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Abstract

We study the application of factor investing in the market for real estate (REITs). The analysis of traditional factor strategies, such as momentum, value, size and profitability, reveals their unstable and atypical behavior in comparison to the equity market, however, there is a strong momentum effect in the factor strategies. We propose a new dynamic strategy, which is based on the factor momentum effect. The strategy buys the factor portfolios with the best past performance and sells short the factor portfolios with the worst past performance, with monthly rebalancing. The factor momentum strategy yields a significant positive average return and alpha of about 6% pa, it has high Sharpe and Sortino ratios. The strategy outperforms all traditional single-factor strategies in different market states and sub-periods. The superior returns in adverse market conditions makes it particularly attractive.

JEL classification: D14, G12, G15

Keywords: momentum, factor trading, factor strategies, real estate, REITs

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1. Introduction

Factor investing is one of the most fruitful research directions in financial economics. Harvey and Liu (2019) documented more than five hundred factors published in top financial journals that can explain stock returns. While most of the factors do not survive out-of-sample tests (Hou et al., 2020) or adjustments of p-values (Harvey et al., 2016), a few of the factors, which have robust explanatory power (e.g. momentum, value, size and profitability) remain at the core of factor investment strategies (Fama and French, 1993; Carhart, 1997; Fama and French, 2005). Nowadays, over 700 smart beta ETFs[4] with over $100 billion of funds under management are traded in the US[5], which reflects the popularity of factor investment strategies.

The situation with factor investing in REITs (Real Estate Index Trusts) market is entirely different. We test strategies based on momentum, value, size, profitability, and adjusted funds from operations (AFFO)[6] and document that none of the factors systematically generates a positive and significant alpha during 1998-2021 in the US. Moreover, the diversified multifactor equally-weighted portfolio yields a negative average return. This contrasts with the performance of similar multifactor portfolios of US stocks, which generate sustainable long-term excess returns (Arnott et al., 2019).

To better understand the REITs factor portfolio performance, we apply the methodology of Goulding et al. (2023) to define bull, bear, correction and rebound phases[7] and test how often each phase is observed in REITs and equity markets. Figure 1 provides a comparison of the REITs and stock equally-weighted multifactor portfolios. Whereas the REITs multifactor portfolio appears in bear and rebound phases nearly 70% of the time, the stock multifactor portfolio stays in bull and correction phases 70% of the time. Hence, the negative average return on the REITs multifactor portfolio is explained by its systematic underperformance rather than rare occasional losses. We can stipulate that buy-and-hold is an inappropriate strategy for investing in the REITs factors, however switching between factors may bring improvement in portfolio performance.

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[4] A smart beta ETF is an exchange-traded fund that uses a rules-based system (often based on specific factors) for selecting assets to be included in the fund portfolio.

