to help predict NAREIT Index. The relationship between REIT price and real estate price may be crucial implication regarding portfolio formation strategy and price prediction." Yoo's findings are confirmed by real-world observations of REIT management - corporate executives tend to expand REIT portfolios when the private market is experiencing relative financial distress and presents good investment opportunities. At the same time, if REIT share price performance gets caught up in financial market turmoil unrelated to underlying property fundamentals, REIT managers tend to downsize REIT portfolios to take advantage of more attractive private market valuations.

REIT managers play another vital role when it comes to presenting REIT-specific performance measures - they can decide which measures to give prominence to and when to emphasize GAAP or non-GAAP metrics. One Author who has researched this behaviour is Feng Zhilan (9) in his article "CEO Influence on Funds from Operations (FFO) Adjustment for Real Estate Investment Trusts (REITs)". Feng found that "more powerful CEOs are indeed associated with higher FFO adjustments, suggesting CEOs' involvement in hiding subpar performance", highlighting the subjective nature of sector-specific performance indicators. On a brighter note, Feng mentions that following additional clarifications and guidelines from the National Association of Real Estate Investment Trusts (NAREIT) and increased scrutiny from the Securities and Exchange Commission (SEC), the prevalence of such bad management practices has diminished, vindicating the efforts of regulators and industry governing bodies. Feng concludes "While non-GAAP performance measures might supply additional information to investors, my results indicate that providing continuous guidance and monitoring is essential."

As an industry that traditionally uses leverage, real estate attracts significant attention from scholars studying the capital structure of companies. In a 2013 article titled "Leverage and Returns: A Cross-

Country Analysis of Public Real Estate Markets” (10) the authors find that while “the theoretical literature suggests a positive relation between financial leverage and asset returns... the empirical evidence on this effect is mixed.” To allow investors to gain a fair view of a company’s financial indebtedness, The European Public Real Estate Association (EPRA) introduced a new financial metric, the EPRA Loan-to-Value (LTV) ratio, in its 2022 Guidelines. Having a good and comparable handle on a REIT’s indebtedness is vital for analysts and external providers of financing, especially during periods of financial distress and market turmoil. Indeed, Ling concludes that “greater use of leverage during the 2007-2008 REIT crisis period is associated with larger share price decreases.”

The use of leverage often results in greater share price volatility during periods of market distress. In a study (11) titled “The Volatility of Listed Real Estate in Europe and Portfolio Implications” the authors find that not all real estate sectors are the same when it comes to share price reactions to adverse market events. Indeed the authors observe that the nature of the market shock determines the sectors most affected by it. For instance, they note that “the residential and industrial sectors show the highest conditional daily volatility during the global financial crisis” which is understandable considering that the 2007-2008 Global financial crisis started in the U.S. housing market. At the same time, the authors find that “during the COVID-19 crisis, the volatility of retail is the highest, while the residential sector is the most resilient”. Author’s findings fully collaborate with the observations of the other authors, with residential real estate stocks in my study sample outperforming other peers over my study period 2018-2022.

Market turmoil in the real estate sector often spills out to the broader economy, with effects commonly seen in readings of household net worth, construction activity, and bank lending. The systemic importance of European listed real estate (LRE) was confirmed in a study (12) titled “Measuring the interconnectedness and systemic risk in the European listed real estate sector”. The authors found that “when the European LRE sector is under stress, bank and non-bank financial sector equity indices show an increase in tail risk.” Author fully agree with the findings of the authors, with

recent events in the U.S. banking sector confirming that their findings are valid on an international level. Indeed, the commercial real estate exposure of regional banks in the United States has led to the underperformance of regional banks relative to the broader U.S. financial sector in the aftermath of the 2022-2023 Federal Reserve rate hiking cycle.

After reviewing the existing literature author find that while real estate benchmarks, such as broad real estate stock indices and exchange-traded funds that follow them, are commonly used in research articles, EPRA indicators are not as frequently employed in academic articles as author would like. Author would suppose this is the result of the relative recency of the mass adoption of EPRA indicators. Furthermore, while a number of European REITs invests overseas, the vast majority of European REITs have a real estate footprint exclusively in Europe. This would explain the relative obscurity of EPRA indicators to researchers outside Europe, particularly in large REIT markets such as North America. As a result, the intersection between EPRA indicators and benchmark outperformance is not well explored, providing fertile ground for future academic research and increasing the relevance of the paper author have written.

