Risk Characteristics of Real Estate Investments

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1. <u>Abstract:-</u>

The motivation behind this paper is to reveal insight into the historical backdrop of business property estimations over the previous decade, what's more, to analyze diverse systems for developing business appropriately esteem records and returns arrangement. We inspect three sorts of lists: (i) Indices that endeavor to recreate property business sector values by "unsmoothing" the examination based Russell-NCREIF Index; (ii) Indices that follow normal ex post exchange costs of business property after some time; and (iii) a record in view of unlevering REIT offer costs. By looking at the changed authentic pictures that outcome from the different record development techniques, one additions understanding in to the nature of business property cost and valuation conduct The REIT-based qualities lead alternate records in time yet show more prominent short-run instability. The exchanges based lists fall behind alternate arrangement in time, and are reliable with the thought that institutional financial specialists endeavor to clutch properties until they can offer them for a cost in any event equivalent to the current evaluated quality, in actuality exchanging off liquidity for lessened instability.

2. <u>Introduction:-</u>

Portfolio designations to option ventures have developed drastically as of late. They now speak to a material part of both the normal return and danger of the normal institutional portfolio. Given their illiquid nature, it is, be that as it may, hard to evaluate and support danger of generally option ventures. Incorrect evaluations of dangers inside of these benefit classes may bring about wasteful expansion, problematic portfolio allotments, and inordinate tail hazard exposures. We break down the key danger components that drive land returns and their connection with other unsafe resources. We demonstrate that it is imperative to represent the examination inclination in like manner return files. General we find that land ventures have critical exposures to the value business sector variable, genuine length of time,

credit spreads and liquidity elements. Our examination contrasts private land ventures (center, quality included and astute) with open REITs

3. <u>Why we used this method and how:-</u>

Time Series Analysis of NCREIF Property Index Returns, NPI returns hereafter

The time series characteristics of NPI return series and Fama/French Rm-Rf series are as under

1. Autoregressive processes (AR)
   The first-order autoregressive process, AR (1)
   The AR (2) process
   The general autoregressive process AR (p)
   The partial autocorrelation function

2. Moving average and ARMA processes
   The first-order moving average process, MA(1)
   The MA (q) process
   The MA (1) process and World decomposition
   The ARMA (1, 1) process
   The ARMA (p, q) processes
   The ARMA processes and the sum of stationary processes
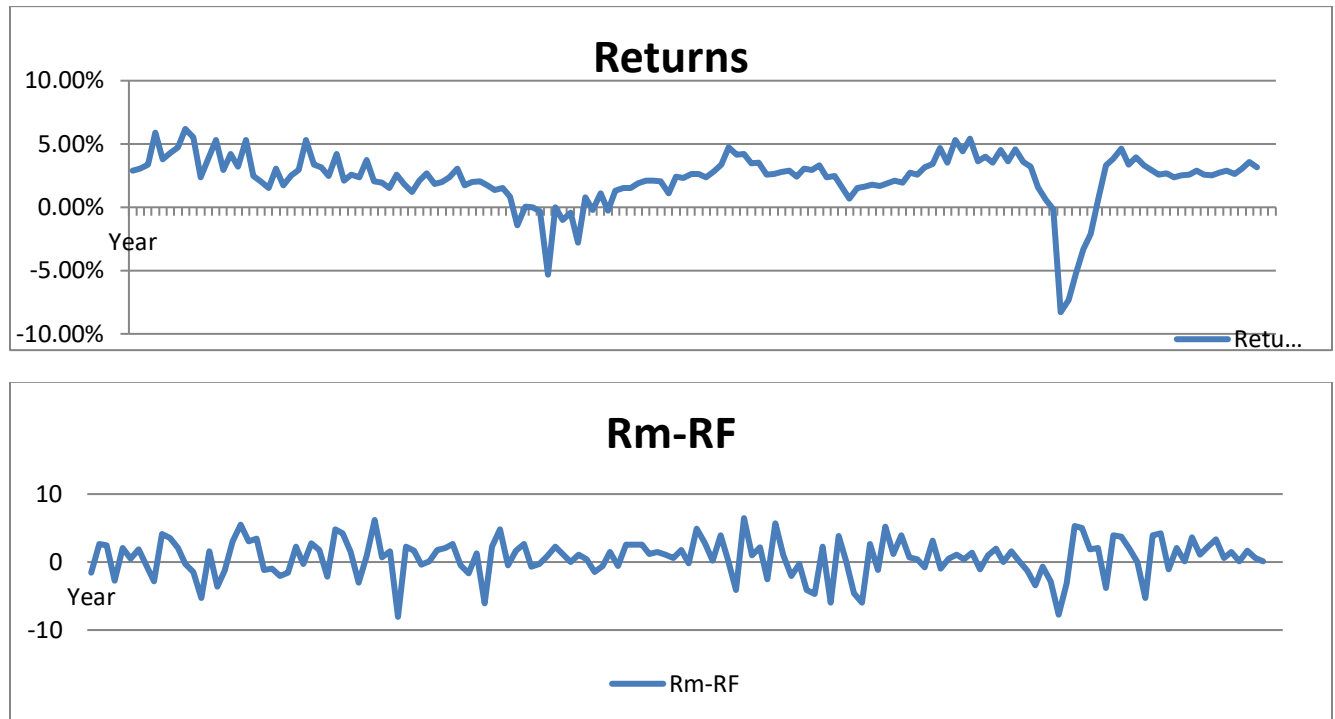
4. <u>Explain all the functions inside the package:-</u>

