

Real Estate as Inflation Hedge in India: A City-Level Comparison of Direct Property and REITs

Dr. Adil Jiwani

Assistant Professor, Department of Management Studies,
Nabira Mahavidyalaya, Katol - 441302, Maharashtra, India
adilajiwani@gmail.com

Abstract

Owing to the shift in interest rates in India, especially in the post-COVID period, investors have developed interest in real estate as an inflation hedge. This paper proposes an empirical test of whether Indian real estate, both direct residential property and listed real estate (REITs), protects investor returns against expected and unexpected inflation. Further, the paper also seeks to verify whether this protection varies across India's major metropolitan housing markets. Building further on the [Fama and Schwert \(1977\)](#) framework and its direct application to India by [Lee \(2021\)](#), the study proposes two hypotheses and tests those on India-centric real estate data, using a regression and cointegration methodology based on NHB RESIDEX city indices and the Nifty REITs & Realty Index. The paper draws on reliable studies to frame the hypotheses and benchmark plausible outcomes, and concludes with portfolio-allocation implications relevant to globally acceptable alternative investment analysis in an Indian context.

The regression, cointegration, and VECM results discussed later are expected outcomes benchmarked against [Lee \(2021\)](#).

Keywords: Inflation Hedging, Real Estate, REITs, India, Cointegration, Asset Allocation.

1. Introduction

Real estate ownership is widely held by Indian households as a store of value, and is very conveniently flaunted as an inflation hedge. Rents are renegotiated periodically and construction costs rise with input prices. Residential prices globally and in India are reported through appraisal-based indices subject to smoothing effect, whereas listed real estate is a genuinely new asset class. Further, the market is extremely heterogeneous at the city-level. Table 1 illustrates this dispersion using the latest available city-level residential price data.

Table 1: City-Level Residential Price Growth Dispersion in India (Year-on-Year, 2024)

City	Annual House Price Growth	Segment / Note
Delhi-NCR	+14.9%	Fastest-growing major metro; strong luxury-segment demand
Bengaluru	+10% to +16%	Double-digit growth; IT-sector-driven demand
Chennai	+10% to +16%	Double-digit growth
Pune	+10% to +16%	Double-digit growth
Mumbai Metropolitan Region	+21% (ANAROCK, avg. price/sq.ft., Q4 2024 y/y)	Largest market by transaction volume
Kolkata	-6.6%	Only major metro to contract over the period
All-India (RESIDEX, national)	+3.1% to +4.3%	Q3-Q4 2024 year-on-year, National Housing Bank

Source: Compiled from NHB RESIDEX-based city estimates and ANAROCK Research as reported in industry market analyses (2024-2025).

The 2024 data show Delhi-NCR prices rising by double digits year-on-year while Kolkata contracted over the same period. India's CPI inflation exceeded the Reserve Bank of India's upper tolerance band of 6% for most of 2022 and was further followed by an aggressive repo-rate tightening cycle. This created a natural test-window opportunity that was not observed by pre-2020 studies.

This paper frames the inflation-hedging dilemma as a well-researched, testable question. Instead of dealing with multiple asset classes across countries, it isolates two specific, testable questions within the Indian market: (1) does direct residential property hedge inflation, and (2) does listed real estate (REITs) hedge inflation as effectively as direct property.

A third dimension is embedded directly into the test design: because NHB RESIDEX publishes city-level indices, the same regressions are run separately for India's major metros, allowing city-by-city rather than country-by-country comparison. This design is in line with the globally acceptable treatment of real estate valuation and REIT analysis.

2. Literature Review

The Fisher-hypothesis extension by [Fama and Schwert \(1977\)](#) decomposes inflation into an expected

and an unexpected component and further tests the sensitivity of each asset class to both. They find US residential real estate is a proper hedge, while [Bodie \(1976\)](#) finds common stocks are a negative hedge. Subsequent REIT-specific work is of a mixed nature: [Park, Mullineaux, and Chew \(1990\)](#) find REIT returns negatively correlated with expected and unexpected inflation; [Titman and Warga \(1989\)](#) argue REITs behave as "catalysts" that anticipate future inflation rather than react to it; and [Liu, Hartzell, and Hoesli \(1997\)](#), extending the analysis internationally, find listed real estate securities generally move like equities with respect to inflation, unlike the stronger hedging properties of direct property. [Glascock, Lu, and So \(2002\)](#) show REIT returns and inflation are cointegrated in the long run but that the short-run relationship frequently reverses. Most importantly, [Muckenhaupt, Hoesli, and Zhu \(2023\)](#) find that though listed real estate hedges expected inflation sufficiently in calm periods, its hedging ability collapses during turbulent, high-volatility regimes such as 2022-23.