Methodology

EPRA has agreed on a set of performance measures set out in its guidelines (1) which author use to conduct this present study. My research examines nine of the largest REIT components of the iShares STOXX Europe 600 Real Estate UCITS ETF (2). The ETF tracks the STOXX Europe 600 Real Estate index, which is an index constructed by index provider STOXX. The index uses a free-float market cap methodology and is reviewed quarterly. The index is relevant to this study since it tracks the real estate component of the STOXX Europe 600 index - the broadest European stock index. The cap factor is quite flexible, with a 30% maximum weight for the largest company and 15% for the second largest. The nine components author examined in current study are Vonovia, Segro, Swiss Prime Site, Land Securities Group, Unibail Rodamco Westfield, PSP Swiss Property, LEG Immobilien, Gecina and Klepierre. Author selected the nine components based on the the highest weight they had in the benchmark ETF at the time of article inception, respectively they had the highest weight in the underlying index the ETF

tracks. In so doing AUTHOR achieved a broad overlap between my sample and the benchmark ETF. This selection is not dependent on either market capitalization or the geographic distribution of the real estate the nine REITs securitize.

The research horizon spans from 2017 to 2022, with data taken from the companies' annual reports. Companies are analysed primarily on EPRA indicators, with the market-implied net initial yield calculated using EPRA indicators as well. For analysis purposes, the nine companies are divided into three groups each consisting of three companies. The groups represent the top tertile, the medium tertile, and the lowest tertile in each of the observed indicators, market implied yield, or factor (momentum and mean reversion) respectively. The EPRA indicators used in the study are EPRA Net Initial Yield (NIY), EPRA Topped-up NIY, EPRA LTV, EPRA Cost Ratio (incl. direct vacancy costs), EPRA Vacancy Rate, EPRA NRV, EPRA Net NTA, and EPRA NDV. The EPRA NIY is arguably one of the most useful EPRA measures. This is due to the fact that yields are a universally recognised way to compare investments in finance. As per the guidelines (1), EPRA NIY takes annualized rental income based on the cash rents passing at the balance sheet date, less non-recoverable property operating expenses in its numerator, and the gross value of the property in the denominator.

The EPRA topped-up NIY builds on the basic EPRA NIY by looking ahead and assuming lease incentives such as rent-free periods expire. Upon expiration, full unadjusted rents are used in the numerator to calculate EPRA topped-up NIY. From a long-term perspective, the EPRA topped-up NIY is more useful than the pure EPRA NIY to assess the true earnings potential of the company. The EPRA Cost Ratio (including direct vacancy costs) is a measure of operational efficiency. In its numerator, the metric takes costs (in my case including direct vacancy costs, although a variation excluding direct vacancy costs is also commonly available), while in the denominator it takes gross rental income. Given the wide variety of expenses in different REIT sectors, EPRA cost ratios are best used to compare REITs in the same sector.

The EPRA Vacancy Ratio is a standard economic occupancy metric, which has in its numerator the vacant estimated market rental value, and in its

denominator the estimated market rental value of the whole portfolio. Given the focus on lost rent rather than purely vacant space, the EPRA vacancy ratio is quite useful in evaluating the economic benefit of potentially releasing vacant space.

The EPRA NRV is the first of three net asset value (NAV) metrics outlined by EPRA. EPRA NRV is arguably the most relevant measure if investors assume a going concern status of the REIT they are evaluating since it presumes the REIT continues to hold its properties for a long period of time, without having to sell them and realize long-term appreciation gains, respectively pay the deferred tax associated with them. As a result, EPRA NRV is the most relevant measure to show the tax-efficient structure of REITs. EPRA NRV also takes into account goodwill and intangibles as per the REIT's IFRS balance sheet, which are commonly associated with asset management activities and are often important for REITs managing properties other than the ones they securitize.

EPRA NTA strives to show the tangible value of a REIT. The main difference with EPRA NRV is that EPRA NTA excludes intangible assets. Since EPRA NTA shows assets more readily available to a REIT (intangibles often reflect future earnings), EPRA NTA is more useful for point-in-time comparison purposes between REITs. EPRA NTA largely excludes deferred taxes, unless they are associated with a portfolio held for sale, in which case they are included. EPRA NDV is the most conservative NAV measure, as it excludes intangible assets and assumes full payment of deferred taxes. Most importantly, it assumes debts are settled at current market prices (which can be important after a period of large interest rate movements). Given EPRA NDV specifics, it is most useful for REITs experiencing financial difficulties which may have to sell assets to shore up their finances.

Results

For the first analysis, the companies are divided into three tertiles depending on whether they outperformed the industry ETF. To evaluate the usefulness of a momentum strategy, Author will evaluate an investment strategy that buys three out of the nine companies that outperformed the industry ETF the most and holds them for one year. My findings Table 1 show that the momentum strategy works 60% of the time, producing an average alpha of 6.53% and an average absolute

return of 2.07% - indicative of the low sector returns experienced over the 2018-2022 period.