Autoregressive processes (AR)

To Analyze the NCREIF Property Index Returns, NPI returns hereafter we have taken the data from 1978Q1 to 2015Q1 as per instructions

We analyze the Data and Got the Trends as Follows

5. Example:-

Returns

Rm-RF

R outputs

1.

mean = 0.0226

var=0.00046

Sharpe ratio:NPI-Rf

2.no discernible trend, no seasonal fluctuations, not constant variance, outliers around 2008

3. same

2.

AR(1): ar1coef=0.7775, intercept=0.023

AR(1,4) ar1=.7669, ar4=.3843 intercept=.014

MA(1): ma1coef=0.4958, intercept=0.0227

As here the trend is unsmooth so

A naïve appraisal scheme may be given by

$$y_t = w_0 r_t + (1 - w_0)y_{t-1}, \quad (1)$$

Where Y_t and r_t denote the (observable) appraisal return and (unobservable) economic return1 on private assets, respectively; stands for the confidence level that appraisers have on the most recent information. By recursive substitution, we can express the appraisal returns as

$$y_t = \sum_i^\infty w_0(1 - w_0)^i r_{t-i}.$$
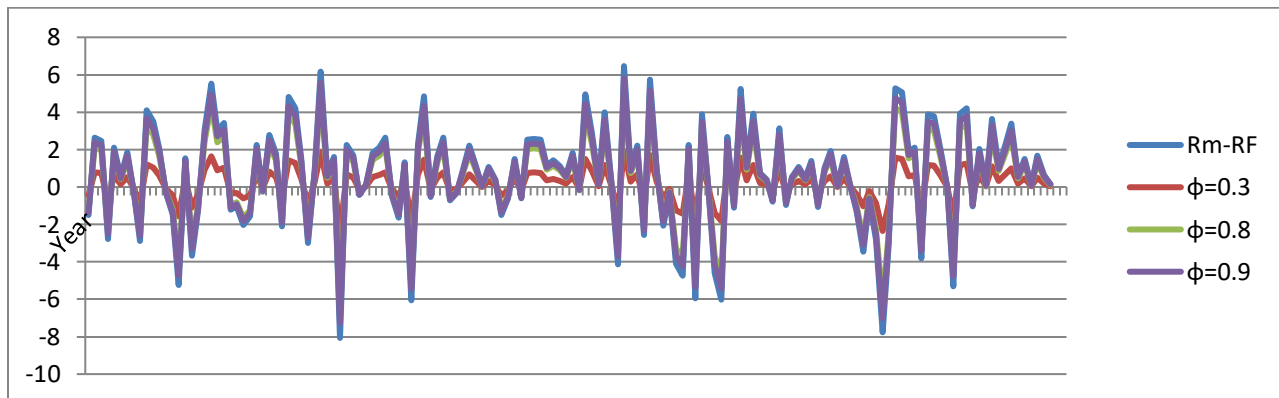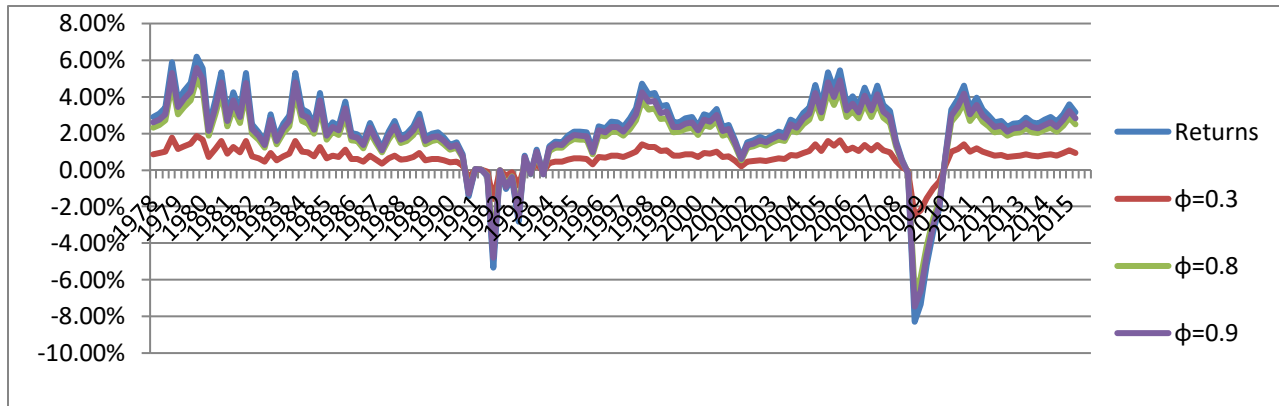
The econometric model of Dimson (1979) generalizes the above appraisal formula as