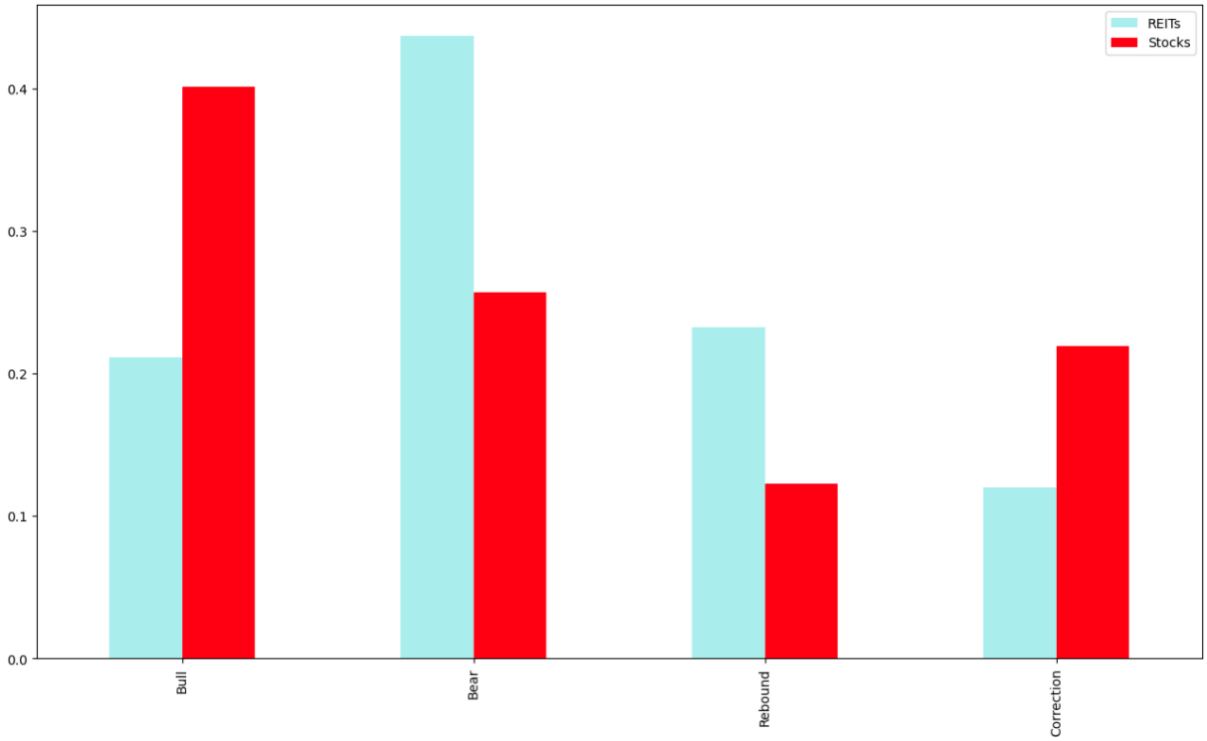
[5] The statistics is collected from ETF DB (https://etfdb.com/themes/smart-beta-etfs/#complete-list&sort_name=assets_under_management&sort_order=desc&page=27) and Statista (https://www.statista.com/statistics/1199383/largest-smart-beta-etfs-traded-usa/).

[6] The AFFO measure can be a better proxy for undervalued assets in the case of the REITs market (Gee and Park, 2025).

[7] Positive market returns in both prior short (2 months) and long (12 months) periods define the bull market, while negative returns in the both periods are associated with the bear phase. Positive long-term returns with negative short-term returns are defined as a correction. The opposite is true for the rebound market state.

Figure 1. Shares of bull, bear, rebound and correction phases of REITs and equities multifactor portfolios

The figure plots the percentage of time when a particular phase (bull, bear, correction and rebound) is observed for US REITs multifactor portfolio (light blue bars) and US stock multifactor portfolios (red bars). The REITs multifactor portfolio is an equally-weighted portfolio of REITs momentum, value, size, profitability and AFFO factors. The stock multifactor portfolio is an equally-weighted portfolio of equity momentum, value, size, profitability and investment factors. The phases are defined using Goulding et al. (2023) methodology based on the intersection of short (two months) and long (twelve months) prior market returns.



In the next step, we test a dynamic factor strategy based on factor momentum. Factor momentum bets on the continuation in factor returns and was initially discovered by Ehsani and Linnainmaa (2022) for equities. We observe significant factor momentum in REITs factors too. The strategy invests in the factors, which have generated the highest alphas in the prior 12 months, and sells short the factors, which have been losers previously. Apparently, the factor momentum strategy generates significantly positive average return (5.68% per annum) and annualized alpha (5.94%) in the US REITs market, whereas single-factor strategies fail. The performance of the factor momentum strategy is robust in different 5-year sub-periods and market states as well as after controlling for common risk factors.

This paper contributes to the growing literature on factor investing in the REITs market. Guidolin et al. (2019) demonstrate that value, size, momentum and investment (but not profitability) strategies yield abnormal returns and outperform buy-and-hold-strategies. However, Glascock and Lu-Andrews (2014) document, that after adding profitability factor,

size and book-to-market lose their explanatory power. Coën and Guardiola (2025) propose that leverage factor plays a significant role in the REITs market. Overall, the results are ambiguous, and factor strategies performance in REITs market is significantly poorer compared to the stock market. The dynamic factor momentum strategy, proposed in this paper, is an attempt to generate robust alpha in this market.