Evidence particular to India is very limited but properly relevant. [Lee \(2021\)](#) applies the Fama-Schwert regression and Johansen cointegration framework to Indian residential property along with China and Russia.

Table 2: Benchmark Empirical Estimates for India — Lee (2021)

Test	Component / Parameter	Estimated Value	Statistical Significance	Interpretation
Short-run Fama-Schwert OLS regression	Expected inflation (beta1)	Negative	Insignificant ($p > 0.05$)	No measurable short-run hedge
Short-run Fama-Schwert OLS regression	Unexpected inflation (beta2)	Negative	Insignificant ($p > 0.05$)	No measurable short-run hedge
Long-run Johansen cointegration test	Fisher coefficient	1.327	Significant ($p < 0.05$)	Property prices rise ~1.3% per 1% rise in the long-run price level (more than one-for-one)
Vector Error Correction Model	Speed-of-adjustment (ECT)	-0.428	Significant ($p < 0.05$)	~43% of deviation from equilibrium closes each quarter

Source: Lee, H. K. N. (2021), *International Real Estate Review*, 24(2), 221-251, India sub-sample (2010Q1-2019Q2).

The study presents two central findings for India: in the short run, the Fama-Schwert regression coefficients on both expected and unexpected inflation are negative and statistically insignificant, meaning Indian residential property showed no measurable short-run inflation hedge over that period; but in the long run, the Johansen cointegration test finds a significant cointegrating relationship with a Fisher coefficient of 1.327 and a significant error-correction coefficient of -0.428. This indicates that inflation leads Indian property prices with a moderate-to-high speed of adjustment.

Supplementing this inflation-hedging literature, two Indian city-level house-price studies establish that RESIDEX-based city indices are heterogeneous enough to justify separate analysis rather than a single national aggregate. Using an ARDL bounds-testing approach on quarterly data for eight major Indian cities (2009Q4-2021Q1), a study by [Bhavsar \(2023\)](#) in the *Journal of Housing and the Built Environment* finds a stable long-run cointegrating relationship among city housing markets. The study also identifies distinct complement and substitute city pairs, implying that inflation-hedging effectiveness need not be uniform across metros. A related study by [Rajesh & Rath \(2023\)](#) documents convergence clubs across Indian cities. Together, this work motivates testing the inflation-hedging hypotheses separately by city rather than assuming a single national coefficient. Testing listed REITs against direct property rather than assuming they hedge identically also makes sense.

3. Research Objectives / Hypotheses

Following the Fama-Schwert decomposition, actual Indian CPI inflation (I) is split into an expected component (EI) and an unexpected component (UI). Real estate returns — direct property index returns and listed REIT returns — are regressed on both components. Two hypothesis pairs are specified:

H1 — Direct residential property vs. inflation (India)

H1(null): Direct residential property returns in India show no statistically significant positive long-run relationship with inflation.

H1(alternate): Direct residential property returns in India show a statistically significant positive long-run relationship with inflation.

H2 — Listed real estate (REITs) vs. direct property (India)

H2(null): Nifty REITs & Realty Index returns show no significant difference in inflation-hedging effectiveness compared to direct property returns.

H2(alternate): Nifty REITs & Realty Index returns show significantly weaker short-run inflation-hedging effectiveness than direct property returns.

A city-level dimension is built directly into the test design: H1 is re-estimated separately for eight major Indian metros using NHB RESIDEX city indices (Mumbai, Delhi-NCR, Bengaluru, Chennai, Pune, Kolkata, Hyderabad, and Ahmedabad). This allows the paper's findings to report whether the accept/reject decision for H1 is uniform across India or varies by metro. This step directly adds to the existing literature by extending the city-heterogeneity findings on Indian housing diffusion to the inflation-hedging question.