Table 1: Momentum Strategy Buying the Top Tertile of the Previous Year's Performers and Holding them for One Year. Implemented Over the 2018-2022 Period

Momentum strategy	2018	2019	2020	2021	2022
Top tertile performance (A)	-2.90%	37.29%	-12.33%	9.10%	-20.81%
ETF performance (B)	-12.62%	24.63%	-9.97%	14.64%	-38.98%
Alpha (A-B)	9.72%	12.66%	-2.36%	-5.54%	18.17%

Table 2: Momentum Strategy Buying the Bottom Tertile of the Previous Year's Performers and Holding them for One Year. Implemented Over the 2018-2022 Period

Mean reversion strategy	2018	2019	2020	2021	2022
Bottom tertile performance (A)	-27.97%	24.57%	-2.99%	5.64%	-26.39%
ETF performance (B)	-12.62%	24.63%	-9.97%	14.64%	-38.98%
Alpha (A-B)	-15.35%	-0.06%	6.98%	-9.00%	12.59%

Author now turn the attention to the mean reversion strategy. To test its viability, AUTHOR will evaluate an investment strategy that buys three out of the nine companies that underperformed the industry ETF the most and holds them for one year. The current findings Table 2 show that the mean reversion strategy works only 40% of the time, producing an average alpha of -0.97% and an average absolute return of -5.43%, again underscoring the low sector returns over the 2018-2022 period.

For next analysis, author turn to the EPRA net initial yields of the nine companies and compare their evolution with the outperformance of the nine companies relative to the sector ETF. The historical data shows that one tertile of the companies in current sample experienced increasing EPRA net initial yields over the 2017-2022 period, while the other two tertiles saw declining EPRA NIYs.

From a performance perspective, the tertile with increasing EPRA NIYs underperformed the ETF

benchmark by an average of -7.34% over the 2018-2022 period, while the two tertiles with decreasing EPRA NIYs outperformed the ETF benchmark by 4.47%. As a result, author can conclude that increasing EPRA NIYs was a sign of financial distress and lower valuation while decreasing EPRA NIYs pointed to high investor interest in the securitized assets.

From a practical perspective, the two strategies author will examine with EPRA NIY refer to quality (buying the top tertile of low EPRA NIYs) and value (buying the top tertile of high EPRA NIYs). While the strategy is a bit cumbersome to implement (annual report dates differ and do not coincide with the calendar year stock holding period), investors can still use the strategies by implementing the semi-annual reports which generally provide an update on EPRA NIYs. Furthermore, changes in EPRA NIYs are generally very gradual which simplifies the quality and value selection process.

Table 3: Quality Strategy Buying the Bottom Tertile of the Previous Year's Lowest EPRA NIYs and Holding them for One Year. Implemented Over the 2018-2022 Period

Quality - EPRA NIY	2018	2019	2020	2021	2022
Quality performance (A)	-8.88%	33.88%	-2.66%	-6.01%	-32.77%
ETF performance (B)	-12.62%	24.63%	-9.97%	14.64%	-38.98%
Alpha (A-B)	3.74%	9.25%	7.31%	-20.65%	6.21%

Table 4: Value Strategy Buying the Top Tertile of the Previous Year's Highest EPRA NIYs and Holding them for One Year. Implemented Over the 2018-2022 Period

Value EPRA NIY	2018	2019	2020	2021	2022
Value performance (A)	-10.45%	21.54%	-42.86%	5.64%	-11.98%
ETF performance (B)	-12.62%	24.63%	-9.97%	14.64%	-38.98%
Alpha (A-B)	2.17%	-3.09%	-32.89%	-9.00%	27.00%

In line with the above observation on decreasing EPRA NIYs companies outperforming the sector ETF, the quality strategy (Table 3) worked 80% of the time, delivering 1.17% average alpha and a -3.29% absolute return. Turning to the value strategy (Table 4) which buys the top tertile of high EPRA NIYs and holds them for one year, it worked only 40% of the time, producing an alpha of -3.16% and an absolute return of -7.62%.

Building on the above analysis of EPRA net initial yields, author will examine EPRA topped-up net initial yields to determine their relationship with ETF outperformance. Once again the test assumes buying the top tertile of the highest EPRA topped-up net initial yields (value strategy) and the lowest tertile of EPRA topped-up net initial yields (quality strategy).