$$y_t = w_0 r_t + w_1 r_{t-1} + \cdots + w_q r_{t-q}, \quad (2)$$

where $w_i \in (0,1)$ represents the weight at time $t - i$ and $\sum_i^\infty w_i = 1$. If eqn. (2) is invertible, we can

Approximate it as a high order AR (p) model

$$y_t = \phi_1 y_{t-1} - \cdots - \phi_p y_{t-p} + w_0 r_t. \quad (3)$$
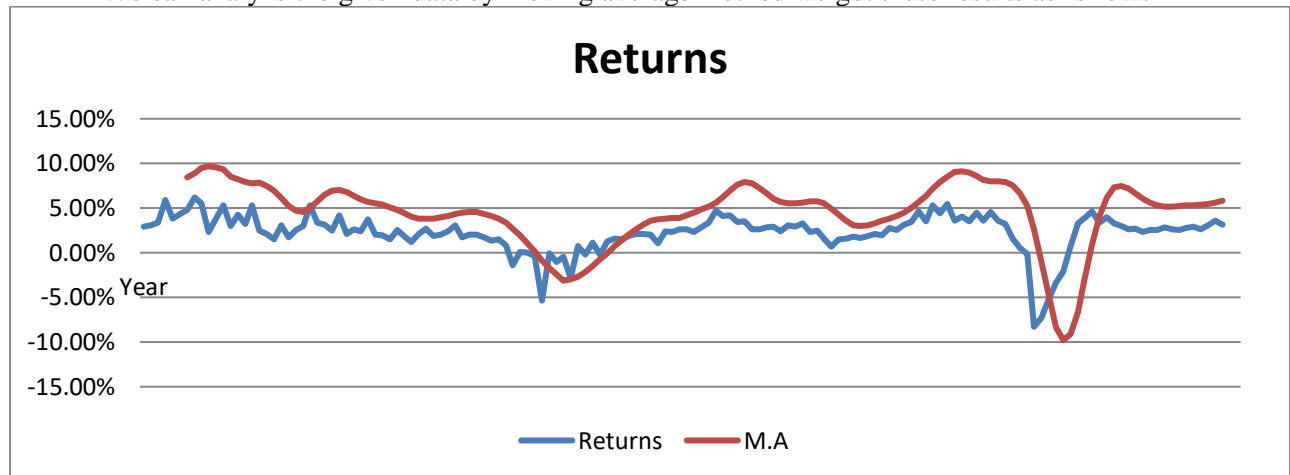
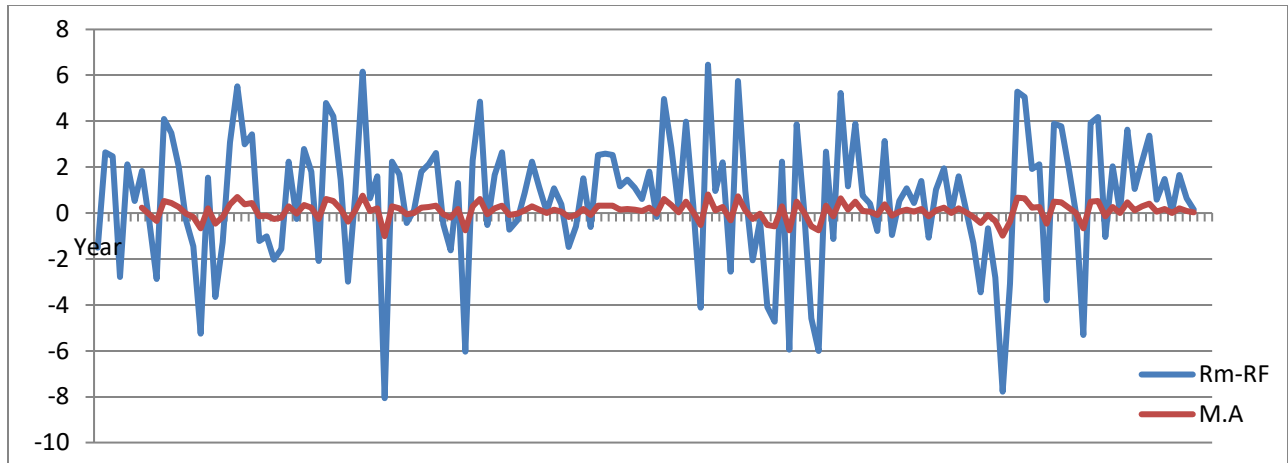Practically approximating eqn. (3) as