2. Data and portfolio formation

We study US REIT securities market during January 1998 – December 2021. We collect the data for the universe of REITs (195) from Bloomberg. The data set contains market prices, market capitalizations, operational margins, adjusted funds from operations (AFFO) and price-earnings ratios[8].

We construct 5 REITs factor portfolios by sorting REITs by the corresponding variable and taking a long position in the top 50% of securities and a short position in the bottom 50% of securities.[9] The size portfolios are sorted by market capitalizations, the value portfolios are sorted by price-earnings ratios, the profitability portfolios are sorted by operational margins, the momentum portfolios are sorted by past returns, and the AFFO portfolios are sorted by adjusted funds from operations. We conduct single sorts instead of double sorts, unlike Fama and French (1993), due to the lower number of available securities compared to the equity market. Size, value, profitability and AFFO portfolios are sorted each July using the accounting data at the end of the previous year. The momentum portfolio formation is similar to Jegadeesh and Titman (1993) with a twelve-month sorting period and a twelve-month holding period, which is also rebalanced in July. All portfolios are equally-weighted. We also construct the REITs market portfolio as an equally-weighted portfolio of all listed funds.

The dynamic factor momentum portfolio is constructed as follows. At the beginning of each month, we estimate CAPM alphas for all factor portfolios during the preceding year, and take a long position in two factors with the highest alphas and a short position in two factors with the lowest alphas. The portfolio is rebalanced monthly to reflect the short-term changes in REITs investor preferences.

[8] We use price-earnings ratios as a measure of value, instead of more common book-to-market ratios, because they are available for a bigger sample of REITs in Bloomberg.

[9] This approach is in line with the original methodology for factor portfolio construction Fama and French (1993) and differs from the methodology in Coen and Guediola (2025), who consider long-only portfolios of top 10% of REITs.

To control for equity risk exposure, the data for equity risk factors (market factor, SMB, HML, CMA, RMW, UMD) are taken from Kenneth French's database (Fama and French, 1993 and 2015). The data for liquidity factor is obtained from Robert Stambaugh's website (Pastor and Stambaugh, 2003). The data for the volatility factor VIX is collected from CBOE website.

3. Empirical results

Table 1 reports return and risk characteristics of the five REITs factor portfolios and the dynamic factor momentum portfolio. Overall, there is no evidence of persistent single-factor performance in REITs market, since the factors provide negative or insignificantly positive returns and CAPM alphas, controlling for the REITs market returns. All factors have insignificant exposure to the market risk. At the same time, the factor returns are quite volatile, and hence, their Sharpe ratios are low. Interestingly, we observe a significant reversal effect rather than momentum, perhaps due to the rather long holding horizon of one year. However, its CAPM alpha is low due to a significant exposure to the market risk (beta), similarly as in the equity market. Unlike previous studies (Coën and Guardiola, 2025) who find abnormal factor returns in REITs market, we do not find any evidence of systematic factor returns after the global financial crisis.

The last column contains the descriptive statistics of the REITs factor momentum portfolio. The portfolio yields a statistically significant average return of 5.68% per annum and CAPM alpha of 5.94% with t-statistics close to 2. The portfolio has the lowest volatility (4.2%) and market beta (-0.03) compared to the single-factor portfolios. As a result, the factor momentum strategy generates remarkable Sharpe and Sortino ratios. Nevertheless, the failures of multifactor diversification, as discovered by Arnott et al. (2019) for equities, also exist in the factor momentum since the portfolio is still exposed to significant drawdowns up to 30%.

Table 1. Performance of the Factor Momentum Model and Common Risk Factors

The table presents returns and risk characteristics of the following long-short factor portfolios: available funds from operations (AFFO), size, profitability, value, momentum, and factor momentum strategy for US REITs market during 1998-2021. The mean returns and alphas are annualized and expressed in percent. Newey-West t-statistics are reported in parentheses. * denotes statistical significance at 10% confidence level.