Table 5: Quality Strategy Buying the Bottom Tertile of the Previous Year's Lowest EPRA Topped-Up NIYs and Holding them for One Year. Implemented Over the 2018-2022 Period

Quality - EPRA topped-up NIY	2018	2019	2020	2021	2022
Quality performance (A)	-3.47%	33.88%	-2.66%	-6.96%	-27.30%
ETF performance (B)	-12.62%	24.63%	-9.97%	14.64%	-38.98%
Alpha (A-B)	9.15%	9.25%	7.31%	-21.60%	11.68%

Table 6: Value Strategy Buying the Top Tertile of the Previous Year's Highest EPRA Topped-Up NIYs and Holding them for One Year. Implemented Over the 2018-2022 Period

ValueEPRA topped-up NIY	2018	2019	2020	2021	2022
Value performance (A)	-10.45%	24.50%	-32.82%	5.64%	-11.98%
ETF performance (B)	-12.62%	24.63%	-9.97%	14.64%	-38.98%
Alpha (A-B)	2.17%	-0.13%	-22.85%	-9.00%	27.00%

The quality strategy (Table 5) showed very strong performance, outperforming the ETF benchmark 80% of the time. The strategy produced an average alpha of 3.16% and an average absolute return of -1.3%. The value strategy (Table 6) again worked 40% of the time, delivering -0.56% total alpha and -5.02% absolute returns. The EPRA Loan-to-value ratio measures the proportion of a company's balance sheet that is funded by debt. As such, it is arguably the most relevant EPRA metric when you want to compare REITs with other sectors such as

banks, technology, etc. as every company can report the share of its balance sheet funded by non-equity sources.

Since it was only introduced in the 2022 EPRA Guidelines, the loan-to-value ratio generally reported in prior years is a standard leverage measure not following the EPRA guidelines. The two strategies AUTHOR tested are buying the lowest tertile of EPRA LTV companies (low leverage) and buying the highest tertile of EPRA LTV companies (high leverage).

Table 7: Low Leverage Strategy Buying the Bottom Tertile of the Previous Year's Lowest EPRA LTVs and Holding them for One Year. Implemented Over the 2018-2022 Period

Low leverage - EPRA LTV	2018	2019	2020	2021	2022
Low leverage performance (A)	-18.96%	37.95%	-15.40%	19.29%	-23.59%
ETF performance (B)	-12.62%	24.63%	-9.97%	14.64%	-38.98%
Alpha (A-B)	-6.34%	13.32%	-5.43%	4.65%	15.39%

Table 8: High Leverage Strategy Buying the Top Tertile of the Previous Year's Highest EPRA LTVs and Holding them for One Year. Implemented Over the 2018-2022 Period

High leverage - EPRA LTV	2018	2019	2020	2021	2022
High leverage performance (A)	-14.16%	25.92%	-17.23%	2.63%	-41.67%
ETF performance (B)	-12.62%	24.63%	-9.97%	14.64%	-38.98%
Alpha (A-B)	-1.54%	1.29%	-7.26%	-12.01%	-2.69%

Table 9: High Efficiency Strategy Buying the Tertile of the Previous Year's Lowest EPRA Cost REITs and Holding them for One Year. Implemented Over the 2018-2022 Period

High efficiency - EPRA Cost ratio	2018	2019	2020	2021	2022
High efficiency performance (A)	-27.97%	18.16%	-42.86%	19.29%	-15.77%
ETF performance (B)	-12.62%	24.63%	-9.97%	14.64%	-38.98%
Alpha (A-B)	-15.35%	-6.47%	-32.89%	4.65%	23.21%

Table 10: Low Efficiency Strategy Buying the Tertile of the Previous Year's Highest EPRA Cost REITs and Holding them for One Year. Implemented Over the 2018-2022 Period

Low efficiency - EPRA Cost ratio	2018	2019	2020	2021	2022
Low efficiency performance (A)	-2.90%	29.92%	17.09%	23.37%	-31.43%
ETF performance (B)	-12.62%	24.63%	-9.97%	14.64%	-38.98%
Alpha (A-B)	9.72%	5.29%	27.06%	8.73%	7.55%

The low leverage strategy Table 7 worked 60% of the time, producing an average alpha of 4.32% and an average return of -0.14%. Turning to the high-leverage strategy Table 8, it worked only 20% of the time, producing an alpha of -4.44% and an average return of -8.90%. The EPRA Cost ratio (incl. Direct vacancy costs) is a highly real estate-specific ratio, in stark contrast to the previous loan-to-value ratio. For the test, author examined a

strategy buying the three lowest EPRA cost REITs (high efficiency) and another strategy buying the three highest EPRA cost REITs (low efficiency). The high efficiency strategy Table 9 worked only 40% of the time, producing an average alpha of -5.37% and an average return of -9.83%. The low efficiency strategy (Table 10) paradoxically worked 100% of the time, producing an alpha of 11.67% and an average return of 7.21%.