$$y_t = \phi_1 y_{t-1} + \phi_4 y_{t-4} + w_0 r_t. \quad (4)$$

6. <u>What the new in this method:-</u>

Moving average and ARMA processes

We can analyze the given data by moving average method we got these results as follows

7. <u>Conclusion</u>:

Unclothing may be seen as a process to retrieve unobservable economic returns (r_t) from observed appraisal returns and a predetermined appraisal models. develops a method to retrieve economic returns from Dimson's model. A simple way to implement their method is as follows:

Fit an MA(q) model2 to appraisal returns

$$y_t = a_t + \hat{\theta}_1 a_{t-1} + \cdots + \hat{\theta}_q a_{t-q}.$$

Re-parameterizing the fitted MA(q) model

$$y_t = \frac{1}{c}ca_t + \frac{\hat{\theta}_1}{c}ca_t + \cdots + \frac{\hat{\theta}_q}{c}ca_t,$$

where $c = 1 + \sum_1^q \hat{\theta}_i$.

Un smoothing is Seen which is as follows

sd of unsmoothed data= 0.0667

3 factors.

for NPI smoothed data.

intercept: -0.030464

Rm-Rf: 0.1909

SMB: 0.0611

HML: 0.2369

Estimate factor loadings

The economic returns on private assets follow

$$r_t - r_f = \alpha + \sum \beta_i f_{it} + e_t. \quad (5)$$

Where f_{it} are fama-french factors in the assignment. Note that we use only monthly returns on the Fama/French website. However, the appraisal returns are only available on a quarter basis. Therefore, you have compound the monthly returns to quarterly returns using

$$(1 + f_{i,s})(1 + f_{i,s-1})(1 + f_{i,s-2}) - 1.$$

In this question, you have to estimate using both the unsmoothed returns in the above question, as well as PIMCO's method (see reference on portal). The steps of PIMCO's method may be summarized as:

$$X_{j,t} = \sum_i^m \hat{w}_i f_{j,t-i}, \forall j.$$

Estimate factor loadings by running the following multiple regression

$$y_t = \alpha + \sum_{j}^{k} \beta_j X_{j,t} + \xi_t.$$

Transformed factors are

for NPI smoothed data.

intercept: -0.030464

Rm-Rf: 0.1909

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HML: 0.2369

References

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