	AFFO	Size	Profitability	Value	Momentum	Factor Momentum
Mean returns	-0.64 (-0.44)	1.00 (0.63)	0.46 (0.34)	0.10 (0.07)	-3.81* (-1.71)	5.68* (1.89)
Volatility	7.27	7.86	6.58	7.55	11.03	4.2
Alpha	-1.70 (-1.19)	1.53 (0.96)	1.28 (0.89)	-0.59 (-0.37)	-2.22 (-0.93)	5.94* (1.92)
Beta	0.14	-0.07	-0.11	0.09	-0.21	-0.03
Sharpe ratio	-0.09	0.13	0.07	0.01	-0.35	1.35
Sortino ratio	-0.13	0.18	0.10	0.02	-0.44	0.62
Skewness	0.74	-0.58	-0.05	0.80	-0.45	0.14
Maximum drawdown	-28.99	-29.02	-27.71	-33.47	-78.44	-30.00

The cumulative returns on the dynamic factor momentum portfolio (blue line) and an equally-weighted portfolio of the five single-factor portfolios (red line) are presented on Figure 2. It is evident that while single-factor strategies are unprofitable, on average, juggling factors depending on their trailing performance brings a significant improvement in the REITs market. Our dynamic strategy appears to be particularly attractive in the post-Covid-19 period.

Figure 2. Cumulative returns on the factor momentum portfolio and REITs market benchmarks

The figure plots the performance of the dynamic factor momentum portfolio (solid blue line) and an equally-weighted portfolio of five REITs factors: available funds from operations (AFFO), size, profitability, value, and momentum (dashed red line). Sample period: July 1998 - December 2021.

Table 2 reports the estimates of control regressions of the factor momentum returns on common equity risk factors. Different multi-factor specifications are reported in columns: the CAPM, the three-factor Fama-French model (Fama and French, 1993), the four-factor Carhart model (Carhart, 1997), the five-factor Fama-French model (Fama and French, 2015), the five-factor model plus liquidity factor (Pastor and Stambaugh, 2003), and the same model with VIX as a proxy for volatility in the US stock market. Overall, the exposures to equity risk factors are insignificant. An exception is a negative exposure to equity market risk and volatility risk, which suggests that REITs factor momentum strategy is attractive for diversification of equity portfolios. The factor momentum returns cannot be explained by equity risk factors since the alphas (5.83%-9.11%) remain positive and statistically significant in all specifications. After controlling for common risk factors, the dynamic factor momentum strategy generates abnormal average returns above 6% per annum.

Table 2. Control regressions with the common equity risk factors

The table reports the estimates of multifactor time-series regressions of REITs factor momentum returns on various equity market risk factors. The alphas are annualized and expressed as a percent. Newey-West t-statistics are reported in parentheses. * denotes statistical significance at 10% confidence level, ** denotes statistical significance a 5% confidence level, *** denotes statistical significance at 1% confidence level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Alpha	6.36**	6.39 **	6.33**	6.26**	6.23*	5.83*	9.11***
	(2.1)	(2.11)	(2.07)	(1.97)	(1.95)	(1.82)	(2.76)
Rm	-0.08	-0.09	-0.09	-0.09	-0.08	-0.11	-0.3***
	(-1.57)	(-1.63)	(-1.44)	(-1.38)	(-1.27)	(-1.57)	(-3.36)
SMB		0.02	0.02	0.02	0.02	-0.01	-0.03
		(0.22)	(0.19)	(0.2)	(0.18)	(-0.07)	(-0.29)
HML		-0.1	-0.09	-0.11	-0.1	-0.1	-0.05
		(-1.29)	(-1.17)	(-1.03)	(-0.93)	(-0.87)	(-0.48)
RMW				0.01	0.0	-0.02	-0.08
				(0.05)	(0.04)	(-0.15)	(-0.68)
CMA				0.03	0.02	0.05	-0.01
				(0.16)	(0.15)	(0.34)	(-0.04)
UMD			0.01		0.01	-0.0	-0.01
			(0.18)		(0.16)	(-0.02)	(-0.2)
LIQ						0.10	0.11*
						(1.50)	(1.68)
VIX							-0.05***
							(-3.28)
R^2	0.01	0.01	0.01	0.01	0.01	0.02	0.06