Table 11: Quality Strategy Buying the Tertile of the Previous Year's Lowest EPRA Vacancy REITs and Holding them for One Year. Implemented Over the 2018-2022 Period

Quality - EPRA vacancy ratio	2018	2019	2020	2021	2022
Quality performance (A)	-22.63%	16.72%	4.87%	-3.36%	-50.50%
ETF performance (B)	-12.62%	24.63%	-9.97%	14.64%	-38.98%
Alpha (A-B)	-10.01%	-7.91%	14.84%	-18.00%	-11.52%

Table 12: Turnaround Strategy Buying the Tertile of the Previous Year's Highest EPRA Vacancy REITs and Holding them for One Year. Implemented Over the 2018-2022 Period

Turnaround EPRAvacancy ratio	2018	2019	2020	2021	2022
Turnaround performance (A)	-11.07%	44.37%	-32.41%	-1.89%	-12.99%
ETF performance (B)	-12.62%	24.63%	-9.97%	14.64%	-38.98%
Alpha (A-B)	1.55%	19.74%	-22.44%	-16.53%	25.99%

The last EPRA indicator author examined before Author start using the all-important NAV measures is the EPRA vacancy rate. Author divided the nine REITs into three tertiles, with the lowest vacancy tertile (quality) and the highest vacancy tertile (turnaround) used for the respective tests. The quality strategy Table 11 performed poorly, producing a positive alpha only 20% of the time. The average alpha was -6.52% while the average return was -10.98%. On the other side of the spectrum, the turnaround strategy Table 12 worked 60% of the time, producing an average alpha of 1.66% and an average return of -2.8%. For my next test, Author examined whether using a

market-implied net initial yield (defined following the methodology described in section *Market-implied yields based on EPRA indicators*, using EPRA Net Reinstatement Value (NRV) as a NAV measure) improves on the returns observed when using the plan EPRA NIY measure.

Once again author divided the nine companies into three tertiles, with quality signifying the three REITs with the lowest market-implied NIYs, while value stands for the three REITs with the highest market-implied NIYs.

The quality strategy Table 13 worked 80% of the time, producing an average alpha of 0.14% and an average return of -4.32%.

Table 13: Quality Strategy Buying the Bottom Tertile of the Previous Year's Lowest Market-Implied NIYs and Holding them for One Year. Implemented Over the 2018-2022 Period

Quality - market-implied NIY	2018	2019	2020	2021	2022
Quality performance (A)	-11.07%	40.36%	-9.13%	-6.52%	-35.22%
ETF performance (B)	-12.62%	24.63%	-9.97%	14.64%	-38.98%
Alpha (A-B)	1.55%	15.73%	0.84%	-21.16%	3.76%

Table 14: Value Strategy Buying the Top Tertile of the Previous Year's Highest Market-Implied NIYs and Holding them for One Year. Implemented Over the 2018-2022 Period

Value - market-implied NIY	2018	2019	2020	2021	2022
Value performance (A)	-17.25%	18.16%	-42.86%	5.64%	-11.98%
ETF performance (B)	-12.62%	24.63%	-9.97%	14.64%	-38.98%
Alpha (A-B)	-4.63%	-6.47%	-32.89%	-9.00%	27.00%

The value strategy Table 14 worked only 20% of the time, producing an average alpha of -5.20% and an average absolute return of -9.66%. Comparing market NIYs with EPRA valuation NIYs,

author concluded that market NIYs are an inferior screening metric, producing lower alphas and lower absolute returns for both value and growth factors.

Table 15: Performance of Select Strategies and Indicators in the Period 2018-2022

Strategy/Indicator	Average alpha	Average absolute return	Alpha in REIT index up years	Return in REIT index up years	Alpha in REIT index down years	Return in REIT index down years
Momentum	6.53%	2.07%	3.56%	23.2%	8.51%	-12.01%
Mean-reversion	-0.97%	-5.43%	-4.53%	15.1%	1.41%	-19.12%
Quality	1.17%	-3.29%	-5.7%	13.94%	5.75%	-14.77%
EPRA NIY						
Value EPRA NIY	-3.16%	-7.62%	-6.05%	13.59%	-1.24%	-21.76%
Quality-Topped-up	3.16%	-1.30%	-6.17%	13.46%	9.38%	-11.15%
EPRA NIY						
Value Topped-up	-0.56%	-5.02%	-4.57%	15.07%	2.11%	-18.42%
EPRA NIY						