4. Research Methodology

Quarterly data are proposed for Q1 2012 - Q4 2024 (52 observations), matching the NHB RESIDEX reporting frequency and capturing both the low-inflation 2012-2019 period and the 2021-2023 inflation shock. Because listed Indian REITs only began trading in April 2019, the REIT sub-sample (H2) covers Q2 2019 - Q4 2024 (23 observations). The analysis is supported with monthly REIT NAV data to increase statistical power.

Table 3: Data Series and Sources for Empirical Testing

Variable	Proxy / Series	Source
Actual inflation (I)	All-India and city-level CPI, quarterly y/y % change	Ministry of Statistics and Programme Implementation (MOSPI)
Expected / unexpected inflation (EI, UI)	ARIMA(1,0,1) fitted value / residual of CPI (Fama-Schwert method)	Derived from MOSPI CPI series
Direct property returns (RD)	NHB RESIDEX, national and city-wise (Mumbai, Delhi-NCR, Bengaluru, Chennai, Pune, Kolkata, Hyderabad, Ahmedabad)	National Housing Bank (residex.nhbonline.org.in)
Listed real estate returns (RL)	Nifty REITs & Realty Index; supplementary NAV series for Embassy Office Parks, Mindspace Business Parks, Brookfield India, Nexus Select Trust	NSE Indices Ltd.; individual REIT trustee reports
Broad equity benchmark	Nifty 50 Total Return Index	NSE Indices Ltd.
Risk-free / expected-inflation proxy	91-day and 364-day Government of India T-bill yield	Reserve Bank of India (RBI) Database on Indian Economy

The Nifty REITs & Realty Index is used as the main proxy for listed real estate because it is the only exchange-traded Indian index that tracks listed REITs alongside real-estate developer stocks with a sufficiently long price history. Since India's pure-REIT trading history begins only in 2019, this broader index is supplemented with individual REIT NAV data to check robustness.

Following [Lee \(2021\)](#) and [Fama and Schwert \(1977\)](#), the short-run Fama-Schwert OLS regression is estimated separately for RD (national and each city) and RL:

$$R(i,t) = \alpha + \beta_1 EI(t) + \beta_2 UI(t) + \text{error}(t), \text{ for } i = D, L$$

H1's short-run component and H2 are tested on the sign and significance of β_1 and β_2 , with a Wald/Chow test comparing coefficients between the RD and RL equations. Second, because Indian CPI and NHB RESIDEX series are integrated of order one (as confirmed by ADF and Phillips-Perron unit-root tests in [Lee, 2021](#)), a Johansen cointegration test and Vector Error Correction Model are applied to test H1's long-run component. This is in line with the same

5. Data Analysis and Interpretation

This section describes the proposed analytical approach and interprets it against the closest available

All price and inflation series will be converted to real (CPI-deflated) terms and log-transformed to stabilise variance before estimation. Missing quarterly values, if any, will be filled using linear interpolation, and every series will be tested for stationarity using ADF and Phillips-Perron tests before regression, following the same preprocessing steps used by [Lee \(2021\)](#).

procedure applied nationally by [Lee \(2021\)](#) and applied across Indian cities methodologically by the ARDL diffusion literature. The error-correction term's coefficient and significance indicate whether inflation leads property prices in the long run, city by city. All returns are converted to real terms before further estimation.

The ARIMA(1,0,1) specification for separating expected and unexpected inflation is adopted because [Lee \(2021\)](#) found it minimised AIC/BIC and passed Ljung-Box residual diagnostics on a comparable CPI series. This order will be re-checked on the 2012-2024 Indian CPI sample using the same diagnostics, and a different ARIMA(p,0,q) order will be used instead if the checks do not support (1,0,1).

Indian benchmark (Table 2), since the regressions themselves have not yet been run on primary data.

Because this design directly replicates a published Indian study, plausible outcomes can be specially benchmarked. At the national level, H1(null) is likely to be rejected in the long run but not necessarily in the short run: [Lee \(2021\)](#) reports an insignificant, negative short-run Fama-Schwert relationship for Indian residential property, but a significant long-run cointegrating Fisher coefficient of 1.327 with an error-correction speed of adjustment of -0.428 (significant at the 5% level).

Extending this 2010-2019 finding through the 2021-2023 inflation shock is itself a meaningful contribution, since India's inflation regime became both higher and more volatile than in [Lee's \(2021\)](#) sample window.

6. Results and Discussion

The results discussed below are benchmarked against [Lee \(2021\)](#) and related literature.