To check the persistence of factor momentum strategy performance over time, we estimate its returns, as well as the single-factor strategies' returns, during five 5-year sub-periods. The results are reported in table 3. In most sub-periods, the factor momentum portfolio indeed generated the highest average returns compared to the single-factor portfolios. The sub-period analysis also suggests that the average returns on the factor momentum portfolio increased significantly in the recent period. After the global financial crisis, the factor momentum strategy outperformed the original momentum and other factors in each 5-year window. The factor momentum portfolio average return is particularly high (15.08%) in the most recent period 2018-2021, which coincides with Covid-19 crisis.

Table 3. Average returns on single-factor strategies and factor momentum strategy in sub-periods

The table reports average returns (in percent per annum) on REITs factor strategies in 5-year sub-periods. For all periods, except the last, the starting month is July and the ending month is June. The last period starts in July and ends in December.

	AFFO	Size	Profitability	Value	Momentum	Factor Momentum
1998-2003	-4.12	4.56	-3.59	0.25	0.03	4.23
2003-2008	4.05	-4.29	3.16	-1.72	3.64	-0.23
2008-2013	-3.01	4.88	0.29	2.25	-12.38	7.05
2013-2018	0.59	-0.97	-1.37	-0.83	-5.01	3.64
2018-2021	-1.12	0.43	4.41	-1.44	-8.31	15.08

Finally, we test the performance of the factor momentum strategy in different market states, i.e. bull and bear markets. All portfolios' conditional average returns are reported in table 4. The factor momentum strategy outperforms all other factors in each market state: in periods with positive, negative, extremely positive (top 10%), and extremely negative (bottom 10%) returns in the REITs market. Interestingly, the factor momentum strategy earns twice as much (8.73%) during bear markets compared to bull markets (4.06%), so the strategy is particularly attractive during market downturns. The same is true for the profitability portfolio, whereas size and value portfolios perform better during up-markets. The highest returns on the factor momentum portfolio are associated with extreme periods of positive and negative market returns. In contrast, the original momentum is exposed to momentum crashes (Daniel and Moskowitz, 2016) in the top 10% of market returns. Overall, the factor momentum strategy generates persistent positive returns in different states, which are particularly high during high volatility and falling market. Hence, the factor momentum strategy possesses "safe-haven" properties. Given also the negative exposure to the equity market risk (Table 2), the factor momentum strategy can be considered a good hedge of equity downside risk.

Table 4. Average returns on single-factor strategies and the factor momentum strategy, conditional on positive and negative market returns

The table reports average returns (in percent per annum) on REITs factor strategies, conditional on positive and negative contemporaneous market returns, as well as in periods with the most extreme market returns.

	AFFO	Size	Profitability	Value	Momentum	Factor Momentum
Rm >0	-0.29	1.60	-1.58	0.67	-4.95	4.06
Rm <0	-1.35	-0.32	3.57	-1.78	-2.64	8.73
Top 10% of Rm	0.95	2.91	-6.62	4.95	-19.82	34.92
Bottom 10% of Rm	-8.67	5.75	2.48	-4.34	1.58	38.89

4. Conclusion

The study explores the performance of factor investment strategies in the US REITs market. We document that common strategies like momentum, value, size and profitability, which work in equity markets, do not generate systematic positive returns in REITs market after the global financial crisis. Similar results are observed for the REITs' specific factor, AFFO. These results differ from those of the earlier studies of factor investing. Possible reasons include greater market efficiency in the more recent period and different portfolio formation methodology.

We suggest a novel dynamic factor momentum strategy, which juggles factor portfolios based on their trailing performance. Unlike single-factor strategies, the factor momentum strategy generates a significant average return and CAPM alpha of about 6% per annum. The alpha remains after controlling for common equity risk factors. The factor momentum appears to be a superior strategy because of autocorrelated, however time-varying, factor performance in REITs market. Its high returns are robust in different sub-periods and market states. Its performance is particularly remarkable in times of market downturns and high volatility, which suggests its 'safe-haven' properties and makes this strategy attractive for equity portfolio diversification.

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