Low vacancy - quality	-6.52%	-10.98%	-12.96%	6.68%	-2.23%	-22.75%
High vacancy - turnaround	1.66%	-2.8%	1.61%	21.24%	1.7%	-18.83%
High efficiency (low EPRA cost ratio)	-5.37%	-9.83%	-0.91%	18.73%	-8.34%	-28.87%
Low efficiency (high EPRA cost ratio)	11.67%	7.21%	7.01%	26.65%	14.78%	-5.75%
Low leverage	4.32%	-0.14%	8.99%	28.62%	1.21%	-19.32%
High leverage	-4.44%	-8.90%	-5.36%	14.27%	-3.83%	-24.35%
Quality - Market NIY	0.14%	-4.32%	-2.72%	16.92%	2.05%	-18.47%
Value - Market NIY	-5.20%	-9.66%	-7.74%	11.90%	-3.51%	-24.03%

Table 16: Ranking of Strategies and Indicators Depending on the Alpha Generated Relative to the ETF Benchmark Over the 2018-2022 Period

Strategy/Indicator	Average alpha
Low efficiency (high EPRA cost ratio)	11.67%
Momentum	6.53%
Low leverage	4.32%
Quality - Topped-up EPRA NIY	3.16%
High vacancy - turnaround	1.66%
Quality - EPRA NIY	1.17%
Quality - Market NIY	0.14%
Value - Topped-up EPRA NIY	-0.56%
Mean-reversion	-0.97%
Value - EPRA NIY	-3.16%
High leverage	-4.44%
Value - Market NIY	-5.20%
High efficiency (low EPRA cost ratio)	-5.37%
Low vacancy - quality	-6.52%

Discussion

In Table 15 below, author summarised the findings of the previous tables. The benchmark ETF index gained in value in 2019 and 2021, respectively 2018, 2020, and 2022 were losing years for the ETF benchmark. Furthermore, author added details on strategy or indicator performance in years where the REIT index gained in value. Likewise, strategy or indicator performance is

highlighted in years where the REIT index lost value.

From the ranking in Table 16 above, author first concluded that the EPRA cost indicator is a poor predictor of alpha generation, since the lowest efficiency companies generated the highest alpha, with high-efficiency companies performing second-worst in the sample. The EPRA cost indicator seems to be more suitable for comparing REITs operating in the same property sector (as

opposed to comparing REITs in different property sectors). In the sample of nine REITs, residential REITs traditionally performed poorly on the EPRA cost measure, but outperformed the index over the observed period nevertheless. Secondly, momentum clearly outperformed the mean reversion strategy over the period. Thirdly, since the overall period was characterized by a decline in ETF value, low leverage also understandably outperformed the high leverage strategy. The fourth conclusion was that buying REITs with low vacancy was the worst possible strategy, implying that the high occupancy was already priced in the shares. In contrast, high vacancy REITs generated some alpha, implying that the operational distress was already priced in the shares. Furthermore, these REITs had the potential to grow revenues in the event of filling up the vacant space. Finally, going for REITs with a low net initial yield, measured either by EPRA NIY, EPRA topped-up NIY, or Market-implied NIY, proved to be the right strategy, consistently outperforming high initial yield REITs. The last observation broadly confirms the outperformance of quality strategies relative to value strategies. This finding aligns with what other researchers found in their article (13) "What are the success factors required for further growth in the European Listed Real Estate Sector". The

authors used Warehouses De Pauw (ticker WDP) as an example to illustrate their point. Using discount/premium to NAV as measured by EPRA NTA, the authors note "Based on a NAV approach, the WDP shares have traded on average from 2012 to 2022 at 1.66x NAV, or a 66% premium, which is widely considered by investors and analysts using NAV as a primary valuation metric, as far too expensive." Despite the relative expensiveness of WDP as measured by EPRA NTA premium (arguably classifying the shares as "Quality" rather than "Value"), the authors note the strong performance of WDP shares of 16.2% annualized between 2012-2022, in line with NAV compounded annual growth of 16% annually. The authors conclude by explaining the strong performance: "This capacity to grow has been delivered by the subsector (logistics) but also by the team and the platform." Author fully agreed that incorporating the real estate sector in which the REIT securitizes real estate will better explain some of the results observed in my study. Together with the NAV premium/discount indicator, these provide avenues for future research.

Author analysed the alpha generated in years that were overall positive for the REIT sector, as measured by the industry ETF.