H2(null) is likely to be rejected in the short run: given that Indian REITs are dominated by commercial office assets with long leases and high correlation to the Nifty 50 (a structural feature noted in Indian REIT-performance literature), REIT returns are expected to track broad equity-market inflation surprises rather than direct-property fundamentals, consistent with the international finding that listed real estate behaves like equities in the short run ([Liu et al., 1997](#); [Park et al., 1990](#)). Whether this gap shall exist in the long run is an open question.

With only 23 quarterly observations, the REIT-based long-run tests will have low statistical power and wide confidence intervals, so results from this sub-sample should be read as indicative rather than conclusive. This is a structural limitation of India's REIT market, which only began trading in 2019, and cannot be resolved by extending the current sample period.

The city-level extension of H1 is this paper's primary original contribution. Delhi-NCR, Bengaluru, Chennai, and Pune posted double-digit annual house-price growth in 2024 while Kolkata numbers contracted (Table 1). Given prior evidence of distinct complement/substitute city pairs in Indian housing diffusion, it is reasonable to expect that the long-run Fisher coefficient and error-correction speed may vary

materially by city: some metros may show a stronger-than-national hedge (Fisher coefficient above 1.327), while others may show a weak or insignificant one. These are proposed outcomes to be tested, not results already obtained.

7. Practical / Managerial Implications

The paper's outcome-based contribution is threefold: (i) it extends [Lee's \(2021\)](#) India-only Fama-Schwert and cointegration findings through the more volatile 2021-2023 inflation episode, testing whether the long-run hedge documented for 2010-2019 still holds; (ii) it is the first application of this framework to compare Indian listed REITs against direct property rather than assuming REITs inherit direct property's hedging properties; and (iii) the city-level NHB RESIDEX breakdown produces metro-specific accept/reject decisions rather than a single national verdict. The results, once tested, are intended to directly inform an India-based investor's or advisor's decision to tilt exposure toward direct property, listed REITs, specific metros, or neither.

This "first application" claim is based on the literature reviewed in Section 2 rather than an exhaustive systematic search, and is offered here as being among the first such applications rather than a definitive first.

8. Conclusion

This paper set out to answer two specific questions for the Indian market: does direct residential property hedge inflation, and does listed real estate (REITs) hedge inflation as effectively as direct property. A third, built-in question asked whether the answer to the first is uniform across India or varies by city.

On the first question, the benchmark evidence in Table 2 indicates the answer is conditional on horizon: [Lee's \(2021\)](#) national-level results show no significant short-run hedge but a significant long-run one (Fisher coefficient 1.327), so H1 is expected to be rejected in the long run but not necessarily in the short run.

On the second question, the structural profile of Indian REITs points toward H2 being rejected in the short run, meaning REITs are unlikely to hedge inflation as reliably as direct property over that horizon; whether

this gap closes in the long run remains open given the short REIT sample.

On the third question, the dispersion already visible in Table 1 — Delhi-NCR's double-digit growth against Kolkata's contraction — suggests the national verdict on H1 is unlikely to hold uniformly across metros, making a single country-wide hedging coefficient an incomplete answer for a city-specific investment decision.

9. Limitations of the Study

This paper is a proposed research design; it does not yet include primary regression, cointegration, or VECM results, so all conclusions are anticipated rather than confirmed. The REIT sub-sample is limited to 23 quarterly observations because Indian REITs began trading only in 2019, which restricts the statistical power of long-run REIT tests. NHB RESIDEX, like most appraisal-based property indices, is subject to smoothing bias that may understate short-run volatility. Finally, the "first application" and literature-gap claims are based on the studies reviewed in Section 2 rather than an exhaustive systematic search.

10. Future Research Directions

Future work should carry out the regressions, cointegration tests, and VECM proposed in Section 4 on actual 2012-2024 data to confirm or revise the anticipated findings in this paper. As India's REIT market matures and its trading history lengthens, the REIT sub-sample could be re-tested with greater statistical power. Extending the same city-level framework to commercial real estate or to other inflation-sensitive asset classes, such as gold or equities, in the Indian context would also be a natural next step.

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Author Information

Dr. Adil Jiwani is currently working as Assistant Professor in Department of Management Studies, Nabira Mahavidyalaya, Katol. He is having 17 years of teaching experience. He has authored 3 research papers in Scopus Indexed Journals and 6 research papers in various peer reviewed journals.