Table 17: Ranking of Strategies and Indicators Depending on the Alpha Generated in Years of Positive Return for the ETF Benchmark (2019 and 2021)

Strategy/Indicator	Alpha in REIT index up years
Low leverage	8.99%
Low efficiency (high EPRA cost ratio)	7.01%
Momentum	3.56%
High vacancy - turnaround	1.61%
High efficiency (low EPRA cost ratio)	-0.91%
Quality - Market NIY	-2.72%
Mean-reversion	-4.53%
Value - Topped-up EPRA NIY	-4.57%
High leverage	-5.36%
Quality - EPRA NIY	-5.70%
Value - EPRA NIY	-6.05%
Quality - Topped-up EPRA NIY	-6.17%
Value - Market NIY	-7.74%
Low vacancy - quality	-12.96%

From the ranking in Table 17 above, author first concluded that overall, fewer strategies/indicators outperformed the ETF benchmark during market upswings. Out of the four strategies/indicators

that did deliver positive alpha, Momentum, Low leverage, and High vacancy - turnaround, proved to be consistent performers, with the curiosity of the EPRA cost ratio already explained above. Secondly,

low vacancy was once again the worst possible indicator to follow. Thirdly, the performance of the net yield indicators was more mixed, with both value and quality indicators underperforming the benchmark. Finally, the mean reversion strategy

also did not work during market rebounds.

Lastly, author turned attention to strategy and indicator performance during years when the ETF benchmark lost value:

Table 18: Ranking of Strategies and Indicators Depending on the Alpha Generated in Years of Negative Return for the ETF Benchmark (2018, 2020, and 2022)

Strategy/Indicator	Alpha in REIT index down years
Low efficiency (high EPRA cost ratio)	14.78%
Quality - Topped-up EPRA NIY	9.38%
Momentum	8.51%
Quality - EPRA NIY	5.75%
Value - Topped-up EPRA NIY	2.11%
Quality - Market NIY	2.05%
High vacancy - turnaround	1.70%
Mean-reversion	1.41%
Low leverage	1.21%
Value - EPRA NIY	-1.24%
Low vacancy - quality	-2.23%
Value - Market NIY	-3.51%
High leverage	-3.83%
High efficiency (low EPRA cost ratio)	-8.34%

From the ranking in Table 18 above, author first concluded that low vacancy was no longer the worst strategy, although it still delivered negative alpha. Curiously, even during index declines the high vacancy - turnaround tertile outperformed. Secondly, low net initial yields (quality) delivered positive alpha, while most value NIY measures delivered negative alpha. Thirdly, as expected, high leverage was the worst-performing strategy after the EPRA cost ratio. This was consistent with other research findings (10) which note that greater use of leverage during the 2007-2008 REIT crisis

period was associated with larger share price declines, all else equal". Finally, momentum had its best alpha generation of the three table comparisons, with mean-reversion also delivering positive alpha, although substantially below momentum.

For the next analysis, author examined the relationship, as measured by correlation, between changes in EPRA indicators and outperformance relative to the industry ETF. The findings were presented in Table 19 below.

Table 19: Correlation of Increases in EPRA Indicators and Outperformance Relative to the Industry ETF, Examined Over the 2017-2021 Period - Individual Results of the Nine Companies

Correlation with outperformance	Vonovia	Segro	Swiss Prime Site	Land Securities	URW	PSP Swiss Property	LEG Immobilien	Gecina	Kleppierre
EPRA NIY	-0.61	0.41	0.41	0.25	0.25	0.41	-0.61	-0.67	0.25
EPRA topped-up NIY	-0.61	0.41	0.41	-1.00	-1.0	-0.17	-0.61	0.17	0.25
EPRA LTV	1.00	0.61	0.41	-1.00	0.25	0.17	-0.17	-0.41	0.41
EPRA NRV	0.61	-0.25	-0.41	-0.25	0.61	0.41	-0.41	-0.17	-0.41
EPRA NTA	0.17	-0.41	-0.41	0.41	1.00	-0.61	-0.41	0.67	-0.25
EPRA NDV	0.61	-0.41	-0.41	0.41	0.61	-0.61	-0.41	-0.17	-0.61

EPRA Cost ratio (incl. Direct vacancy cost)	-0.61	-0.61	0.67	0.41	0.41	-0.67	-0.61	0.17	1.00
EPRA Vacancy Rate	0.17	-0.61	0.67	-0.61	-0.41	-0.41	0.67	0.41	0.41
Market-implied yield NRV	-0.17	-0.41	-0.41	0.61	0.41	-0.17	-0.17	-0.17	0.41
Market-implied yield - NTA	-0.17	-0.41	0.17	0.61	0.41	-0.17	0.17	0.67	0.41
Market-implied yield - NDV	0.61	-0.41	0.17	0.61	0.41	-0.17	0.17	0.41	0.41

Table 20: Correlation of Increases in EPRA Indicators and Outperformance Relative to the Industry ETF, Examined Over the 2017-2021 Period - Mean and Median of the Nine Companies

Correlation with outperformance	Mean	Median
EPRA NIY	0.01	0.25
EPRA topped-up NIY	-0.24	-0.17
EPRA LTV	0.14	0.25
EPRA NRV	-0.03	-0.25
EPRA NTA	0.02	-0.25
EPRA NDV	-0.11	-0.41
EPRA Cost ratio (incl. Direct vacancy cost)	0.02	0.17
EPRA Vacancy Rate	0.03	0.17
Market-implied yield NRV	-0.01	-0.17
Market-implied yield - NTA	0.19	0.17
Market-implied yield - NDV	0.25	0.41

To draw conclusions from the correlation results, author presented them (Table 20) in two statistical measures, namely arithmetic mean and median for each of the observed indicators.

With the caveat that none of the eleven examined indicators exhibit a very strong correlation with ETF outperformance, author can firstly concluded that increases in EPRA topped-up yield during the year are associated with ETF underperformance. Secondly, increases in the EPRA LTV ratio were linked with ETF outperformance. Thirdly, increases in market-implied yields during the year, especially as measured by NDV and NTA, were associated with ETF outperformance. On the other hand, increased in market-implied yield as measured by NRV are associated with ETF underperformance, blurring the overall usefulness

of market-implied yield as an indicator. Likewise, increases in EPRA NDV are synonymous with ETF underperformance; however considering the inconclusive results for EPRA NTA and EPRA NRV, the NAV measures are not very useful in predicting ETF outperformance.

The main limitation of this article is that it does not observe relationships between EPRA indicators and ETF outperformance at small-capitalization European REITs. For example, trends at larger European REITs may be obscured by passive investors. Another downside of my analysis is that it does not account for underlying property sectors when conducting the study. For instance, all residential property REITs performed strongly in the pandemic 2020, while retail property REITs were severely affected by lockdowns.

Finally, author used annual share price performance (evaluating individual REIT and ETF performance on a calendar year basis) while the year-end EPRA indicator data is available with a slight delay (most commonly in company annual reports published post-year-end). This may impact study results in some cases. Nevertheless, EPRA indicators only change gradually most of the time, with investor information present from the Q3 reports and expectations for earnings until year-end making my study approach acceptable. Payout policy and dividends were also not considered as part of the analysis. Instead, author focused on pure share price performance.

Conclusion

EPRA indicators have become an indispensable tool for analyzing public real estate in Europe. Hope is that other regions make efforts to systemize and unify real estate performance indicators as well.

All these analyses showed that over the 2018-2022 period, the momentum factor, low EPRA leverage ratio REITs, and REITs with a low topped-up EPRA NIY produced the highest alpha relative to the benchmark ETF. The lowest alpha was delivered by selecting REITs based on a low EPRA vacancy ratio, a high market-implied net initial yield, and high leverage. Some EPRA indicators, such as the EPRA cost ratio, proved less useful in my analysis. Instead, these indicators are best used to compare REITs securitizing the same type of real estate. These findings showed that selecting REITs based exclusively on EPRA indicators, market-implied yields, or factors such as momentum and mean reversion, can produce significant alpha over the benchmark ETF index. That said, the inconclusive results from previous correlation analysis point to the need to diversify your strategy over several REITs, which will help eliminate idiosyncratic risk stemming from the underlying securitized real estate.

Advice to REIT managers would be to give prominence to EPRA indicators in their reporting where appropriate, as they allow for comparability across companies. Furthermore, providing certain or all EPRA indicators together with their quarterly or semi-annual results (as opposed to only with their annual results) will enable users of financial reports to better evaluate the financial performance or REITs.

Policymakers should make efforts to align EPRA standards with those in other regions of the world, with the ultimate aim of producing a universal global real estate performance standard. This will significantly ease the comparability of public real estate across the world, bringing immense benefits to all users of financial reports.

Investors should definitely complement their REIT selection criteria with EPRA indicators as a data-based approach will certainly help reduce volatility in financial markets and potentially increase return predictability. Alpha generation, as always, will depend on the extent to which investors adopt a given strategy. The more capital is put into a given strategy or factor, the harder it will be for it to outperform the respective REIT benchmark.

Abbreviations

Nil.

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Author Contributions

The Author confirms sole responsibility for the following: study conception and design, data collection, analysis and interpretation of results, and manuscript preparation.

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